

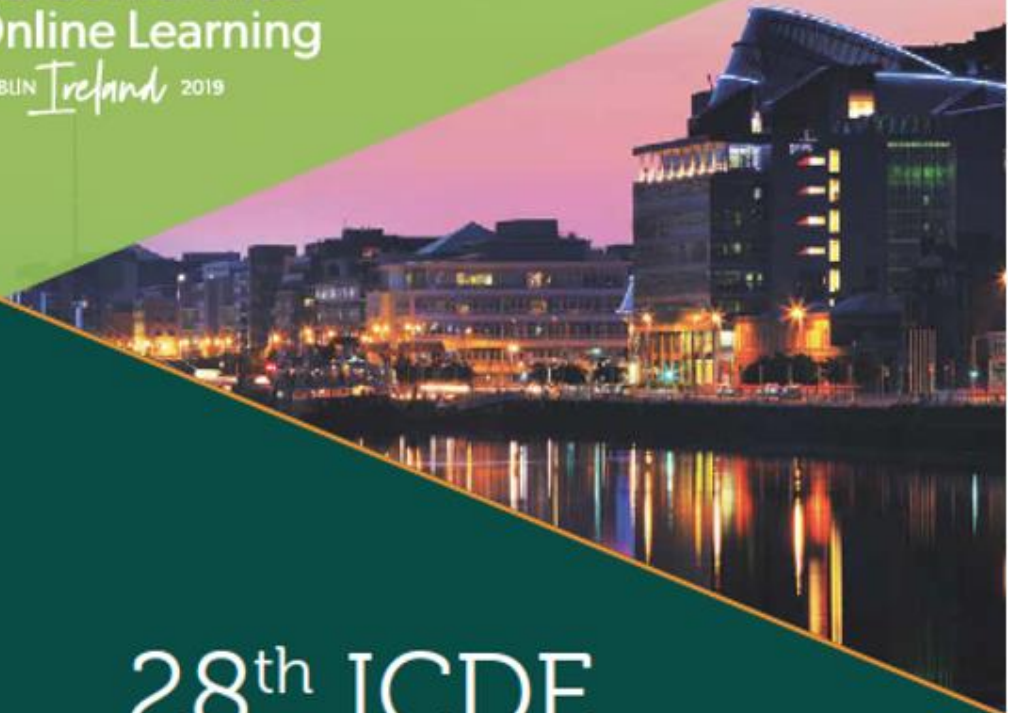


INTERNATIONAL  
COUNCIL FOR OPEN AND  
DISTANCE EDUCATION



# World Conference on Online Learning

DUBLIN *Ireland* 2019



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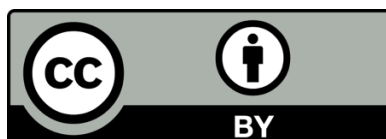


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## INTRODUCTION

The 2019 ICDE World Conference on Online attracted over 800 delegates from more than 80 countries. At the time of the World Conference in November 2019 no one predicted or even considered how the world might change in the space of just a few months to the point where Online Education would become absolutely crucial to our lives in the face of a global pandemic. In the prophetic words of our conference poem, “We no longer stop learning when the darkness gathers”. The pivot to rapidly teach online has forced us to think around corners and fast-track the future. While history teaches us to be wary about making bold claims of the future it is highly probable that "online education" will never be the same again. In many respects, online learning in response to Covid-19 is both a crisis and new opportunity for educators to reimagine education for better futures.

Accordingly, the World Conference theme of *Transforming Lives and Societies* is even more relevant than it was when delegates came together in Dublin. Also still highly relevant is The Dublin Declaration, included in the World Conference Proceedings in both traditional Celtic and a more accessible contemporary font. At the time, The Dublin Declaration sought to tease out and distil some of the key messages that we hope will not get lost in the great onlining of education at the start of the third decade of the 21<sup>st</sup> Century. While online learning is not the panacea that will by itself transform the education system, looking towards a new and better future, traditional face-to-face delivery models can no longer be viewed as the default or baseline of good education and lifelong learning. Our discussions in Dublin renewed the importance of reimagining the art of the possible and the need for growing innovative mindsets in turbulent times.

There is a risk, however, the mainstreaming of online education will promote old 19th Century teaching methods on new 21st Century networks to merely dump large volumes of undigested information down modern digital diameter pipes to relatively passive learners, with no transformative advantage. Beyond the current health crisis, if we want to develop creative, innovative and highly imaginative learners capable to solving tomorrow’s problems today, then we need to value and support these dispositions in those who teach and in our future education systems. Tensions remain, nevertheless, between traditional conceptions of education and the creation of more open cultures of innovation, which anchored in core values and practices serve to unlock the so-called “iron triangle” of widening access to learning whilst enhancing quality and reducing costs. In the post Covid-19 era, questions of who is telling the online learning story, what are they telling and why and who benefits most remain crucial to harnessing the transformative potential of digital technologies in the service of a quality education for all.

Set against a very different and uncertain future, the 2019 World Conference papers are spread across two volumes, with Full Papers appearing in this first volume. All the papers that appear below have undergone an extensive peer review process involving: (i) a review of original abstract proposals, (ii) a review of paper submissions before the conference, and (iii) a post conference review. Unfortunately, the final review process delayed publication of the proceedings. And not all submitted papers passed through the review process, with in some cases the work appearing under another paper category, which you will find in Volume 2. With this formal record of the 2019 World Conference along with many presentations available on the website, we now look forward to your participation in the 2021 ICDE World Conference in Natal, Brazil where we hope to continue discussions of care, equity and social justice for more cohabited, healthy and sustainable societies.

Professor Mark Brown,  
Professor Mairéad Nic Giolla Mhichíl,  
Dr Elaine Beirne,  
Dr Eamon Costello

April 2020



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## CONFERENCE POEM

### Solas an Léinn

Bogann an peann ina ghluais-gluais ar phár, gach scríob, gach stríoc, gach scuís  
Ina chathú do Phangúr Ban, an cat.  
An dúch ag lonrú faoi sholas buí an choinnill  
A phreabann is a thagann is a imíonn i bhfolach sa dorchadas máguaird,  
Cosaint fhánach ag manach ó na táibhsí is ó na scáileanna a líonfadh an dorchadas.  
Mochthitim na hoíche ag fógairt deireadh le léann  
In Aimsir Bhanríon an Gheimhridh, Aimsir Bhéara, í  
Ina gabha fuardorcha -ar nós Danu is a clann.  
Máthair na nDéithe, Cailleach an Fheasa - Samhain a séasúr, oidhreacht Ogma a táin.

Ach ní hamhlaidh inniu teorainn dorcha don léinn,  
Na múrthaí sin ina smionagair roimh na gréasáin leictreonacha  
I ré seo an tsolais.  
Teicneolaíocht an eolais, an léann inár nglac, sinn ar fad, ag cách.  
Díocas is dóchas, deireadh le himeallchríoch oíche,  
Oscailte do chách, cuma aois, saghas ná aicme, gnéas, dúchas, ná cine -  
Tá na ballaí titithe, ar oscailt don ghléine,  
Feadáin dóchais ina dtuilte, ina ngile, ina ndlíí.  
Gaois na n-aoiseanna gan folú gan smachtú gan srian,  
Á scaipeadh go mear tríd an mhearchlár -  
Clíceáil na gcnaipí ina chlagarnach, ina rabharta, ag líonadh an tosta.  
Lugh nua an tSamhraidh chugainn, Bríd Gheal an úirEarraigh, leis.

Inniu, bíonn máthair ag bagairt gach créacht is mífhortún  
'Muna múchtar an gléas sin . . . ' istoíche.  
An scáileán ag lonrú go gléigeal ar leiceann,  
Clibcheab an eolais ó luibhne.  
Athnuachaint, athbheochan, athshaol do gach duine - fear nó bean, óg nó aosta.  
Agus Pangúr Bán, an mac? Gluais-gluaisimid, le chéile. Ar fad.

## Learning in the Light

The pen moves-moves on parchment, every scrape, every mark and squish  
An enticement to Pangur Bán, the cat.  
Ink shining in the yellow candleglow  
That flickers and wickers and hides in the darkness on the edge,  
A weak defence for monks from the shades and spirits that filled the night.  
Early drawing-in of dusk heralding an end to learning.  
They lived in the Time of Winter's Queen, Béara Time  
In her dark and chill smithy - as did Danu and her clan.  
Mother of the Gods, Wise Woman of Samhain Time - she of Ogma's kin.

We no longer stop learning when the darkness gathers,  
Those old webs have crumbled in this era of light.  
In an age of information, learning squats tight in our grasp, within reach of all.  
Enthusiasm, hope - an end to endings,  
Open to all ages, kind or creed, sex, sort or breed.  
The walls are fallen, open to the light,  
Runlets of hope gathered into torrent, into flood, into deluge.  
The wisdom of ages revealed, unsealed, dispersed, no borders,  
Through fleet formulae and functions and click-clack keys  
In a clatter and in a swell, flooding the silence.  
Summer Lugh reborn, and bright Bríd of Spring.

Today, a mother's dire threats of woe and misfortune  
'If you don't leave down that laptop . . .'  
Late, into the dark night, the screen shining out bright against a cheek,  
The tip-tap of knowledge at fingertips.  
Renewing, reviving, re-forming everyone - male and female, young or old.  
And Pangur Bán, the mac? We move-move, all together.

# icde world conference on online learning the dublin declaration - 2019

## Introduction

Set against the backdrop of Samhain, a Celtic tradition dating back thousands of years celebrating the changing of the seasons from light to dark, the 28th ICDE World Conference on Online Learning in Dublin brought together around 800 educators from 80 countries. Over five-days in November in 2019 the World Conference provided a timely opportunity to critique, critically reflect on and celebrate the many and varied facets of online education. Framed by the overarching theme of Transforming Lives and Societies, the discussions in Dublin explored competing powerful change forces and different and contrasting preferred futures for online learning. From a rich tapestry of future discourses in Dublin, the following strands help to tease out and distil some of the key messages.

## 1. Shifting shapes

Online education is not a neat singular shape. There are a variety of forms of online education and greater understanding is still required of the contextual and societal contours and the influence of important cultural factors in supporting learning. Moreover, the boundaries between online, open, digital and traditional models of distance learning have become increasingly blurred—for better and for worse. Therefore, online and off-line education is not a simple quality between good and bad, old and new, public and private – such binary thinking fails to convey the complexity and rapidly shifting forms of online learning and education.

## 2. Shades of Openness

There is a sense in which Openness is the elixir, the new gold standard of education and research. However, openness can be opaque with many different meanings and challenges. A broad spectrum critique of open is continually required, so that a myriad of education and learning futures can emerge. A renewed commitment to open practices and social justice for transformative learning experiences was asserted in Dublin.

## 3. Sharpening the Shoos

Talk of openness also raises controversial questions about business models. Such questions were not avoided in Dublin as the conference explored the evolving nature of the MOOC movement and the influence of commercial forces. But business models are not new and polemic debates do little to advance deeper understandings of how new models of online education might serve to unlock the so-called iron triangle of widening access to education whilst enhancing quality and reducing costs. Governments and policy-makers need to do more to fully harness the potential of online education to promote sustainable business models and implementation that support the goals of life-long learning and education for all.

## 4. Sunsets and Breakingsays

A key theme emerging from Dublin was that traditional face-to-face delivery models should no longer be viewed as the default or baseline of education and lifelong learning. Indeed, new and emerging models of online learning challenge conceptions of good pedagogy—irrespective of when, where and how people choose to study and learn. The continuing development of online education is impacting all delivery models and diminishing the distinction between formal, non-formal and informal learning. This point is evidenced by the strong focus in Dublin on the continued emergence of micro-credentials and their position within the landscape of recognised learning pathways.

## 5. Closing the Gaps

Online learning is not the panacea that will by itself transform the education system. Discussions in Dublin renewed the importance of reimagining the art of the possible and the need for growing mindsets in turbulent times. A consistent theme is the hope that new online technologies will promote more transformative and considered learning experiences remains largely hype and technocentric. The conference highlighted the need for teachers, educational leaders, researchers and policy-makers to embrace and to critique current models of teaching, learning and assessment in context. Tensions remain between traditional conceptions of education and the creation of a culture of innovation. More creative, equitable and critical forms of pedagogy to redefine learning and education are required for the knowledge society and in response to the ecological crisis facing the planet.

## 6. Closing Chasms

The need for balance and disciplined debate to critique online education to expose the challenges, the big questions and indeed its limits were brought to the fore in Dublin in this respect the ICDE World Conference supported rich debate, disagreement and the expression of differing viewpoints. This critique should not simply be rooted in simplistic narratives or comparisons. It requires sophisticated theoretical reasoning and empirical evidence drawn from multiple disciplines to challenge myths, misinformation and half-truths whilst adding to research and to inform transformative practice. Questions of who is telling the online learning story, what are they telling and why and who benefits most remain crucial to harnessing the transformative potential of digital technologies in the service of a quality education for all. In this respect the conversations emerging from Dublin reminds us to also ask whose story is not being told and whose voice is missing or misrepresented?

## 7. Rays of Light

The Dublin Conference was anchored in the Sustainable Development Goals (SDGs), the conversations served to paint a bigger picture of how online education has enormous potential globally to help support and transform lives and societies. With tones and intentions of optimism, realism and activism the ICDE World Conference on Online Learning has left us with the clear message to engage with issues of social justice. It illustrated the importance and necessity of digital presence and participation of indigenous heritage and culture in the networked world to promote diversity and to support context and situated learning experiences. A rich tapestry of cultures and contexts in the online learning space connects learners and does not other their learning experiences. The concept of cohering, challenged the Dublin ICDE conference to renew our commitment to access, to inclusion and to lifelong learning and to reject hegemonic monolithic thinking. Delegates leave Dublin with a clear message for the future that online learning is committed to the values and practices of social justice, equity and ethics in a cohabited, sustainable society.

## Conclusion

At the heart of the ICDE World Conference in Dublin was the message of transformation. The challenge distilled by this declaration for all participants before we meet again in Natal in Brazil is to take ethical, sustainable and transformative actions that go beyond lofty aspirations.

**Professor Mark Brown,  
Professor Máiréad Nic Golla Mhichíl,  
Professor Joe O'Hara,  
Dublin City University**

7<sup>th</sup> November 2019



## The Dublin Declaration

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Online education is not a neat singular shape. There are a variety of forms of online education and greater understanding is still required of the contextual and societal contours and the influence of important cultural factors in supporting learning. Moreover, the boundaries between online, open, digital and traditional models of distance learning have become increasingly blurred—for better and for worse. Therefore, online and off-line education is not a simple duality between good and bad, old and new, public and private - such binary thinking fails to convey the complexity and rapidly shifting forms of online learning and education.

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There is a sense in which *Openness* is the elixir, the new gold standard of education and research. However, openness can be opaque with many different meanings and challenges. A broad spectrum critique of open is continually required, so that a myriad of education and learning futures can emerge. A renewed commitment to open practices and social justice for transformative learning experiences was asserted in Dublin.

#### 3. Sharpening the Shoots

Talk of openness also raises controversial questions about business models. Such questions were not avoided in Dublin as the conference explored the evolving nature of the MOOC movement and the influence of commercial forces. But business models are not new and polemic debates do little to advance deeper understandings of how new models of online education might serve to unlock the so-called iron triangle of widening access to education whilst enhancing quality and reducing costs. Governments and policy-makers need to do more to fully harness the potential of online education to promote sustainable business models and implementation that support the goals of life-long learning and education for all.

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A key theme emerging from Dublin was that traditional face-to-face delivery models should no longer be viewed as the default or baseline of education and lifelong learning. Indeed, new and emerging models of online learning challenge conceptions of good pedagogy—irrespective of when, where and how people choose to study and learn. The continuing development of online education is impacting all delivery models and diminishing the distinction between formal, non-formal and informal learning. This point is evidenced by the strong focus in Dublin on the continued emergence of micro-credentials and their position within the landscape of recognised learning pathways.



## 5. Turning the Tide

Online learning is not the panacea that will by itself transform the education system. Discussions in Dublin renewed the importance of reimagining the art of the possible and the need for growing mindsets in turbulent times. A consistent theme is the hope that new online technologies will promote more transformative and considered learning experiences remains largely hype and technocentric. The conference highlighted the need for teachers, educational leaders, researchers and policy-makers to embrace and to critique current models of teaching, learning and assessment in context. Tensions remain between traditional conceptions of education and the creation of a culture of innovation. More creative, equitable and critical forms of pedagogy to redefine learning and education are required for the knowledge society and in response to the ecological crisis facing the planet.

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Professor Mark Brown,  
Professor Mairéad Nic Giolla Mhichíl,  
Professor Joe O'Hara

7<sup>th</sup> November 2019

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**Professor Joe O'Hara**  
DCU Institute of Education, Dublin City University

**Dr Morten Flate Paulsen**  
ICDE, Secretary General

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**Dr Morten Flate Paulsen**  
ICDE, Secretary General

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**Professor Mairéad Nic Giolla Mhichil**  
Head, Ideas Lab and Senior Research Fellow, National Institute for Digital Learning, Dublin City University

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Ideas Lab, National Institute for Digital Learning

## Social & Cultural Committee

**Caitriona Nic Giolla Mhichil**  
Chair



## If We Knew Then What We Know Now: 15 Years of Data on Improving Online Learning Design

Deb Adair<sup>1</sup>, Kay Shattuck<sup>1</sup>, Barbra Burch<sup>1</sup>, Whitney Zimmerman<sup>2</sup>

<sup>1</sup>Quality Matters, USA

<sup>2</sup>Pennsylvania State University, USA

### Abstract

Quality Matters (QM), an international non-profit organization, has been collecting evaluation data on online courses for 15 years at the time of this writing. These evaluations, conducted in structured 3-team peer reviews by online learning instructors trained to identify evidence and provide collegially critical and helpful feedback, compare the design of courses against a broadly adopted, research-supported standard set (the QM Rubric™). This work has yielded unique longitudinal data about the quality of online courses in the field, how this changed over time, what remains a challenge, and how to improve online course quality. Because these data are generated from the application of Standards that are anchored in educational research, they provide a window into how knowledge generated from research is being practically applied in the online environment. These data are broadly generalizable, as QM supports the full array of higher education institutions by Carnegie classification and has approximately 1,200 institutional or organizational members, including K-12 schools, community colleges, universities, and corporations in the U.S. and 11 countries outside of the U.S. More than 18,000 courses have been reviewed using the QM Standards and more than 9,600 of these were official reviews (using the full QM Rubric) for which data are collected. QM has collected data on quality across different types of course disciplines and levels, pedagogical models, learning platforms, institutions, regions, and countries. Key findings include course design practices that have seen significant improvement and those that remain a challenge. Also examined are the kinds of preparation of courses and faculty that have a positive outcome on the evaluation of quality.

**Keywords:** Quality Matters, Online Learning, Course Design

### Introduction

Quality Matters (QM) has been collecting and examining evaluation data on online courses across the U.S. and beyond for 15 years. This gives QM a unique ability to provide analyses and data-informed discussions about the evolving state of online education. Tracing online course quality data points provides a picture of how online education has changed over time and what is still a challenge, as well as giving data-informed glimpses of how to improve online course quality. QM, established in 2005, is the global organization leading quality assurance in online and innovative digital teaching and learning environments. Quality instructional design of an online course is a foundation for quality assurance from which quality assurance implications for the department, program, and institutional levels stem. The purpose of this paper is to share what has



been observed about higher education online courses from 15 years of closely examining online courses across different levels, disciplines, and pedagogical models. During that time, just over 9,600 official reviews have been conducted at more than 500 organizations, including K-12 schools, community colleges, universities, educational publishers, and corporations. QM members represent the full range of institutions by Carnegie classification, in 49 of 50 U.S. states and 11 countries outside of the U.S. Because the data are generated from the application of Standards that are anchored in education research, they provide a window into how teaching and learning research is being practically implemented in online environments.

#### QM Standards, Rubric, and Integrated Tool Kit

Articulated QM Standards of quality were developed and are continuously reviewed through a rigorous regular research process (see Shattuck, Zimmerman, & Adair, 2014). These Standards and point values, along with Annotations for each standard comprise the QM Rubric™. Standards alone are necessary, yet insufficient to evaluate the quality of a course (see Adair & Shattuck, 2019) without a consistently applied review process (see <https://www.qualitymatters.org/why-quality-matters/process>). The QM Peer Review process is the integrated procedure for evaluating the application of QM Standards. The goal of this process is to evaluate, and improve, the quality of online course design according to a research-informed set of quality standards.

The QM Rubric Standards are applied in every official course review. When a course is officially reviewed using QM Standards, it is evaluated by the same criteria using the same evaluation process as all other courses that are officially QM reviewed. In the QM course review process, quality is certified when a course meets QM Rubric Standards at a level of 85% or above. The QM Certification Mark on a course signifies that the course has undergone QM review and met quality course design standards at a high level. To complete the review, a team of three peer reviewers (PRs), actively teaching online faculty that has received requisite QM professional development is formed. The review team uses the full QM Rubric (including the Specific Review Standards and their point values and Annotations) to review the course according to the appropriate QM Rubric. (See <https://www.qualitymatters.org/qa-resources/rubric-standards>.)

Hallmarks of the QM Peer Review Process are its collaborative and collegial approach for assessing the course against QM Standards and providing detailed feedback to the course developer for improving the course. QM uses a Course Review Management System (CRMS) digital tool for collecting data during an official QM Course Review. Data collected by the CRMS allows QM to see the outcomes of official course reviews and track differences. In the aggregate, these data are used to help QM refine the QM Rubric Standards and Annotations. These data also help QM evaluate how educational organizations implement QM tools and processes and provide guidance for the organizations on their online course design. Information from these analyses is shared with the panel of experts charged with establishing the next edition of the Rubric, adding to the Rubric's rigor. The Standards in the QM Higher Education Rubric have undergone six rigorous research rounds; thus, the current Higher Education Rubric Edition is the Sixth (2018-present) one.

#### **Conceptual and Theoretical Framework**

The diffusion of innovation theory (Rogers, 2003) served as the conceptual framework and instructional design as the theoretical framework for this descriptive research project. The diffusion of QM validated



quality Standards and peer review processes (Shattuck, Zimmerman, & Adair, 2014) was tracked through the number and results of courses submitted for official review by member institutions. The theories of instructional design (Reigeluth & Carr-Chellman, 2009) serve as the baseline for development of the QM Standards of quality of the design of online courses (Shattuck, 2007).

## Research Methods

Following trends for 15 years (the original QM Rubric was released in 2005; see Shattuck, 2007), data have been drawn from official course reviews conducted from the 2006-2007, 2008-2010, 2011-2013, Fifth Edition (2014-2018), and Sixth Edition (2018-present) editions of the QM Higher Education Rubric, for a total of 4,329 reviews. Prior to 2010, data from official course reviews were analysed internally, focusing on each Standard and the percentage of time the Standard was met in courses during official QM reviews. In 2010, Whitney Zimmerman, an independent researcher affiliated with Pennsylvania State University and one of the co-authors of this paper, was engaged to conduct a deeper statistical analysis of the data from QM's official course reviews. Identifying information for the institutions, reviewers, and course developers was removed from the analyses.

As of this writing, four statistical analyses have been completed:

1. 2008-2010 QM Higher Education Rubric (40 Specific Review Standards) - 274 official course reviews included in analysis.
2. 2011-2013 QM Higher Education Rubric (41 Specific Review Standards) - 1,494 official course reviews included in analysis.
3. Fifth Edition QM Higher Education Rubric (2014-2018) (43 Specific Review Standards) - 2,091 official course reviews included in analysis.
4. Sixth Edition QM Higher Education Rubric (42 Specific Review Standards) - 477 official course reviews included in analysis.

The QM Higher Education (QM HE) Rubric, Sixth Edition, contains 42 Specific Review Standards (QMSS) for which each of the three PRs on a review team independently assess the quality of the course design. QMSSs are categorized as Essential (worth 3 points), Very Important (worth 2 points), and Important (worth 1 point). Assessments are binary: if the PR assesses a Standard is met at a level of 85% or above, it is marked as being "met"; if the PR determines a Standard is not at least 85% met, it is marked as being "not met." At least 85% of all of the QMSS (including all of the Essential Standards) must be met for the designation that the course has met QM Standards.

For the overall assessment of the review team to be that a course has met QM Standards, at least two of the three reviewers must have determined the course has done so. In reviewing the course, each PR is required to provide (in a collegial manner) constructive, specific, and measurable feedback to the Course Representative for each Standard Not Met and is encouraged to do the same even for Met Standards. This feedback is aggregated through the CRMS tool by the chair of the review team and provided to the Course Representative – with the individual reviewers' names removed. If the course has not met Standards overall, the Course Representative has the option of amending the course to improve it so that can be Certified as meeting QM Standards.



## Results and Discussion

Each of the six editions of the QM HE Rubric contains the same eight General Standards with associated QMSS. It is those QMSS that are assessed during the structured official review. Applying percentages to the number of courses that meet QM Standards during the initial review revealed a large increase in percentage of courses meeting Standards from the 2008-2010 edition to the 2011-2013 edition of QM HE Rubric. Although institutions were increasingly using the QM Rubric to develop their courses from the start, this percentage increase was unexpected and prompted internal analyses of the QM PR processes to assure consistent application and functioning of the peer preview process. The result was an extensive professional development for PRs and oversight of the QM PR process to assure consistent applications. Results of courses meeting QM Standards during the initial reviews since 2014 have been around the 50%. Unsurprisingly, since the review process intentionally supports continuous improvement, data show that nearly 100% of the courses met standards upon amendment, beginning with the 2011-2013 edition of the QM Higher Education Rubric.

	# of Courses	Initial Review	On Amendment	Not Met/Have Not Yet Met**
2008-2010	274	105 (38%)	131 (48%)	38 (14%)
2011-2013	1,487*	1,051 (70.6%)	394 (26.5%)	42 (2.8%)
Fifth Edition (2014-2018)	2,091	1,146 (54.8%)	866 (41.4%)	79 (3.8%)
Sixth Edition (2018-Present)	477	236 (49.5%)	227 (47.6%)	14 (2.9%)

**Table 1: Percent of Courses Meeting QM Standards**

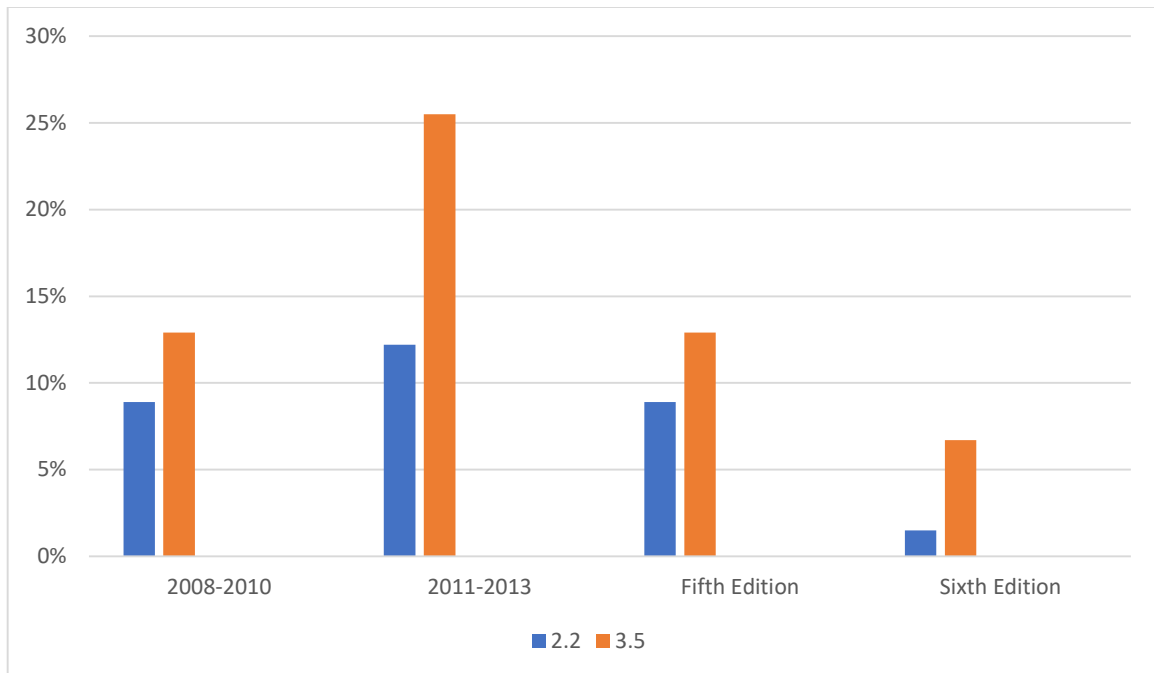
\*Missing data for this analysis brings the number of courses down from 1,494 to 1,487.

\*\*This outcome is as of the time the data was analysed. It is possible that these courses ultimately did meet Standards.

Each QMSS in the QM HE Rubric has an assigned value of Essential (3 points), Very Important (2 points), or Important (1 point) to be assessed by each PR when reviewing a course. The nature of the assessment forces a choice of either “met” or “not met” by each PR based on her or his determination of enough evidence within the design of the course to meet each Standard at an 85% level. The point value is automatically assigned via the CRMS.

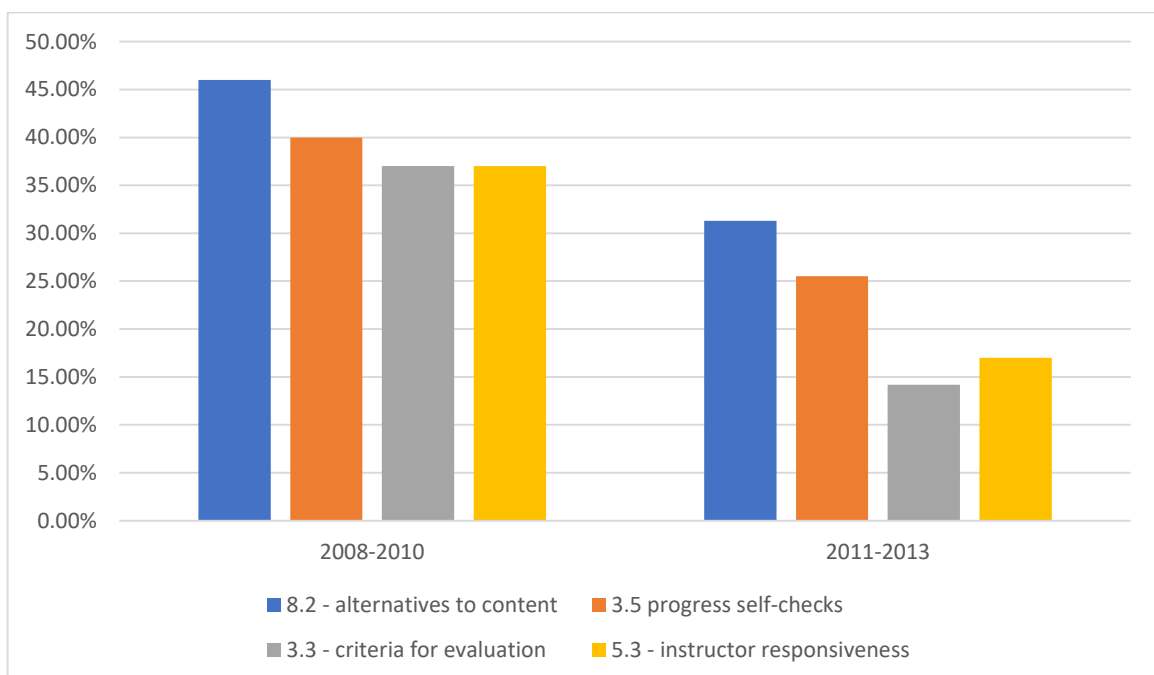
Using the 2006 QM Higher Education Rubric, the most frequently missed Standards in course reviews were:

- Standard 2.2 – The module/unit learning objectives describe outcomes that are measurable and consistent with the course-level objectives, with 44.71% not met on initial review and
- Standard 3.5 – “Self-check” or practice types of assignments are provided for timely student feedback, with 42.35% not met on initial review.



**Figure 1: Most Frequently Missed QM Standards Evolution from 2006**

By the Sixth Edition, Standard 3.5 had evolved to, “The course provides learners with multiple opportunities to track their learning progress with timely feedback,” and both Standards 2.2 and 3.5 had a greatly reduced frequency of not being met – 2% in the case of Standard 2.2 and 6.7% in the case of Standard 3.5. Looking at the most frequently missed Standards from the four data sets 2008-2010, 2011-2013, the Fifth Edition (2014-2018), and the Sixth Edition (2018-present), a positive shift has been made from each version of the Rubric to the next.



**Figure 2: Most Frequently Missed QM Standards Evolution 2008-2010 to 2011-2013**

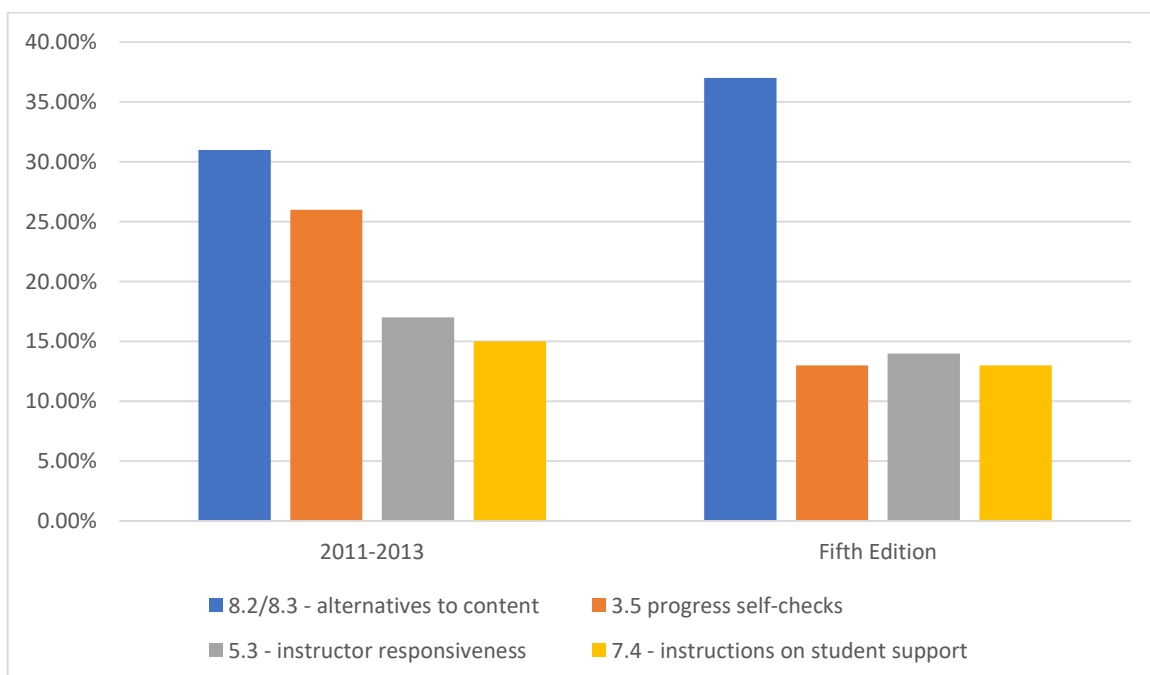


For course reviews that used the 2008-2010 Edition of the Higher Education Rubric, the most frequently missed Standards in the initial review were:

- Standard 8.2 – Course pages and course materials provide equivalent alternatives to auditory and visual content (46%)
- Standard 3.5 – “Self-check” or practice assignments are provided, with timely feedback to students (40%)
- Standard 3.3 – Specific and descriptive criteria are provided for the evaluation of students’ work and participation (37%)  
and
- Standard 5.3 – Clear standards are set for instructor responsiveness and availability (turn-around time for email, grade posting, etc.) (37%)

These same Standards, slightly revised in the 2011-2013 Edition of the Higher Education Rubric, were not missed as frequently. (Note: these are percentages from the final review as the focus of the 2011-2013 analysis was on inter-rater agreement and did not include comparisons between initial reviews and reviews after amendment.):

- Standard 8.2 - The course contains equivalent alternatives to auditory and visual content (31%)
- Standard 3.5 – Students have multiple opportunities to measure their own learning progress (26%)
- Standard 3.3 - Specific and descriptive criteria are provided for the evaluation of students’ work and participation and are tied to the course grading policy (14%)  
and
- Standard 5.3 - The instructor’s plan for classroom response time and feedback on assignments is clearly stated (17%)



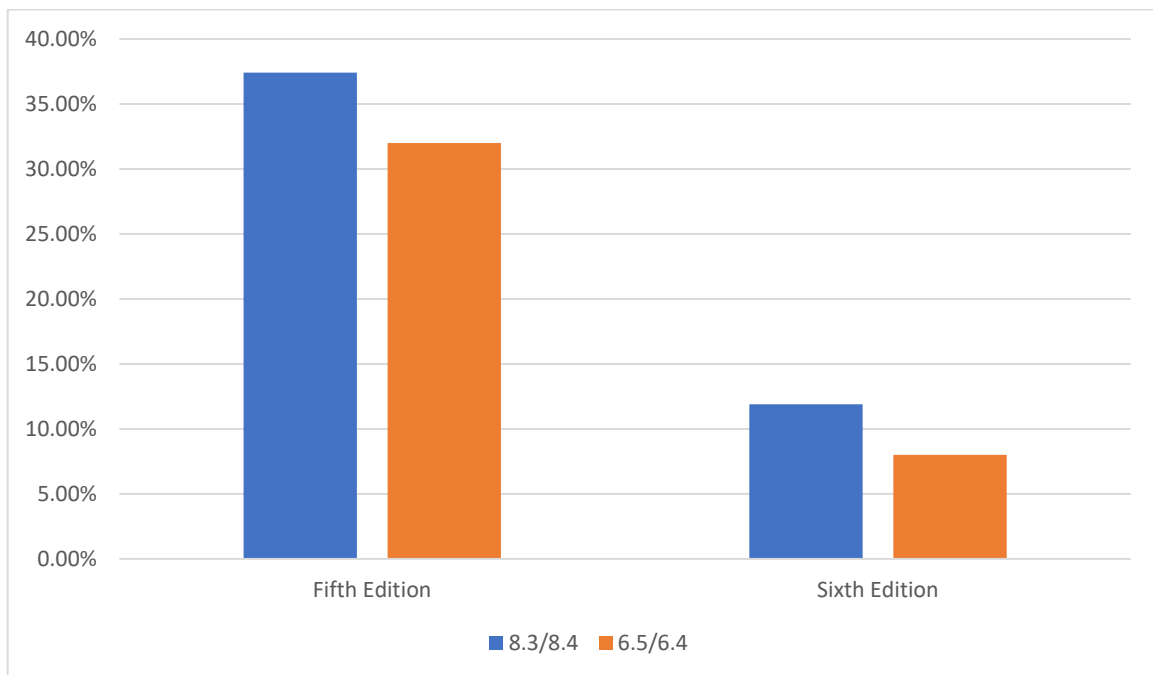
**Figure 3: Most Frequently Missed QM Standards Evolution 2011-2013 to Fifth Edition**





Standard 8.2, 3.5, and 5.3 (with the addition of Standard 7.4 – Course instructions articulate or link to an explanation of how the institution’s student support services can help students succeed and how students can access the services – missed 15% of the time) were the ones that were most frequently missed in course reviews using the 2011-2013. (See above.)

To compare these results to those for the Fifth Edition Rubric, adjustments were made for revisions in the Fifth Edition. In the Fifth Edition, the Standard most similar to 8.2 from 2011-2013 was Standard 8.3, “The course provides alternative means of access to course materials in formats that meet the needs of diverse learners,” which was not met in 37% of reviews. Standard 3.5 was revised to “The course provides learners with multiple activities to track their learning progress,” and was missed on 12.9% of the reviews. Standard 5.3 was consistent across the two editions; for the Fifth Edition, it was not met in 14% of reviews. Standard 7.4 was revised slightly for the Fifth Edition to, “Course instructions articulate or link to an explanation of how the institution’s student services and resources can help learners succeed and how learners can obtain them,” and was missed 13% of the time.



**Figure 4: Most Frequently Missed QM Standards Evolution Fifth Edition to Sixth Edition**

For course reviews using the Fifth Edition (2014-2018), the most frequently missed Standards (in reviews after amendment) were:

- Standard 8.3 – The course provides alternative means of access to course materials in formats that meet the needs of diverse learners (37%)  
and
- Standard 6.5 – Links are provided to privacy policies for all external tools required in the course (32%)

For the Sixth Edition (2018-present), these Standards were revised; Standard 8.3 became Standard 8.4, and Standard 6.5 became Standard 6.4; percentage missed is for initial review:



- Standard 8.4 – The course provides alternative means of access to multimedia content in formats that meet the needs of diverse learners (12%)  
and
- Standard 6.4 – The course provides learners with information on protecting their data and privacy (8%)

### Analysis of Review Performance by Academic Discipline

Deeper analyses of data gathered from QM Course Reviews revealed correlations of academic disciplines of courses voluntarily submitted by member institutions for official QM Reviews. Analysis of performance of courses by academic discipline in the course review process was done for the 2011-2013, Fifth Edition (2014-2018), and Sixth Edition (2018-present) of the QM Higher Education Rubric. Table 2 shows the percentage of courses that met Standards in their initial review, by academic discipline, with a corresponding increase from the 2011-2013 Rubric to the Sixth Edition Rubric.

Discipline*	2011-2013 % and (total reviews)	Fifth Edition (14-18) % and (total reviews)	Sixth Edition (18+) % and (total reviews)
Business	83% (278)	61% (297)	89% (92)
Education	75% (232)	60% (210)	91% (57)
Formal Science	63% (124)	48% (236)	90% (41)
Healthcare	64% (162)	60% (252)	91% (85)
Humanities	64% (203)	48% (360)	73% (66)
Natural Science	56% (75)	47% (141)	75% (16)
Other	71% (125)	64% (271)	87% (38)
Social Science	70% (295)	52% (312)	85% (41)

**Table 2: Percentage of Courses Meeting Standards in Course Reviews, by Discipline**

\*Note: Total reviews is the number of official reviews included in the analysis for each rubric edition

While these analyses do not provide any generalization to the quality of all online courses by academic discipline, they do provide a picture of the evolving nature of courses voluntarily submitted by QM members for official QM review. In earlier years, there was greater variability, and poorer performance, in review outcomes across disciplines compared to the current Sixth Edition Rubric. Although the current edition has been in use only since July of 2018, this finding is likely to persist. QM’s train-the-trainer approach to the professional development it provides to faculty and staff has been instrumental for scaling and institutionalizing the effective dissemination of these quality standards. With the Sixth Edition, the strong performance of online courses across all disciplines suggests that dissemination of improved course design practice is happening more broadly across departments and academic disciplines within institutions.

### Relationship Between Course Developer/Instructor Familiarity with the QM Rubric and Course Review Outcomes

The relationship between the faculty course developer/instructor’s familiarity with the QM Rubric and the outcome of the review, initially and upon amendment, has also been examined. Of note for reviews using



the 2008-2010 Rubric is that courses submitted for review by an individual familiar with the QM Rubric were much more likely to meet Standards on initial review (75.5% versus 34.63%), and these courses were less likely to fall into the unmet category. Analysis of the 2011-2013 reviews showed that 93.3% of individuals who submitted courses for review were familiar with the QM Rubric.

To further explore the relationship between familiarity with the Rubric and review outcomes, analyses were performed for courses reviewed using the Fifth and Sixth Editions of the Rubric based on responses to the following questions asked of the Course Representative at the outset of a course review:

1. Was this course designed specifically to meet QM Standards?
2. Have the course developer(s) received professional development in the application of QM Standards?
3. Was this course pre-reviewed (internally) with QM Standards?

### **Impact of Courses Designed to Meet QM Standards**

For the Fifth Edition, courses that were designed specifically to meet QM Standards scored an average of 0.618 standard deviations higher than those not designed specifically to meet QM Standards on the initial review and 0.222 standard deviations higher upon amendment. They were 69.9% more likely to meet standards on initial review. For the Sixth Edition, courses that were designed specifically to meet QM Standards actually did meet them on initial review 85.2% of the time compared to courses that were not designed to meet QM Standards actually meeting them 67% of the time.

### **Impact of QM Professional Development**

For the Fifth Edition, 13.8% of the courses reviewed had no course developer(s) with professional development in the application of QM Standards, while 25.1% of the courses had some course developers with professional development, and 61.1% of the courses had all courses developers with professional development in the application of QM Standards. Initial review scores were highest when all course developers had received professional development and lowest when none of them had. Further, the likelihood of a course meeting Standards in the initial review was higher when some or all course developers had professional development than when none of them had it.

Turning to courses reviewed using the Sixth Edition, 5% of the courses had no course developer(s) with professional development in the application of QM Standards, while 25% of the courses had some course developers with professional development, and 70% of the courses had all course developers with professional development in the application of the QM Standards. Initial review scores were highest (average of 92.68 points out of 100) when all course developers had completed related professional development and lowest when no course developers had completed it (average of 80.04 points out of 100).



## Impact of Pre-Review

For the Fifth Edition, courses that had been pre-reviewed prior to the official review scored an average of 0.530 standard deviations higher in their initial review and 0.214 standard deviations higher upon amendment than did courses that were not pre-reviewed. Pre-reviewed courses were 1.424 times more likely to meet Standards in their initial review than courses that were not pre-reviewed. Analysis for the Sixth Edition course reviews shows that courses that had been pre-reviewed scored an average of 92.68 in the initial review versus an average score of 85.86 for courses that had not been pre-reviewed. Perhaps more meaningful is that 52.9% of the courses that were pre-reviewed met standards in the initial review, compared to only 36.6% of courses that had not been pre-reviewed.

## Conclusion

The analysis of longitudinal data from QM's CRMS provides a unique window into how online learning courses have evolved as measured by the diffusion of application of the QM Rubric and official peer reviews. More than 18,000 courses have been reviewed using the QM Standards, and more than 9,600 of these were official reviews. Courses for QM reviews are selected voluntarily by member institutions to undergo a consistently applied peer review process based on validated Standards of quality. An important, even critical, feature of the QM Rubric is its evolution over time to increase the clarity of the expectations of quality in course design and to continually increase these expectations over time. For example, the number of Essential Standards in the Rubric has increased over the editions from 14 to 23 and Standards are often refined over time to address research-supported educational practices in deeper ways.

The increasing rigor in the Rubric editions may have impacted the variation seen in the percentages of courses meeting the Standards in the initial review. The trends, however, show a positive movement towards improved course design with the most frequently missed Standards in one Rubric edition being met more frequently in subsequent Rubric editions. The analysis supports the fact that broader adoption and dissemination of the Standards within institutions, demonstrated in part by the increasing use of professional development training and internal, informal, pre-reviews from 2008 to the current Sixth Edition Rubric, have had positive impacts on courses design quality (higher percentages meeting QM Standards). Additionally, the trend can be observed with the expansion of academic disciplines in online courses being voluntarily submitted for official QM Reviews and the percentage of the courses within each discipline area meeting QM Standards.

The longitudinal data captured in the QM course review process clearly shows the advancement of quality in online courses over the last ten to fifteen years. The state of the art in online course design, at least for those institutions participating in the QM review process, has improved over the breadth of academic discipline areas. The data suggests this improvement is related to the increased participation in professional development related to course design and in the preparation institutions engage in prior to evaluation of course quality. Data collection and analysis will continue for course reviews using current and future editions of the QM Rubric to determine why and how course design quality changes over time.



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## Online Student Workload: Perceptions of Workload and Actual Self-Log of Study Time at the Open University of Japan

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### Abstract

At the Open University of Japan (OUJ), a 35-year-old distance education university that has been using television and radio broadcasting as the main instructional delivery system, full online course offering is still quite new among students as it was only started in 2016. There is still confusion among both students and faculty members as they lack common understandings in terms of what is the appropriate course load in designing and implementing a full online course. The regulations by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) loosely state that one credit should comprise 45 hours of study. In reality, if a university course of one credit actually requires 45 hours of a student's time in completing it, it may be considered as too demanding by the average university student. In fact, a regular broadcasting OUJ course consists of 15 45-minute broadcast lecture programs (television or radio) and one 300-page textbook to comprise two credits. A student can earn two credits for the course by passing the final exam held at study centres across the country. The final exams usually consist of 10-15 multiple choice questions though a small percentage of courses have essay questions. Student workload is not really accounted for when watching or listening to the broadcast lecture programs or reading the textbook as long as they pass the final exam. However, when it comes to online courses, students face a totally different reality. Online courses are being offered using a learning management system, Moodle, where every action of a student is in a sense accounted for. Instead of giving a one-time on-site exam to earn credit(s), full online courses tend to give students formative assessment throughout the duration of a course: hence, a higher chance of earning credits if the student regularly logs in and complete the assignments in time. The expectation of student workload in online courses can be very different from that in broadcast courses. In this study, data were collected regarding perception of workload from students who took at least one online course in Fall 2018. The study will become the basis for further study to collect self-report log data as well from students who are taking an online course(s), using our newly developed app called "manapi-log.

**Keywords:** Distance Education, Online Education, Student Workload, Course Load, Online Courses, Formative Assessment

### Introduction

Online learning is becoming an integral part of open and distance education. The Open University of Japan (OUJ) is a 35-year-old single-mode open and distance education university which has been using television and radio broadcasting as the main instructional delivery system. Even today, over-the-air broadcasting is



still a dominant mode of instructional delivery as the Japanese name of OIJ, *Hoso Daigaku*, literally means “broadcasting university”. At OIJ, in addition to over 3,000 face-to-face classes that are being managed and offered at 50 study centres across Japan in the academic year of 2019, 344 courses (165 via television and 179 via radio) are offered through broadcasting, and 48 courses are offered online. All the 344 courses that are broadcast via television or radio are also made available online so that students can watch or listen to the lectures at their convenience.

Full online courses were started in the academic year of 2016 at OIJ. In the academic year of 2015, two courses were started as partial online courses. They were considered as partial online courses as they still required for students to take on-site exams to complete the courses. The full online courses don’t require students to make any physical visit to an OIJ facility to complete the courses. For this reason, those are considered to be a totally new model of instruction at OIJ in which formative assessment has become an integral part, while traditional broadcast courses require summative assessment in the form of final exams. One online course consists of eight units if it bears one credit or 15 units for two credits, while one broadcast course consists of 15 45-minute lecture programs in addition to an approximately 300-page textbook for two credits.

In the 35-year history of OIJ, as for the broadcasting courses, the length of content is pretty much fixed and unchanged, as the broadcasting time is fixed, and the number of channels has not really changed though the advancement of compression technologies has started to allow multiplexing of three standard definition television channels in one high definition television channel. Faculty members have worked with editors to publish textbooks, and with producers and directors to produce television or radio programs in a fixed schedule which usually spans two years. In other words, for 35 years, the methods and processes of making broadcasting courses have not changed.

When full online courses began to be considered among faculty members in 2014, there was confusion and lengthy debates over the appropriate length of content and appropriate study activities for students. Among faculty members of OIJ, the content usually refers to the video lecture and the notion of 15 45-minute video lecture was also considered for the online courses. For formative assessment, online quizzes are placed at the end of each lecture, and discussion forums are placed in some courses. The instructional design varied course by course and it was difficult for faculty members to reach a consensus in terms of the appropriate amount of content and learning activities for an online course. The only guideline they can resort to is the one put forth by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) which states that a course of one credit should require 45 hours of studying. This guideline should apply to any course regardless of the medium of instruction; however, in reality it is questionable that there is any course that actually requires 45 hours of studying to earn one credit as the course may be considered too burdensome for students.

In designing a new online course from scratch, it is important that student workload needs to be considered as being not very different from that of traditional courses that students are accustomed to. If online courses are too demanding in comparison to traditional courses, then some students may shy away from them. On the other hand, if online courses are considered too easy for students, they may run the risk of not meeting the standards set forth by MEXT.



This study attempts to find out students' perception of workload and satisfaction of online courses in comparison with broadcasting courses that OJ has traditionally been offering.

## Methods

A survey questionnaire was designed and developed to assess the following:

- 1) the motivation to register for the online course(s);
- 2) the perception of workload of each of the activities (i.e., watching lecture videos, reading materials, taking quizzes, participating in forums, and writing reports) in the online course(s);
- 3) the perception of workload of online courses in comparison to that of broadcasting courses;
- 4) the perceived difficulty of taking online courses in comparison to that of broadcasting courses;
- 5) the level of engagement of taking online courses in comparison to that of broadcasting courses;
- 6) the level of satisfaction of online courses in comparison to that of broadcasting courses; and
- 7) how strongly the student would recommend the online course(s) to his/her friends.

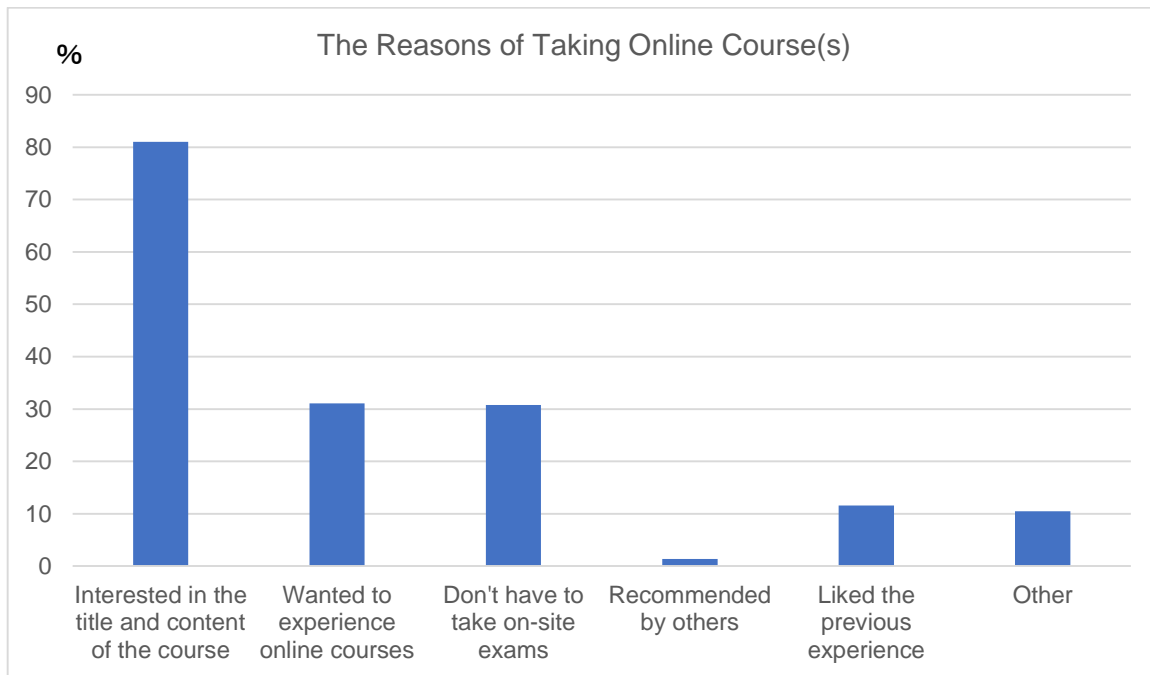
For those who took more than one online course in the semester, the question item 2) was repeated to cover up to three online courses. In addition to the above questions that are related to the online course(s), demographic questions were also asked to identify student's registration status (i.e., full-time undergraduate, part-time undergraduate, course-only undergraduate, full-time graduate, part-time graduate, or course-only graduate), gender, age group, occupation, and the affiliated study center.

The questionnaire was created online using REAS (Realtime Evaluation Assistance System) developed inhouse in 2006. An email message invitation to participate in the survey was sent to all students (a total of 5343 email addresses) in March 2019, who had registered for at least one online course in the second semester of the academic year of 2018. As these email addresses are the ones given by the university when the students have registered for a course at OJ for the first time and may not be the ones students check regularly, another invitation message was sent to the second email addresses if students provided one in the student registration system. The second invitation message was sent to a total of 4941 addresses after one week of sending the initial invitation.

## Results

A total of 939 people responded (the response rate of 17.6%) to the online survey. Among the respondents, 70% (n=658) are full-time undergraduate students and 7% (n=73) are full-time graduate students. The multiple-response question asking the reason(s) for taking the online course(s), as shown in Figure 1, show 81% of respondents (n=758) said they were interested in the title and content of the course; 31% (n=293) said they wanted to experience OJ online courses; and 30% (n=283) said they don't have to take the on-site final exam(s) at the study centers.





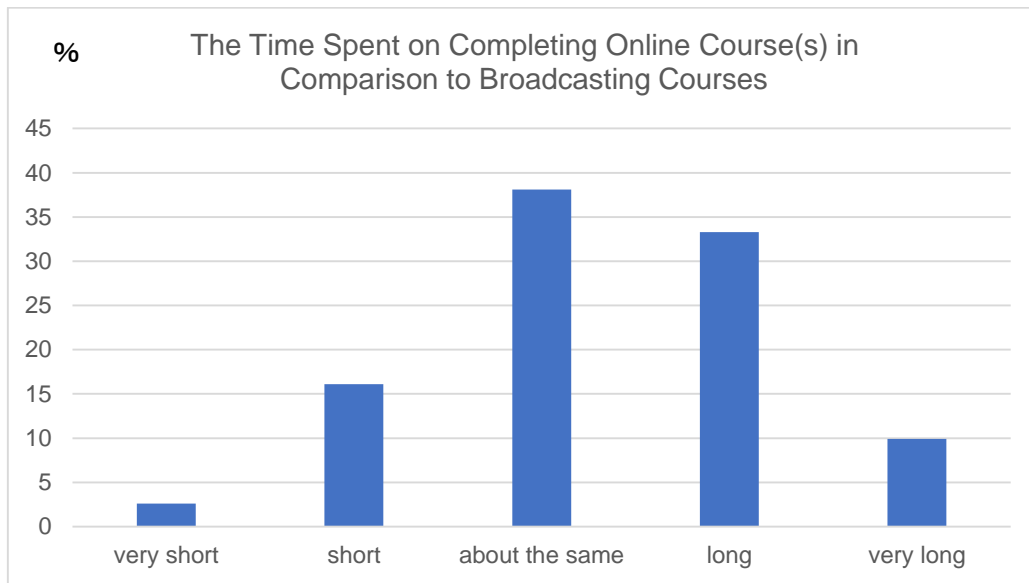
**Figure 1: The Reason for Taking Online Course(s)**

With regards to the number of online courses they registered for in the second semester of 2018, 69% of the respondents (n=651) took only one course; 20% (n=191) took two courses; and 9% (n=89) took more than two courses.

Regarding perceptions of workload, excluding those who answered not applicable, over 60% of the respondents answered the workload was as expected across all the different activities (61.2% for lecture videos, 65.2% for reading materials, 61.8% for quizzes, 69.5% for discussions, and 64% for reports.)

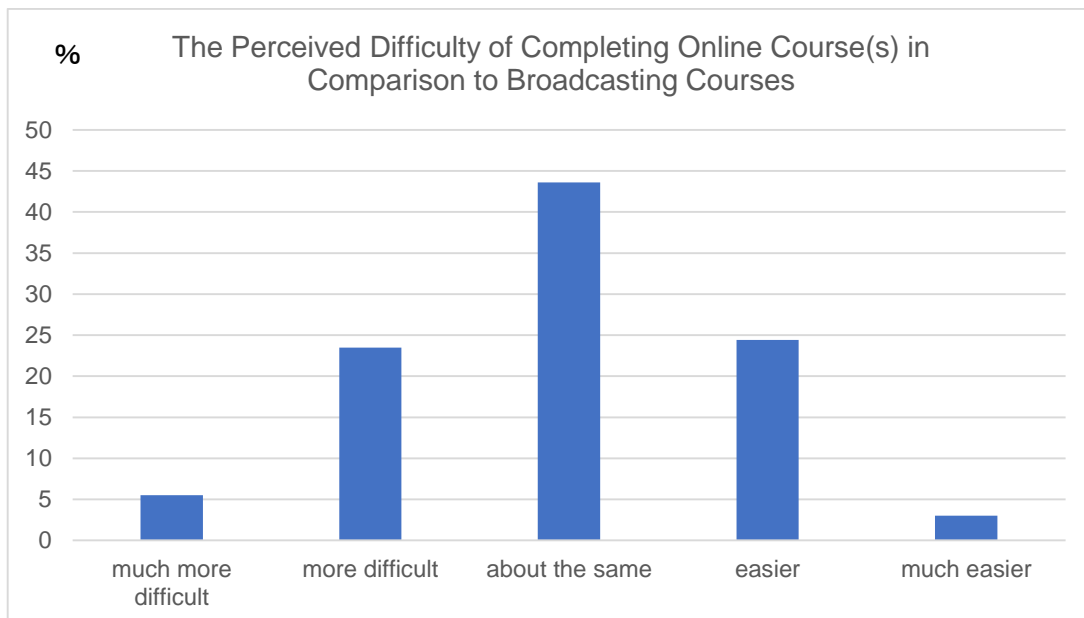
Open-ended responses indicate that students are satisfied overall with the workload of online courses though a few indicated that the videos tended to be unnecessarily long and the workload is too heavy for one-credit courses. Several students mentioned that it had taken more hours than expected in writing reports, but they also mentioned that they learned a lot in doing so. Many respondents mentioned that reading other students' postings had given them other perspectives that were useful.

Among all the respondents, 87% (n=801) have taken broadcasting courses in the past, and among those who have taken broadcasting courses, 38% (n=308) replied that they had spent about the same amount of time on online course(s) in comparison to the broadcasting courses. 33% (n=266) spent more time than they had in broadcasting courses as shown in Figure 2. The open-ended responses indicate that the amount of time spent may not be much different, but they spend a big chunk of time before the final exam for broadcasting courses while they tend to spend time more constantly throughout the semester for online courses as online courses have quizzes and reports that are interspersed through the course of study.



**Figure 2: Time Spent on Completing Online Course(s) in Comparison to Broadcasting Courses**

As for the perceived difficulty of online courses in comparison to broadcasting courses, as shown in Figure 3, 43% (n=349) replied that it's about the same as that of broadcasting courses; and 24% (n=197) said it was easier while 23% (n=184) said it was more difficult. In the open-ended responses, some mentioned that the level of difficulty is not different, but the degree of cumbersomeness and the level of engagement required differ. Overall, respondents state that online courses are more demanding in terms of information gathering and thinking rather than memorizing but they feel they've learned more deeply.

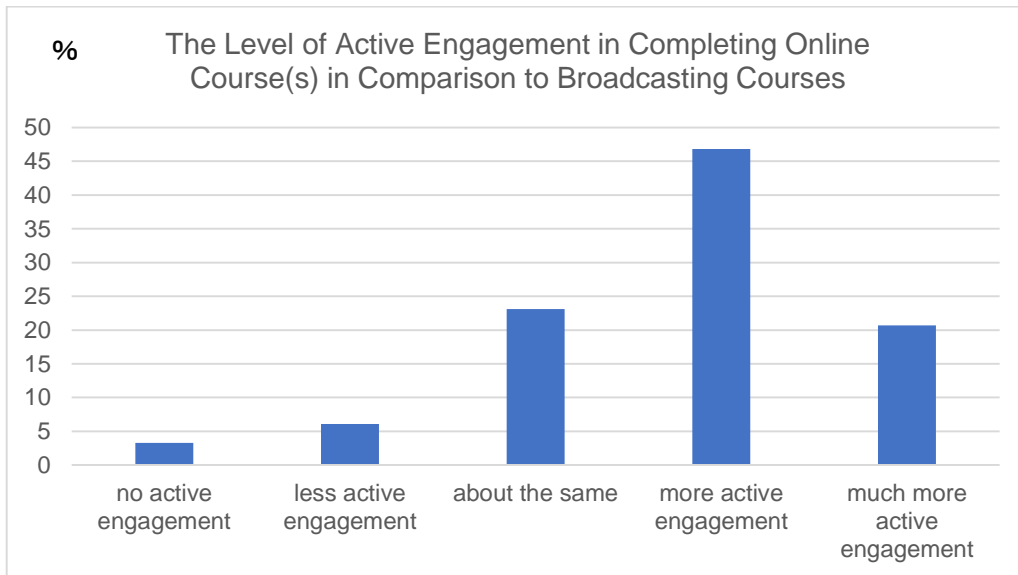


**Figure 3: The Perceived Difficulty in Completing Online Course(s) in Comparison to Broadcasting Courses**

Regarding the level of active engagement in comparison to broadcasting courses, 46% of respondents (n=373) said they could learn in online courses more actively than broadcasting courses and 20% (n=162) said much more actively while 23% (n=188) said the level of active learning is about the same between online and

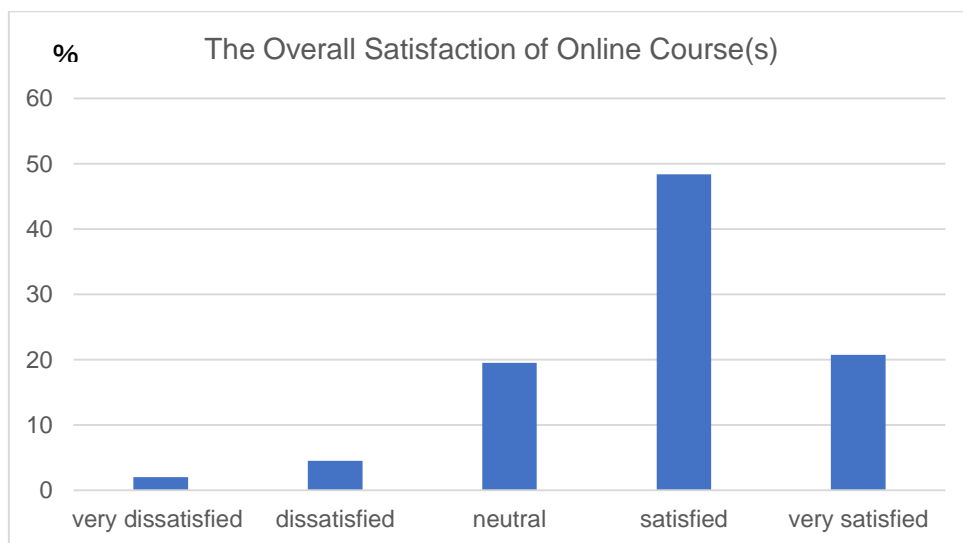


broadcasting courses as shown in Figure 4. The open-ended responses indicate that the design of online courses necessitate them to learn actively and the multiple deadlines help them to actively plan the study. Some of them also mention that writing reports make them think more actively and deeply and reading other students' responses widen their perspectives.

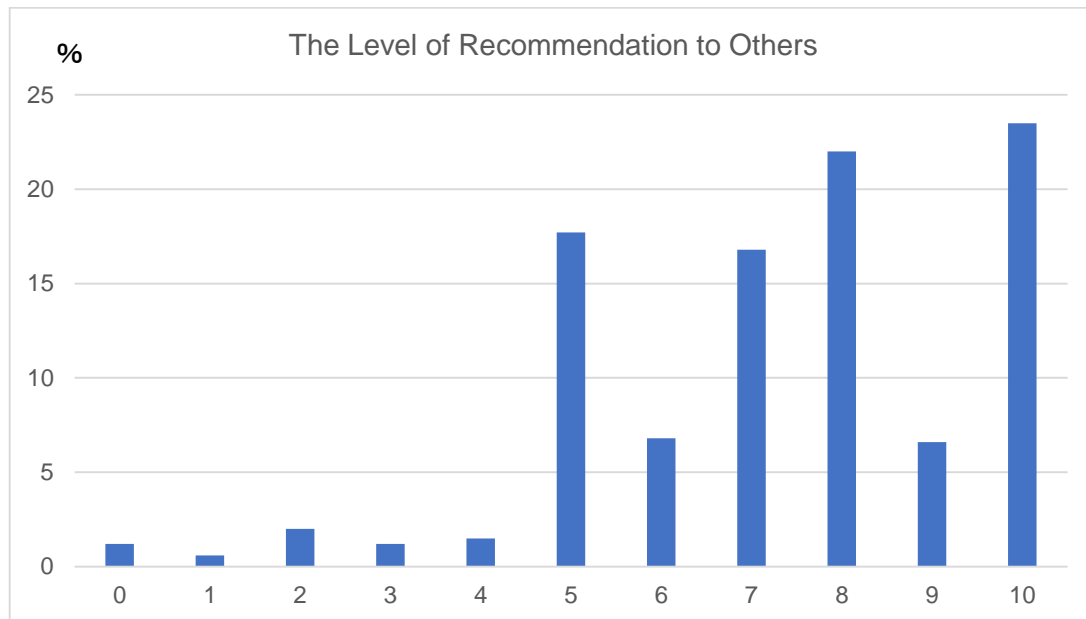


**Figure 4: The Level of Active Engagement in Completing Online Course(s) in Comparison to Broadcasting Course(s)**

As for the overall satisfaction of online courses, 48.4% (n=472) said they are satisfied and 25.6% (n=250) very satisfied as shown in Figure 5. In other words, 74% of respondents indicated as being satisfied with online courses. Another item asked respondents how strongly they would recommend online courses to other students with the rating from 0 to 10; 0 being "would not recommend at all" and 10 being "would strongly recommend". The mean is 7.31 and the distribution of the responses is shown in the Figure 6.



**Figure 5: The Overall Satisfaction of Online Course(s)**



**Figure 6: The Level of Recommendation to Others**

The strongest motivational factor that affects the overall satisfaction of the online course experience seems to be the fact that students do not have to take on-site exams at study centers. The independent samples *t*-test shows that the difference of satisfaction level is significant at  $p < .0001$  between those who marked the non-existence of the final on-site exam as one of the reasons to take online course(s) ( $m = 4.06$ ) and those who did not ( $m = 3.84$ ). The level of recommendation to others also shows a significant difference ( $p < .0001$ ) between those who marked the non-existence of the final on-site exam as one of the reasons to take online course(s) ( $m = 7.79$ ) and those who did not ( $m = 7.10$ ).

As for the relationship between the overall satisfaction and the study load of each activity (i.e., lecture videos, reading materials, quizzes, discussions and reports), lecture videos and reading materials are statistically significantly related (in both cases  $r_t = -.069$ ,  $p < .05$ ). When it comes to the level of recommendation, lecture videos and reports are statistically significantly related ( $r_t = -.085$ ,  $p < .01$  for lecture videos and  $r_t = -.111$ ,  $p < .01$  for reports). In other words, shorter than expected lecture videos and reading materials tend to lead to students' overall satisfaction, while shorter than expected lecture videos and reports that are less laborious than expected tend to contribute to the higher recommendation to other students.

In terms of demographic variables affecting overall satisfaction of online courses or the level of recommendation, gender and age do not have a statistically significant influence. However, it is notable that the types of occupation seemed to have statistically significant influence as shown in Table 1 and Table 2. The students who classify themselves as house-keepers or self-employed tend to show a higher satisfaction and a higher level of recommendation than others. It may be due to the fact that house-keepers and self-employed tend to have more flexible time they can allocate to the coursework than others; therefore, they tend to be under less time constraint and feel more satisfied.



Measure		Sum of Squares	d.f.	Mean Square	F	Sig. of F
Overall Satisfaction	Between Groups	16.998	8	2.125	2.682	.006
	Within Groups	759.713	959	.792		
	Total	776.711	967			
Level of Recommendation to Others	Between Groups	69.285	8	8.661	1.754	.082
	Within Groups	4735.615	959	4.938		
	Total	4804.900	967			

Table 1: One-Way Analysis of Variance for Overall Satisfaction and Level of Recommendation

		N	Mean	SD
Overall Satisfaction	Education/Research	65	3.77	.948
	Government	131	3.86	.990
	Company	278	3.91	.853
	Self-employed	83	4.06	.902
	Agriculture	5	3.60	1.673
	Healthcare	74	3.85	.734
	Homemaking	72	4.31	.725
	Part-time	101	3.91	.873
	Others	159	3.81	.949
	Total	968	3.91	.896
Level of Recommendation to Others	Education/Research	65	6.82	2.263
	Government	131	7.25	2.241
	Company	278	7.38	2.086
	Self-employed	83	7.54	2.103
	Agriculture	5	7.00	4.243
	Healthcare	74	7.15	2.137
	Homemaking	72	8.06	1.935
	Part-time	101	7.13	2.436
	Others	159	7.21	2.417
	Total	968	7.32	2.229

Table 2: Occupation

It may be commonsensical to assume that those who are satisfied with the experience of online courses will take online courses again and the data from this study also show that. For those students who indicate that they will take another online course in the next semester, the overall satisfaction ( $M=3.99$ ,  $SD=.878$ ) and the



level of recommendation to others ( $M=7.65$ ,  $SD=2.12$ ) were statistically significantly higher ( $p<.005$ ) than those who indicate that they will not take another in the next semester ( $M=3.82$ ,  $SD=.914$  for the overall satisfaction; and  $M=6.95$ ,  $SD=2.281$  for the level of recommendation to others). Though the question was intended to identify those who would take at least one online course in the subsequent semester, so that we could contact the students for further participation in the study, and some respondents might have an intention to take another online course in the future, not the immediately following semester, it's believed that the question should have captured the intention to retake an online course in the future.

## Conclusion

This study showed that the workload to complete an online course was not very different from what the students originally anticipated, although it was hypothesized that the students who took an online course might have encountered an unexpectedly heavy workload. Even in comparison to the broadcasting courses, the students seemed to have perceived the workload of online courses not much heavier though it could vary depending on the particular course. Overall the satisfaction of online courses is high, especially for those who value the flexibility of assessment; in other words, not having to come to one pre-determined physical place at a pre-determined date and time for final exams.

As the next step to the data collection via online questionnaire reported in this paper, we are currently conducting a panel study in which students who are actually signed up for at least one online course are asked to continuously log the time they spend for each activities in an online course throughout the semester using the mobile app developed for this particular purpose. Eighty-two students are participating in the study and we should be able to see the actual time spent on activities in completing an online course.

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## The Production of Open Educational Resources as an Alternative for Training Volunteer Health Workers in Rural Communities in Tanzania

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### Abstract

Producing Open Educational Resources (OERs) is a method to disseminate open and online knowledge, whether in formal or informal education, through open licensing, which allows the sharing and elaboration of derivative works. This is the educational resources logic of development used by the Laboratory of Technological Innovation in Health, at Federal University of Rio Grande do Norte, in partnership with the Ministry of Health of Brazil, to promote training courses for workers in the unified Brazilian health system, SUS, available in the virtual learning platform, AVASUS, also developed by the Laboratory. When a Brazilian who performs community work in Tanzania found AVASUS in seeking alternatives that could improve health conditions in the rural communities in which he works, he asked for permission to translate a course of community health workers into Swahili, a language spoken in some African countries, from which the Laboratory decided to investigate whether it was only a case of translation or whether it would be necessary to produce a new derived resource. Noting the UN 2030 Agenda, specifically Sustainable Development Goal 4, ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all; and 17, strengthening the means of implementation and revitalizing the global partnership for development, this paper describes the process of developing a course for community health volunteers in rural locations in Tanzania, which required adapting the work methodology used in Brazil to meet the reality of Tanzania, respecting political, social, cultural and health specificities. It was concluded that a local team would be required to record videos directly in the Swahili language, due to the lack of literacy of the population in general, and the involvement of communities as actors in the simulations, portraying the environment in which they live and also strengthening the need to promote health among the people. Communication, local health systems, concepts of basic hygiene, first aid, among other topics were discussed. The translation of the OERs into Portuguese and into English will make it possible to achieve an even greater reach of resources, by means of a technical cooperation work based on the exchange of knowledge, technologies, mainly information and communication ones, and experiences, through actions that stimulate access to innovation and education to contribute to the promotion of Sustainable Development Goals around the world.

**Key Words:** open educational resources, lifelong learning, ICT, distance education, health education, south-south cooperation.



## Introduction

Education is a fundamental human right and a transformative process of many other aspects of an individual's life. And with the advent of information and communication technologies, an important ally in both formal and informal education is Distance Education. Through this method we can think of classrooms in which teacher and student do not need to be neither at the same moment of time nor in the same geographic space.

The new learning methodologies are useful in realities such as those of Brazil. The country has extensive territorial dimensions and a public health system composed in December 2018 by 2,862,351 professionals (Cadastro Nacional de Estabelecimentos de Saúde, 2019). They are linked to what was called, in 1988, as SUS, the Unified Health System of Brazil, a national medical service network that serves the entire population free of charge, without distinction, with cases from low to high complexity (Souza, 2002). The Brazilian Ministry of Health has the challenge of designing permanent education strategies for these professionals, who need training in the areas in which they work, including updates on concepts they studied at the time of formal education and on new events that could cause health injuries.

One of these strategies was, through the Term of Decentralized Execution 66/2015, to design a research project with the Federal University of Rio Grande do Norte that could develop, among other things, large-scale training processes, support in virtual environments of learning and learning objects that promote permanent health education directed at SUS workers. From this, the Laboratory of Technological Innovation in Health, LAIS, with the collaboration of the Secretariat of Distance Education of the university, SEDIS, developed the AVASUS, a Virtual Learning Environment that houses MOOCs, open and free distance courses that provide Open Educational Resources for the promotion of lifelong learning for students and professionals of the health area and for the population in general (Araújo, 2017).

The basic structure of the courses that compose AVASUS is Open Educational Resources arranged in media such as e-books, videos, animations, games, interactive HTMLs, infographics, comics and others. The content is thought by teachers and professionals who work in the health service, that is, they know the reality that needs to be taught to the public. And the adaptation of this content for media is done by a team of LAIS and SEDIS with expertise in the production of dynamic and interactive teaching materials. The graduates of the courses receive certification for each completed educational module.

AVASUS was the virtual environment that Rafael Silva chose to train on community health issues and enrich volunteer work he does in the city of Morogoro, Tanzania. Rafael is a Brazilian missionary linked to the non-governmental organization YWAM, Youth with a Mission, which promotes activities for prevention and protection of minors at risk, support and recovery of dependents and, mainly, community development, which is the focus of work in countries of Africa.

Rafael found the "Introductory Course for Community Health Agent", which aims to enable people of any formation to develop actions of health promotion and disease prevention. The profession of community agent is regulated in Brazil, but not in Tanzania. Even so, Rafael believed that the content could be useful and





wrote to the contact e-mail available on the platform asking if he could translate the course to Swahili and thus empower local residents with regard to health care.

Given that the needs experienced in Tanzania differ from those presented in Brazil, the group of researchers in the areas of health care, internationalization, education and communication of LAIS decided to send a small team to carry out an on-site mission and verify if a translation actually would be enough or if something else could be done.

This decision is in line with the trajectory of national and international technical cooperation established by LAIS, as well as the alignment of the university with the UN 2030 Agenda and its Sustainable Development Goals. In this case, specifically health, education and international technical cooperation (SDG 3, 4 and 17, respectively).

About three years ago, LAIS has been expanding the scope of its activities in the field of international cooperation, incorporating principles and guidelines for technical cooperation among developing countries and South-South cooperation, as contemplated in Brazilian foreign policy and in international actions of the Ministry of Health. According to such foreign policy, technical cooperation and South-South cooperation initiatives are understood as the horizontal exchange of knowledge and experience originated in cooperating developing countries. They bring the idea of sharing lessons learned and successful practices generated and tested to meet challenges in similar realities. They can also be tools that foster development, promote human and institutional empowerment and lead to structural changes in the socioeconomic reality of the countries for which they are intended, always on a non-commercial basis (Brasil, 2017).

Experience with a Tanzanian community has in itself provided the opportunity to analyze the actions of LAIS as an agent of international technical cooperation, as executor of education and communication in health, but mainly as a Laboratory open to learning and incorporation of new knowledge to improve its innovation agenda in order to support Brazil and any other countries in the reach of SDGs. The Incheon Declaration brings South-South cooperation as an important element of international development cooperation, stating that "due to their increasing importance, their particularities and history, South-South cooperation should be seen as an expression of peoples and countries of the South, based on their experiences and shared goals" (UNESCO, 2016, p. 35). This was the objective of the Laboratory, to share experiences and knowledge to promote development.

What the team composed of three of the authors of this article found in the mission to Tanzania, which occurred in October 2018, was a reality of 70 to 80% of the country's population living in rural areas with no access to basic services such as health, education, water and sanitation. It should be noted that Tanzania is one of the poorest countries in the world, with a per capita GDP of US \$ 3,200 in 2017, placing it at the 193rd position among all the countries associated with the United Nations.

In this context, LAIS decided not only to translate the "Introductory Course for Community Health Agent", but to make a derivation of the original material to produce a course for community health volunteers in rural locations in Tanzania, respecting political, social, cultural and health specificities. This production would involve planning the necessary content and organizing a new mission with a team that would record videos in the Swahili language with doctors and the local population. Videos because writing is not a common reality.



And the Swahili language for being the predominant one in the country. English is the second official language, but the Swahili itself is not unanimous among the speakers: there are over 100 different languages in the various communities and tribes that make up the Tanzanian ethnic mesh.

This paper intends to describe the necessary steps for the production of the course for community health volunteers in rural locations in Tanzania, in order to contribute to the sharing of a methodology for the production of Open Educational Resources in international cooperation. There is no information of previous work dealing with the issue of OERs production at this level of collaboration and adaptation to the local reality of an African country. Thus, it is hoped that the research will stimulate and inform other initiatives of institutions interested in the exchange of knowledge, information and communication technologies and experiences that bring them closer to the SDGs of 2030 Agenda.

Open Educational Resources as alternatives so that no one is left behind: the commitment to education and the global partnership for sustainable development

The 2015 World Education Forum, held in Incheon, South Korea, was an important milestone for the global commitment to sustainable education goals. From the forum emerged the document that became known as the Incheon Declaration for Education 2030. The Declaration is a commitment among nations to 2030 Agenda and the Sustainable Development Goals, proposing measures and strategies to transform lives through education in the following 15 years. This commitment becomes clear when talking about a "holistic, daring and ambitious" education agenda that "will not leave anyone behind" (UNESCO, 2016, p. iii), highlighting SDG 4, "Ensuring inclusive and equitable quality education, and promoting lifelong learning opportunities for all" (United Nations, 2015, p. 19), in addition to its associated goals.

The concept of lifelong learning, by the way, guides the Action Framework for Education 2030 contained in the Incheon Declaration. It is clear that countries need to offer flexible learning opportunities through non-formal ways and with the help of information and communication technologies (UNESCO, 2016). It is understood that lifelong learning is rooted in the integration of learning and living, covering learning activities for people of all ages (children, young people, adults and the elderly, girls and boys, women and men) in all life-wide contexts (family, school, community, workplace and so on) and through a variety of modalities (formal, non-formal and informal) which together meet a wide range of learning needs and demands (UIL, n.d., p.2).

Thus, the Brazilian Ministry of Health's initiative with LAIS and SEDIS to promote lifelong learning to health professionals, teachers and students, in addition to the general population, through the AVASUS platform, is in line with the global commitment to education for 2030. AVASUS is not only a technical cooperation instrument for the Brazilian policy of management, education and health work, but also an area of international technical cooperation for achieving the SDGs both by Brazil and by any other country and / or citizen that benefit from its use. This is because it is the duty of states to invest in innovative initiatives that enable the whole population to have access to quality education, especially those whose situations are more difficult to achieve (UNESCO, 2016).



In the field of social sciences, cooperation denotes common action aimed at achieving goals desired by all stakeholders (Coser, 1987). At the international level, the term cooperation is revealed in interinstitutional relations between governments, and between them and international organizations and / or other non-governmental organizations, transnational networks, among others.

Over the years international cooperation has been explored in various objects in the field of international relations, political sciences and anthropology. But after the creation of the United Nations system, precisely after the Second World War, the concept was heavily influenced by the development of war-torn countries and around what was called the International Development Cooperation or CID. The CID brought in itself the notion of verticality of relations, where developed countries were responsible for making efforts for the development of those in a worse situation. In this line, cooperation was confused with external aid.

Already since the 1970s, the decolonization of African countries and the criticisms of developing countries in the United Nations system raised the general feeling that all countries have what to teach and what to learn and that relations between countries could be horizontal. From then on, the CID began to contemplate the term Technical Cooperation among Developing Countries and further South-South cooperation, or between countries of the geopolitical South (Almeida, Lima & Marcondes, 2015). At the end of the 1980s, with the creation of the Brazilian Cooperation Agency of the Ministry of Foreign Affairs, these terms became part of Brazilian foreign policy planning and were consequently internalized in the different national sectors, including health (Lima, 2017).

Health, education and international cooperation are the focus of the relationship between the Federal University of Rio Grande do Norte and the Tanzania missionary group. Not by chance, three of the 17 Sustainable Development Goals of 2030 Agenda established by the United Nations: SDG 3, "Ensuring a healthy life and promoting well-being for all, at all ages" (United Nations, 2015, p. 18), SDG 4, "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (p. 19), and SDG 17, "Strengthening the means of implementation and revitalizing the global partnership for sustainable development" (p. 28).

Only with resilient and efficient educational systems we can think of sustainable development, eradication of poverty, and health promotion, especially in neglected sub-sectors and low-income countries with conflict or emergency situations. These are the places with the big gaps in education. The Incheon Declaration itself, in establishing strategic approaches for SDG 4 to be achieved, recommends "Providing distance education, ICT training and access to appropriate technologies and infrastructure necessary to facilitate a learning environment at home as well as in conflicts and remote areas" (UNESCO, 2016, p. 19-20), e "books, other educational materials, open access educational resources and technologies that are non-discriminatory, conducive to learning and student-friendly, context-specific, cost-effective and available to all students - children, youth and adults" (p. 11).

These aspects were considered by LAIS in the decision to produce the course for community health volunteer in rural locations in Tanzania. The use of distance education and, consequently, learning objects to impart basic knowledge of health promotion actions is strategic to raise the public's attention on these subjects. According to Menezes and Braga (2015), learning objects would be reusable components or elements in



educational contexts, cataloged and made available on the internet for reuse in education, as images, audios, videos, animations, simulations, hypertexts, softwares, among others.

One of the categories of learning objects is Open Educational Resources (OERs), that have the characteristic of being reused and readapted so that this knowledge is extended to reach a great number of students (Santana, Rossini, & Pretto, 2012). The OERs must obey the four Rs to be recognized as an open content, which are reuse (right to make a copy of that content), reprint (right to adapt or change it), remix (combine it with others to create a new one) and redistribution (distribute copies, changes or remixes that were made from it).

All contents available on the AVASUS platform are OERs and licensed under Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0), which permits copying and redistribution in any medium or format, as well as remix, transformation and creation from material to any purpose, even a commercial one. With regard to assignment, it is necessary to give appropriate credit, provide a link to the license and indicate changes, if they are made. Even knowing the license, Rafael Silva chose to request permission from the university to translate the content into the Swahili language. And if he had not done so, perhaps this work of international cooperation would not have been materialized.

In order to achieve the results of this research, we sought to map the Open Educational Resource process of production fruit from the international cooperation between LAIS and the Tanzania missionary group. Then, through a descriptive methodology, the steps and requirements necessary for the execution of the project will be presented, in order to propose possible innovative, replicable and transferable practices (UNESCO, 2016) to other members interested in producing OERs via international partnerships.

### **Challenges to empower community health volunteers in rural locations in Tanzania**

LAIS and SEDIS, together, have developed a production methodology of didactic materials which has been worked on and improved for about four years. This methodology includes the participation of specialized professionals who work daily in health practice and write technical content, and an interdisciplinary team composed of pedagogues, instructional designers, grammar and proofreaders of publishing, illustrators, designers, programmers, camera operators, animators, presenters, announcers, art and creative directors, audio and video editors that transform static content in living languages (Araújo, 2017). The media reflect references common to students' daily lives, which are immersed in entertainment formats such as streaming services, TV series, social media, games, interactive and graphic resources. In order for the OERs to be implemented on the AVASUS platform, the material must comply with a validated and pre-established flow. However, the methodology of the work had to be adapted so that the international cooperation work that is the object of this research materialized, due to the innumerable variables.

### **The design of the course**

After finding the need to produce a new OER from the “Introductory Course for Community Health Agent”, initially LAIS promoted the contact between the author of the original course and Rafael Silva, who would make the adjustments to the reality of Tanzania along with two local doctors and physiotherapists who serve



in Morogoro-based international programs. The exchange of experiences contributed to the initial process of content planning.

From then on, the Tanzanian team made the pedagogical planning of the entire course, with the advice of the Brazilian researchers, dividing it into thematic units and listing the learning priorities for the population of the rural communities. According to Haidt (2004), pedagogical planning has the function of: 1) trying to anticipate the difficulties that may arise in the course; 2) avoid the routine and mechanical reproduction of classes; 3) to adapt the work to the available media and the characteristics of the students; (4) to adapt content, pedagogical strategies and evaluations to the teaching and learning objectives of the course; and 5) ensure adequate distribution of work in relation to the duration of the course. At this stage, the contact was still fully established in Portuguese, because it was the common language between the Brazilians and the missionary Rafael Silva.

There was a total of ten topics, which addressed concepts around local health systems, hygiene, first aid, communication and the importance of community health volunteers in rural communities. It is worth noting that this definition was made based on the work experience of the local professionals, from the contact with the populations and their greater needs and deficiencies. Habits, customs, traditions and political, religious, economic and cultural specificities were also considered, so that the public could identify with the material that would have contact.

One of the derivations of this direction was the decision to present the content in videos. The choice of this media is justified mainly by pedagogical reasons: due to the low literacy level of the target communities of the course, its application should be through a simple, visual, easily assimilated media and clearly presenting elements that dialogue with their daily lives and culture. It was also decided to include the two doctors as presenters of the course, speaking in Swahili, the most widely spoken language in the country, understood by the majority of the population. The image of the qualified professional to transmit the information was pointed out as fundamental to the success of the course. It was identified as fundamental the presence of a translator in the process of production of the course, due to the need to follow the speeches in Swahili during the recordings to verify if what was being said corresponded to what was in the script.

The next step was to think about a timetable for the second LAIS mission in Tanzania. This mission would consist of recording and pre-editing all videos. This included the presentation of the content by doctors, support images and simulations in local communities and tribes, which should consider the time of travel to these localities. We must remember the rural character of the Tanzanian people, which meant that all the routes to the places chosen as recording scenarios were always long. The two teams then drew up a ten-day travel schedule, including the 30-hour flights between Brazil and Tanzania and the transfer of the capital Dar Es Salaam to the town of Morogoro, which was about 185 km. The pre-edition with the translator, which would consist of organizing all the conducting speeches of the contents, dividing them by units, would make it feasible to complement the videos with auxiliary images after the mission. If this step had not been planned, the editor would not be able to make cuts and adjustments to a material in the Swahili language alone in Brazil. All the time available should be maximized as possible.

## The execution

In January 2019, three researchers landed in Tanzania, one who had been on the first mission and two others who joined the second. One of them was responsible for the general direction and one of the cameras, the second for the direction of scene and the other camera and the third one acted like instructional designer, producer and continuist. There were many challenges. Tanzanian doctors had never been in front of cameras, and an introductory training on posture and speech techniques was necessary before the first scenes of each, which gave a slower recording pace in the early days. The filming began in the morning and continued uninterrupted until just before the end of the afternoon, because it would be necessary to return to the city still with the clear sky due to the precarious accesses of the roads. There was no electricity to recharge batteries and to design large lighting indoors. The strong sun characteristic of the region contributed to the quality of the light captured, but it was also necessary to buy wires, lamps and plugs in the local commerce to produce manually luminaires that aided in the capture of the scenes. A vehicle power inverter was used connected to the van of missionary Rafael Silva, who was transporting the team.



**Figure 1 – Tanzanian doctors presenting video content**

It was up to the instructional designer to supervise all the scenes, making sure the script was being fulfilled in its entirety. The marking was done by means of clapperboard and a printed guide that contained the speeches in Swahili and the correspondence in Portuguese. She worked with the translator, a university student of Mozambican nationality who spoke Portuguese, English and Swahili. Without the presence of the translator, the work would not be able to happen. At various times he identified inconsistencies in speech, errors in content sequencing, and even possibilities to better explore the performance of doctors on the scene over the course of recording days. The young man showed interest in the area of production of video materials and joined the Brazilian technical team on his own, helping also in capturing the audio. This eventually remedied the deficiency caused by a loss of equipment that did not arrive in time for the recordings due to a failure of the airline and also marked the exchange of knowledge between the teams.



**Figure 2 – Translator working with a doctor and the instructional designer during the recordings**

It was highlighted the involvement of communities and tribes in capturing scenes for the course. Residents themselves acted in simulations of burns, fractures and fainting, contributing to illustrate the material with local reality. It was noted the residents' satisfaction to belong to the work and to feel useful to contribute with an education project for their people.



**Figure 3 – Tanzanian community residents simulating a fainting scene**

The capture of audio, as well as the video, was constantly checked by the directors, because any mistake or absence could not be fixed after the return to Brazil. It was only possible to define scenographic plans, frames, sequences, techniques for capturing audio and moving the camera throughout the recordings, taking full advantage of the possibilities offered by the environment. One example was the use of large African trees as natural filters of strong sun light.



**Figure 4 – Brazilian team filming a scene in a Tanzanian community**

The translator accompanied the team during the pre-edition, which took place on the last day of work in Tanzania, and in post-production, which was the subsequent translation into Portuguese and English of all course content already at a distance.



**Figure 5 – Team recording in strong sunshine with Tanzanian doctors in a local community**



**Figure 6 – Brazilian team with translator, Tanzanian residents and doctors and missionary Rafael Silva (on top right) at the end of the work**





The total execution time, from Tanzania recordings to completion of the course, including the translation of Swahili into Portuguese and English, was six months.

## Conclusion

Education is a social responsibility shared by the State, civil society, nongovernmental organizations, educational institutions, private entities and so many other entities that can join forces to think about sustainable development. The Federal University of Rio Grande do Norte, through LAIS and SEDIS, has been implementing national and international cooperation actions to generate innovative solutions that can contribute to the Sustainable Development Goals of the 2030 Agenda. Lifelong learning in health for professionals, teachers, students and the general population is a concrete step in this direction.

It is hoped that the cooperation work developed with the Tanzania missionary group to enable health volunteers to work in rural communities will serve as a model for methodology to be adopted in similar cases. Thus, by promoting research on health education, it will be possible to stimulate responses to both local and global challenges, as well as to promote education for sustainable development and education for global citizenship.

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## Intelligent Tutors for Personalized Learning in Online Environment: Challenges and Opportunities

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### Abstract

Online learning is getting popular among students at a rapid pace. From the year 2002 to 2014, the number of online learners more than tripled, from 1.6 million to 5.8 million in the United States. The popularity of online learning is attributed mostly to the flexibility it provides for learners and the convenience of not having to commute or travel. Despite the popularity, students graduating with an online degree in science and engineering disciplines lag behind, due to the popular notion that effective skill building cannot happen online. Indeed, online learning lacks in-person, peer to peer interaction, which is proven to an effective learning method in the sciences. We propose the use of teacher designed intelligent tutoring systems as an inexpensive and effective option to bridge the skills gap in an online environment. With freely available tools provided by Carnegie Mellon University's Cognitive Tutor Authoring Tools (CTAT), we challenge undergraduate students with problems, scaffold student learning with appropriate hints and timely feedback, and promote mastery learning. With fine-grained data collected from student-tutor interaction across diverse student learners from 3 countries (USA, India, and Philippines), we quantitatively show that intelligent tutoring systems can provide productive intervention, and improve student learning.

**Keywords:** Intelligent Tutoring Systems, Personalized Learning, Education Research, ICT, Physics Education, STEM Education, Science Education, Engineering Education, Mathematics Education

### Introduction

Student enrolment in online degrees and online classes is growing at an ever increasing pace. According to US government's federal data, more than 6.3 million American students, mostly undergraduates, enrolled in at least one online class in Fall 2016 – a 5.6% increase from the previous year (“Inside Higher Ed,” n.d.). Online learning offers many advantages compared to traditional classes. The class schedule is flexible – students can choose to learn at a time of day or week that best suits their schedule. With the availability of multimedia learning materials, students can learn at their own pace, watching, pausing, and rewinding lecture videos



until they understand course material(Norman, n.d.). Online education is cheaper. From the administration’s point of view, there is no need to employ staff to maintain campus facilities such as a gymnasium or a library. Consequently, universities are able to offer online degrees at cheaper rates. Online classes save time, as there is no need to run back and forth to the class, or wait for students and tutors (Sun & Chen, 2017). Despite such advantages, one of the key disciplines for improving our society – the science, technology, engineering, and mathematics (STEM) fields are lagging behind in online student enrolment. To date, most online degrees awarded are in the fields of business administration, criminal justice, psychology, nursing, and education (“Wiley Education Services,” n.d.).

It is not difficult to understand the reasons why. Understanding course materials and achieving mastery in STEM courses requires ‘active’ learning (Ates & Eryilmaz, 2011; Ding & Reay, 2014). Over the years, a large body of research has been dedicated to understand best practices in STEM learning, and activity based, hands-on learning has been repeatedly shown to produce best learning outcomes (Zabunov & Gaydarova, 2013). Active learning involves students working with laboratory tools and demonstration equipment to experiment, ask questions and interpret data to understand scientific phenomena. Extra-ordinary multimedia applications and virtual reality tools have been made to improve science education (Zabunov, 2012). It is hard to implement such active learning strategies in an online classroom.

Another important challenge in STEM is educating underprepared students. American Association of Colleges & Universities (AAC&U) reports that 53% of students entering colleges and universities is underprepared (AAC&U, 2002). As college education has become necessary for professional success these days, student enrolments are on the rise, including underprepared students. One way to get them up to speed is by utilizing developmental college preparatory courses (Martorell & McFarlin, 2011) that will educate and train them on fundamentals of principles and build skills for college level course work. However, such courses demand significant investment of time and money, both for the college administration and the students. Consequently, they add to the college tuition cost, which is an important concern in these times when students are inundated with burdensome education loans (Boatman, Evans, & Soliz, 2017).

In this work, we present a teacher-authored computer based tutor as a viable alternative to bring a diverse group of online students with different skill levels up to speed in fundamental concepts and calculations involved in STEM courses. To study the efficacy of this method, we ask the primary research questions:

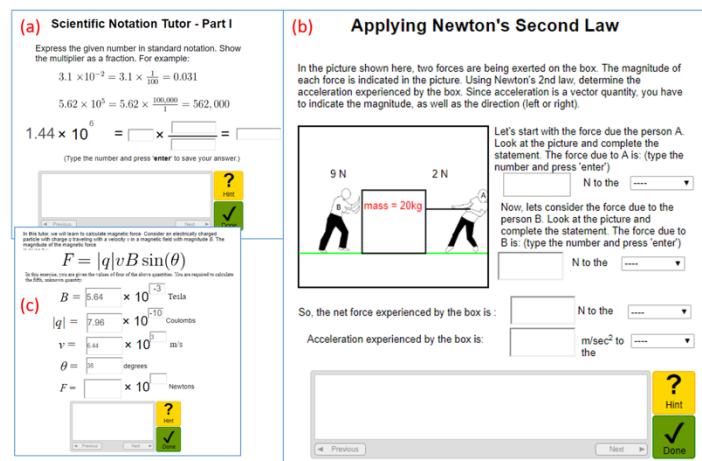
- Can a teacher, who is not a computer programmer, design and develop intelligent tutors that can train students on fundamental STEM concepts and calculations?
- How effective is such a tutor which will improve skill levels of students, and produce learning gains?

Attempting to answer this research question involved several stages of work. First, we designed a set of computer-based tutors at a level that we expected would match the students’ prior knowledge level. The tutors featured in this work involve lessons intended to build students’ skills in STEM subjects such as physics and mathematics.



## Tutor Design

The design details involved in making the tutor are presented in detail elsewhere. We used Carnegie Mellon University's tutor building software called Cognitive Tutor Authoring Tools (CTAT). This software is available free of cost to any teacher throughout the world, for use in an educational setting (Aleven, McLaren, Sewall, & Koedinger, 2009). With the CTAT, teachers are empowered to design, develop and deploy the tutors they author, with graphical user interface based drag and drop tools (Aleven, McLaren, & Sewall, 2009; Aleven, McLaren, Sewall, & Koedinger, 2006). The tutors are easy to make, help build flexible tutors, and can be designed to provide a specific or general learning experience according to the teachers' requirements (Aleven, Baker, Wang, Sewall, & Popescu, 2016; "CTAT Tutorials," n.d.). The student interface for some of the tutors designed and developed by the authors are shown in Figure 1.



**Figure 1: Screenshots of tutor made by authors. (a) Scientific Notation Tutor (b) Newton's Law Tutor, and (c) Magnetism Tutor.**

As shown in Figure 1, the top most part of the tutor shows the title in bold. This gives students an idea of what to expect. For example, in Figure 1(a), students can expect to be trained in understanding scientific notation. Here, the students are shown an example of how to interpret a number expressed in scientific notation. The students are expected to emulate this example and express a given number shown in scientific notation, to numeric form. If they need help, the students can ask for help by clicking the 'hint' button below. As the students enter their answer in the boxed provided, immediate feedback is provided to them either to correct their error or as an encouragement for entering the correct answer. Similar structure of computer-aided instruction is provided in Figures 1(b) and 1(c) for lessons involving Newton's Second Law and Magnetism, respectively.

A general pathway for providing such need-based guidance is shown in Figure 2. Such a flow chart can be customized to different tutors based on the teacher's instructional needs and the students' learning needs. As shown in Figure 2, hints are provided in tiered levels. Hint 1 is intended as a soft hint to prod the students' memory for problem solving. Hint 2 is more specific, tailored to the problem at hand, intended to show concepts and calculations to solve this particular problem. Hint 3 is a hard hint, giving the exact correct answer to help students progress towards the next problem.

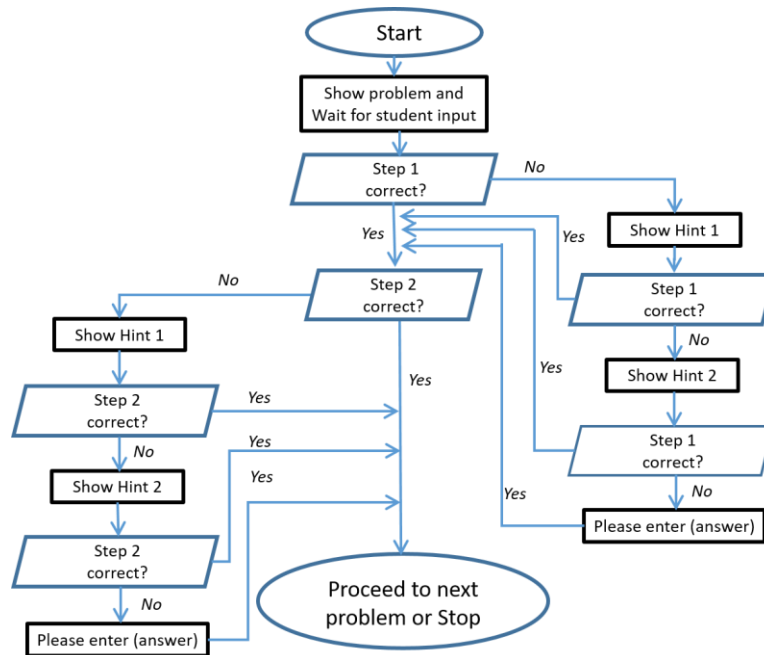


Figure 2: A flow chart type general pathway to design need-based guidance for students using intelligent tutors.

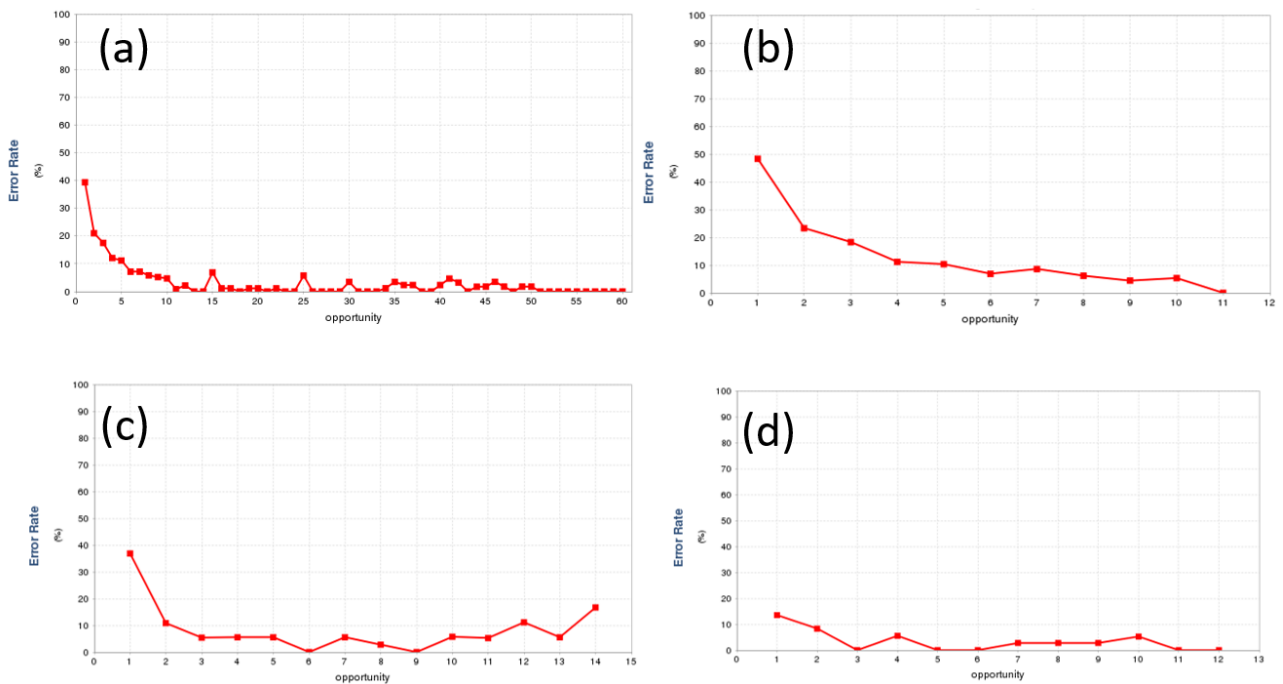


Figure 3: Learning Curves showing student interactions with our tutors. X axis shows number of opportunities students had to learn, and Y axis shows error. Error rate keeps dropping as students work with tutors.

### Participants

Tutors involving lessons in subjects as varied as physics, computer science, mathematics, and economics were implemented by the authors. The student participants were undergraduate students from a wide geographic area including USA, Philippines, and India. Overall, several hundred students have participated in

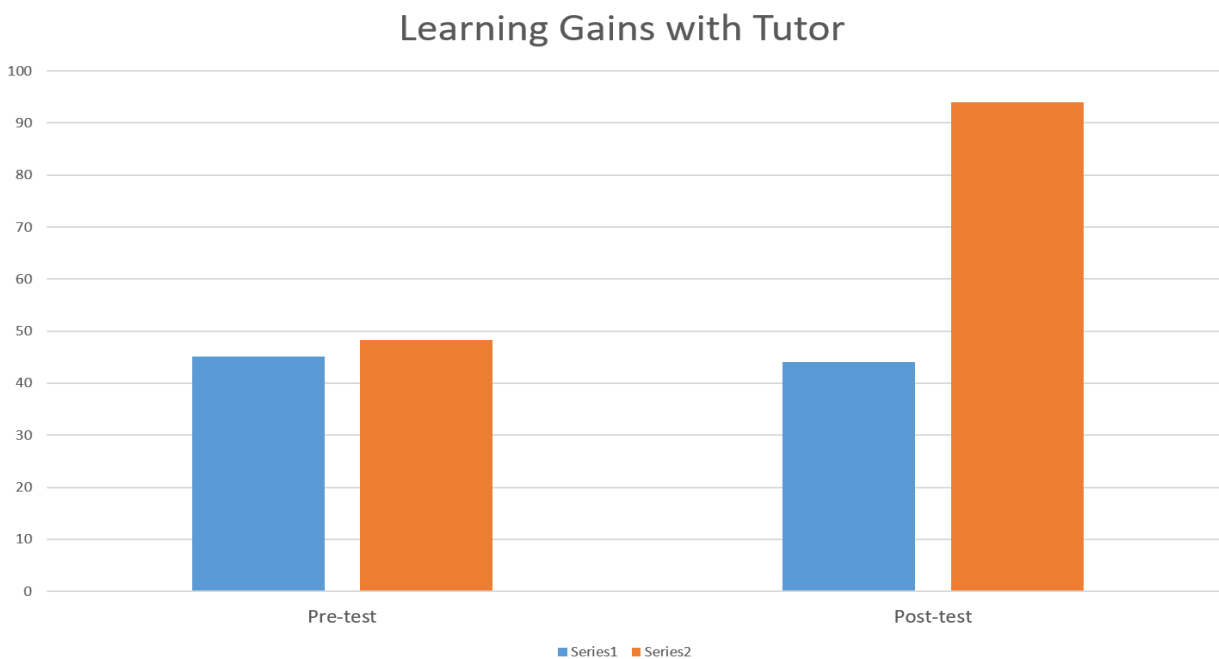


learning experiences with our tutors, with about 100,000 fine-grained transactions with our tutoring software. Such a large data sample helps us analyze the specifics of student learning and evaluate learning gains with our tutoring software.

## Results

Outcomes of student learning with some of our tutoring software is shown in Figure 3. All insets (a), (b), (c), and (d) are learning curves, describing how students progress as they work with our tutors. The X-axis shows the number of opportunities students are given to demonstrate their knowledge and Y-axis shows the number of errors students make. As we can see, as they progress with tutors, the number of errors keep decreasing, indicating students are making progress in their learning. In some instances, such as in Figure 3(c), the error rate shows a slight increase towards the last few opportunities. Upon inspection, this was shown to occur as a result of students' misunderstanding involved in the concepts and calculations relating to this particular tutor. Thus, the learning curve is a strong indicator not only for students' learning, but also for highlighting areas where students have misconceptions.

Students' learning gains while working with our tutors were quantitatively measured by administering pre-test and post-test. In this study, a set of 53 undergraduate students were asked to participate in learning with our tutors. A subset of these students (N=38) were asked to learn STEM related concepts and calculations between a pre-test and post-test, while the other students (N=15) were not provided instruction at all. We observed that students who studied with our CTAT based tutors showed a significant change in scores between pre-test ( $48 \pm 19\%$ ) and post-test ( $94 \pm 14\%$ ), whereas the control group of students (not provided any instruction) remained essentially stagnant with a pre-test score of  $45 \pm 20\%$  and post-test score of  $44 \pm 15\%$ . These results are summarized in Figure 4.



**Figure 4: Student Learning Gains observed when working with our tutors. Students who learn from CTAT based tutors learn better than those who don't.**

## Conclusion

In conclusion, we have demonstrated that it is possible for non-programmer teachers worldwide to make their own intelligent tutoring system to provide computer aided training to their students. We have discussed the design, development, and deployment details of a few tutors we have implemented in USA, Philippines, and India. Careful learning curve analysis of student-tutor interaction show that tutors act as effective tools to provide desirable learning to our students and produce positive student learning outcomes. Similar tutors can be implemented by teachers throughout the globe to produce very effective and efficient learning outcomes. Such tutors can also be used to run high quality masters' and PhD thesis grade educational experiments to evaluate learning outcomes provided by tutors in various domains of knowledge.

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## Mix and Match: University-Corporate Cross-Fertilisation in Active Learning Approaches for Soft Skills Development

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### Abstract

The robots are coming for your job! Prepare yourself for a future of work where the jobs haven't even been invented yet! The top ten 21st century skills! Almost every week brings new announcements about the need for graduates to demonstrate what are varying referred to as soft skills, transversal skills or non-academic skills. Looking beyond the hype, much of which has been debunked, and however we name them, there is still a strong case for considering these to be essential skills for living and working in new times. The eLene partners have been working on soft skills for nearly a decade, through a series of European projects. The current project, eLene4Life, explores how active learning contributes to the development of soft skills in both higher education (HE) and the corporate sector, with a view to fostering cross-fertilisation, not in terms of companies dictating what should be taught in HE, but rather about learning from each other about the how. A parallel transnational analysis was carried out in both sectors to gather data on how active learning is being used to develop soft skills, through 43 semi-structured interviews with HE teachers in 11 countries and a further 43 with private training providers, human resources managers and in-company trainers in 8 countries. The results highlight similarities in the active learning approaches used. However, the HE participants reported a number of challenges related to costs, time, and teacher professional development. A mismatch between the use of digital tools for active learning in HE and the corporate sector was also noted, with the latter integrating a much wider range of collaborative and work-based tools. Furthermore, both sectors raised the question of the difficulty in assessing of soft skills with sufficient objectivity. Further research is thus necessary, with an emphasis on raising awareness among teachers and trainers with respect to soft skills assessment grounded in theory. The results of these first two studies are currently being transformed into a concrete Dynamic Toolkit of active learning methods for soft skills development, in order to support the piloting of selected initiatives and the development of a discussion-based MOOC for teachers and trainers. Finally, the fostering of a Community of Practice will support further cross-fertilisation between the two sectors.

**Keywords:** Active Learning, Soft Skills, Higher Education, Corporate Training, Transnational



## Introduction

According to different studies (for ex. Rao, 2018), the world is shifting from “a knowledge economy to a self-knowledge economy” and, at present, there is a mismatch between academic education and the skills required in the labour market. The importance of soft skills has often been stressed. Many studies (Deloitte, 2011; ISFOL, 2012; IUL, CRUI, & Centromarca, 2012; Manpower Group, 2014) have focused on transversal or soft skills, which are reported as being the hardest skills to find in young graduates.

A number of documents issued by the European Union confirm that soft skills are closely connected with employability (EC, 2012), but they are not thought of as such within many universities (EC, 2013). Companies need a more skilled workforce and opportunities should be given to young people to develop those soft skills, such as entrepreneurial skills, coping skills (i.e. the capacity to deal with a problem in a creative way), learning to learn, and other skills (such as the ability to work in teams, to communicate clearly and effectively, to adapt to different cultural contexts, to solve problems, to manage conflicts, and to show endurance in complicated or stressful situations) that will help university students make a successful transition from full-time education to entering the labour market. The importance of these transversal skills is also highlighted in the 2018 European Commission Proposal on Key Competences for Lifelong Learning and the 2018 World Economic Forum report 'Towards a Reskilling Revolution: A Future of Jobs for All'. Over and above the question of employability, soft skills can contribute to the development of critically aware citizens capable of contributing effectively to society in a VUCA (Volatile, Uncertain, Complex, Ambiguous) world.

However, at present, different countries have different methodologies and approaches to the teaching and recognition of skills for employability. This has led to a mismatch between academic higher education (HE) and skills required in the labour market. According to the McKinsey Report Education to Employment: Getting Europe’s Youth into Work (Mourshed Patel & Suder, 2014), providers, employers, and young people seem to live in “parallel universes.” For example, in Europe, 74 percent of education providers were confident that their graduates were prepared for work, yet only 38 percent of youth and 35 percent of employers agreed. The existence of such discrepancies implies that cooperation should be strengthened among the different stakeholders to identify and further develop solutions in the form of educational models which mobilise appropriate learning and teaching approaches for the development and recognition of transversal skills, embedded within the curriculum.

The eLene partners have been working on these essential skills for nearly a decade, through a series of European projects. eLene2learn explored the role of digital technology in supporting the development of learning to learn competencies in lifelong learning transitions. eLene4work compared the views of students, recent graduates, teachers and human resources managers on the importance and role of soft skills and digital soft skills. eLene4work developed a framework and piloted open learning pathways for students through MOOCs, OERs and personal journals. eLene4LIFE is now exploring how active learning contributes to the development of soft skills. The cross-fertilisation approach between HE and the corporate sector is not interested in companies dictating what should be taught in HE, it is more about learning from each other about the how.



## Theoretical background

### *Soft skills*

The definition of what “soft skills”, “transversal skills” or “essential skills” actually are has been heavily debated, not only within this specific project, but also in the research field in general. In the previous eLene project, eLene4work, the ModEs Project’s Taxonomy (2012) was chosen as reference: “Soft skills represent a dynamic combination of cognitive and meta-cognitive skills, interpersonal, intellectual and practical skills. Soft skills help people to adapt and behave positively so that they can deal effectively with the challenges of their professional and everyday life.” (p.67 of the MoDEs project report).

### *Active learning*

Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing...[in] the classroom (Prince, 2004). Active learning refers to a broad range of teaching strategies which engage students or trainees as active participants in their learning. Typically, these strategies involve learners working together during class, but may also involve individual work and/or reflection, as well as group work outside the classroom. The focus is on how to learn rather than what to learn, placing the learner at the heart of the process. Active learning can be on a spectrum of learner and teacher control of the learning process and learning environment. The main characteristic of active learning is that students are engaged in activities which involve more than just listening and note-taking, e.g. reading, discussing, writing. (Bonwell & Eison, 1991; Prince, 2004; Raynal & Rieunier, 2010; University of Minnesota - Center for Educational Innovation).

Some of these methodologies can be drawn from the experiences of company training and will be based on “experiential learning” through internal (or, in some cases, external) practical activities. In both cases, reflection on the outcomes and student self-assessment will be fostered and enriched by the use of digital technologies. In HE, soft skills development can be in the form of specific courses or embedded in ‘traditional’ courses through appropriate teaching methodologies (case studies, problem-based learning, project-based learning). The main goal is to foster students’ active learning.

## Methodology

eLene4Life is an Erasmus+ Strategic Partnership project (2018-2021) supporting curriculum innovation in HE through the development of active learning approaches for soft skills, with the ultimate aim of improving students’ employability.

The main objectives of eLene4Life are to:

- develop new innovative curricula and educational methods integrating active learning, at the same time addressing commonly encountered barriers such as large class sizes and physical spaces,
- improve the relevance of HE curricula in a VUCA (Volatile, Uncertain, Complex, Ambiguous) world, through a focus on soft skills.



A key point of the project is the analysis of the real practices of companies and their internal dynamics in terms of team working, e-collaboration, communication, change management and situations that involve soft skills in general. Both methodologies and tools used by companies to support newly graduated employees could offer an interesting point of view from which to start the research activity.

The variations across member states with respect to University-Corporate collaboration in curriculum innovation mean that a transnational approach is vital for addressing this issue, enabling the partnership to draw on a wide base of experience and to address the inherent cultural differences, for example in terms of attitudes towards and maturity of cross-sectoral collaboration. By bringing together and analysing examples from the different participant member states, the project will enable each partner to learn from experiences outside their national context and thus to be in a stronger position to bring about change through the pilot projects they implement, and to feed the results back in to the project in order to develop a truly transnational perspective on cross-sectoral collaboration for the integration of transversal skills in the curriculum.

As an Erasmus+ Strategic Partnership project, the main focus is on the comparison between different European countries and on best practice exchange. In order to give the analysis a sound methodological grounding, the project takes a qualitative approach, through desk research followed by semi-structured interviews conducted with 43 HE teachers in 11 countries (Belgium, France, Germany, Hungary, Italy, Netherlands, Spain, Poland, Portugal, UK, USA) and a further 43 semi-structured interviews with Human Resources managers, in-company trainers, training providers and coaches in 8 countries (Belgium, France, Germany, Ireland, Italy, Netherlands, Poland, UK).

Finally, eLene4Life aims to create the methodological basis for the interaction with companies to foster a permanent Corporate/HE Community of Practice for innovation in learning and teaching, in which the different stakeholders (teachers/instructors, students, representatives of private companies) will be involved in order to exchange experiences, discuss, update the common knowledge and evaluate the results of the experimentations.

## **Results**

The findings of the two transnational analyses are detailed in two specific reports (eLene4Life, 2019a; eLene4Life, 2019b). The first report takes the form of a transnational qualitative study analysing the state-of-the-art of innovative methodologies and activities which foster the acquisition of soft skills in HE institutions and actors. The results highlight the consolidated practices, future developments of the activities already performed in different contexts, demands and challenges, risks, and opportunities. The second one captures the state-of-the-art of innovative methodologies and activities fostering the acquisition of soft skills in the Corporate sector and explores their transferability into the HE context.

### *1. Transnational Analysis on Innovative Higher Education Learning Models on Soft Skills*

On the HE side, these interviews explored the motivations of teachers to invest time and energy in Soft Skills training. The individual teacher initiative was cited by all the participants for the integration of the Soft Skills and the active methods in the programmes.



The strongest drivers for soft skills training and use of active learning methods at university are: student learning and development, graduate employability, and student engagement in classrooms. Time is considered the biggest obstacle, as it can discourage teachers from using active learning for soft skills learning in various ways: in lesson or course planning, but also in the classroom for interactions (teacher - student, between students, or for personalised feedback).

All interviewees acknowledged that integrating soft skills using active learning methodologies into the curricula is mostly a personal initiative of teachers, also given the challenges of their implementation.

“The personal belief that soft skills can be a powerful mechanism to motivate learning, building learners’ self-efficacy, providing soft skills aside from the ones that are promoted through the syllabus.” (prof. Gabriella Agrusti, LUMSA University, Italy)

Faculty observed students’ difficulties in staying motivated or handling group work, specifically when collaborating with peers or communicating effectively in a group or in public. Teachers reported that students themselves see the same challenges and demand the inclusion of soft skills in the curriculum. This was collected from the feedback forms completed at the end of courses, a rapidly expanding practice across the HE sector.

“I noticed that students lack self-presentation skills and understanding of the text. The work of an interpreter is to a large extent working with people, I think that these competencies are very important.” (prof. Tomasz Chudak, Maria Curie Skłodowska University, Poland)

“Experienced professionals take communication or soft skills classes because they understand its importance in their daily work; why shouldn’t we offer this training sooner, while they are enrolled in the university as students?” (prof. Claudio Pensieri, LUMSA University, Italy)

Based on students’ performance and the research on the changing nature of work, teachers already observed in class some of the difficulties that students will face in their future jobs. They thus wish to prepare them for professional life and help improve students’ employability. Moreover, when creating their course learning outcomes or when deciding which soft skills to include, many teachers reported taking into consideration graduates’ employability rates or their own professional experience working outside academia.

There is also a self-reported desire for renewal of teaching methods from faculty and trainers, which can allow a stronger teacher-student interaction or foster greater engagement and motivation from students during classroom time. This trend seems to be on the rise, especially with the increased use of flipped classrooms where basic content delivery happens online and classroom time is for more advanced coursework and discussions.

When soft skills are not the primary learning outcome of the course, teachers reported that the use of active learning methodologies generates curiosity or more engagement with the academic content: students ask more questions, are more involved with the coursework, and there is an increased level of trust between students and faculty.



Teachers also report an aspiration for academia to address societal needs in their courses, for example, showing students how to apply classroom knowledge to real-life contexts, improving graduate employability rates, or to developing sustainability-related knowledge. Interviewees from business schools or university colleges mentioned that since some institutions have in their DNA the mission to educate students holistically, they are expected to have soft skills as an important part of their curricula. This can be seen in institutional mission statements, in the learning outcomes throughout the course descriptions, in their partnerships with actors from the world of work, or in the support available to staff to improve their teaching skills via centres for teaching and learning (although their names can vary from institution to institution).

Among the most frequently quoted barriers to start teaching soft skills using active learning methodologies we found: limited time, teacher and student workload, or number of training courses available. Almost all teachers who were interviewed admit to having limited knowledge or training on how to assess soft skills learning. The most common challenges found were how to determine the impact of the activity (how to measure the before and after mastery of the skill), how to assess the progression of the skill for each student, how to provide personalised feedback, or even how to analyse the learning data collected. Some teachers doubt they should even try any measurement for fear of lacking objectivity.

When taught transversally, soft skills are not part of the formal list of course learning outcomes, thus they are often not assessed, although sometimes teachers report that they take into consideration the quality of teamwork or the ability to give a good presentation.

Another interesting input came from University Colleges, non-formal living and learning communities with dedicated student affairs professionals in charge of soft skills training. The answers illustrated how until recently the focus was to introduce soft skills training into university curricula, that is, start organising the training even though the assessment of the learning outcomes was superficial or incomplete, for the reasons quoted above. It was important to start piloting this type of training, even though teachers realised the importance of measuring impact.

## *2. Transnational Analysis of the Transferability to Higher Education of Corporate Active Learning on Soft Skills*

Nearly all interviewees from the Corporate Sector agreed on the project aims and to the importance of providing soft skills training at HE level.

“So many young people haven’t had a job and they don’t really understand what the modern workplace is like. I think that anything universities could do to help them would also make things easier for employers. Lots of employers nowadays are having to ‘babysit’ young people at work, they are so unprepared” (HR Manager, UK).

At the beginning of each conversation, the interviewees were asked to provide their own definition of the concept of Active Learning and examples of what they meant. Afterwards, the aforementioned eLene4Life definition was provided. This produced a rich variety of answers, whose common points can be summarised as follows:

- Learning through simulations, in close relationship with real world situations;

- Emphasis on decision making and action (learning by doing);
- Simulation of real-world constraints and pressure;
- Use of digital tools to support learning;
- Being experience-based and stimulating proactivity;
- Learning at the workplace;
- Exploiting the theory into real-case situations;
- Getting feedback from peers on what has been learnt;
- Being fully incorporated into the daily job practice;
- Aimed to the development of self-awareness;
- Being participatory.

Typically, soft skills training is organised in small groups with observation by a facilitator, around the research on a given subject with restitution to the group. These courses are very professional-centred, often supported by an online skills management system to help participants define their goals and link activities to those goals. Learning is led by the learners themselves, sometimes with peer intervention or N + 1 to allow learners to develop their weak or strong points. Evaluation is done through critical reflection and often by peers.

The most frequently used active methods mentioned in the business world are:

- Problem-based learning: simulation of real-life situations that need to be solved collaboratively.
- Learning by doing: Through workshops, games and role plays according to the needs of learners.
- Peer learning: to improve self-awareness and to receive feedback directly through teamwork.
- Mentoring: This involves specific skills from the mentor.

Interviewees recognise that learning tasks set for graduates must be as authentic as possible. Thus, problem-based learning could be a useful approach, based on real issues where outcomes could have value for learners.

An overall finding of nearly all the interviews carried out is that Active Learning, however you define it or you consider it, is essential in corporate training. Moreover, most of the interviewees, especially those coming from big multinational companies, stressed the fact that learning on the job is the main learning they address, and the most effective. If asked about the comparison between university and corporate training, they also tend to underline how their perception is that these are two totally different fields. University teaching is often seen as using an ineffective frontal lecture-based methodology, while the real active learning happens (or has to) in nowadays corporate training.





Most of what we learn about work happens ‘on the job or in the moment’: there is a small element of providing the theoretical, foundational stuff. The actual development of learning happens actively, in the workplace... going about your day-to-day job. [HR Manager, UK]

## Discussion

### *Digital tools: a mismatch?*

Considering the time and space constraints in the classrooms, digital tools can be useful to support learning, if used in a blended approach. As many are sceptical about the efficacy of structured Learning Management Systems, most suggested the use of quick (and often free/open source) apps or software in order to support virtual workgroups training, testing, gaming and more. The most commonly used digital tools in Soft Skills training in HE are response systems (live classroom or amphitheatre surveys), followed by file storage, planning and evaluation tools, and online education platforms. On the corporate side, numerous tools for collaborative work, knowledge and skills management, and personal and collective organisation were cited. This raises a double question, firstly on the adequacy of the tools used in HE with regard to the development of soft skills, and secondly on the level of knowledge and ease with respect to the most appropriate tools. Having said this, whatever tools teachers can easily understand and transfer to their courses, were considered beneficial.

### *Potential for cross-fertilisation*

One of the objectives of the eLene4Life project is to establish a Community of Practice bringing together representatives of HE and the world of business in a logic of mutual learning. The potential for this "cross-fertilisation" exists in the interest expressed in HE to apply the active methods used in companies, by mobilising external experts (trainers, coaches) already existing, and by the awareness of the need for soft skills training. The project found less business interest in applying HE methods, and the high cost of external experts remains a burden on universities. A further point to consider is that universities are still very focused on the performance of individuals, by contrast companies tend to focus more on team performance. However, the difficulty in providing a contextualised and authentic learning experience in HE represents an opportunity for more collaboration around internships and missions in companies or associations, around a well-defined objective of development and assessment of soft skills.

In a few isolated cases, sceptical opinions were expressed about the ability of universities to teach soft skills to their students:

Universities should not try to overreach: they cannot teach students everything, perhaps the most important thing is to truly teach them how to learn and be open to new learning experiences. (Sales manager, US Company, the Netherlands).

The eLene4Life response to this is that “teaching students to learn” is providing them with exactly one of the most essential soft skills: learning to learn.



### *Size matters*

Further limitations concern the size of university classes. HR managers and trainers within companies are sceptical about the transferability to the HE context, especially for the audiences targeted by the project (80 and above) for several reasons. The methodologies for motivating the learner to engage actively in the discussion seldom scale up efficiently from the 12-15 range they are accustomed to in the corporate sector, to the larger audience that is customary in university amphitheatres.

### *Reshaping the role of teachers*

A common finding across the majority of interviews is that the role of university teachers mobilising active learning methods for soft skills development requires a different skill-set. Teachers need to develop their own soft skills in order to support their students, and shift to a more mentoring/coaching approach. If this is not possible, assistants or other professional coaches should accompany the HE teachers.

The only real methodological indication we give to our trainers is “you’re not a teacher, you’re a facilitator” (Training Manager, Italy).

Developing the digital capability of HE teachers is also a priority in order to integrate more relevant collaborative tools into active learning approaches. Soft skills training, assessment and use of active learning methods in classrooms need better teacher training, hence the importance of professional development in this field. Teachers self-report a gap to engage in this training and methods using the same scientific standards for hard skills assessment. In terms of soft skills assessment, a lot of diverse opinions emerged regarding the rationale, if it can or even should be done due to a perceived lack of objectivity. Consequently, in order to further develop soft skills training in a HE context, more advancements are needed in the objective assessment of the learning outcomes of such training.

### **Conclusion**

To conclude on a message of hope, the partners of the eLene4Life project have agreed on the following statement:

Higher education can demonstrate that, despite large numbers and constraints in terms of budget, human resources and time, it is possible to improve teaching and learning - with the help of active methods and digital tools - to support, in any discipline, the development of individuals.

The forthcoming activities of the project concern the development of a Dynamic Toolkit to enable teachers to appropriate a selection of active methods and conduct a series of pilots during the 2019-2020 academic year. In parallel, the Community of Practice will take shape before the launch of a MOOC for professional development of teachers. It is expected that all these outputs will contribute to the development of soft skills training, grounded in appropriate pedagogical approaches.



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## Developing Glocal Understandings of Online Teaching Practices: Transforming Practices through Collaborative Self-Study

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### Abstract

Transformative experience is described as a dramatic, fundamental change in the way we see ourselves and the world (Lyons, Halton, & Freidus, 2013, p. 163). Using self-study of teaching practices as a methodology for transformation (LaBoskey, 2004), a cross-disciplinary inquiry group at a mid-western United States public university brought together faculty from the disciplines of education, nursing, history, and psychology. The research group aimed to create a community of online instructors who systematically study their own online teaching in a supportive community while also collaborating and producing scholarship of teaching (Boyer, 1990) that could be shared with others. By becoming reflective and critical, open to the perspectives of others, and accepting of new ideas, the group sought to reframe online teaching practices and beliefs at both the personal and professional level for improvement-aimed purposes beyond the individual researcher (Loughran & Northfield, 1998; Samaras, 2014). Bi-weekly, over the course of a year, the researchers shared critical events (Webster & Mertova, 2007) from online teaching experiences within a “public homeplace” (Belenky, Bond, & Weinstock, 1997, p. 13) using a modified collaborative conference protocol (Anderson, et al., 2010; Bergh, Edge, & Cameron-Standerford, 2018; Cameron-Standerford, et al., 2013; Seidel, Walters, Kirby, Olf, Powell, Scripp, & Veenama, 1997). The protocol guided us to see and re-see a critical event from multiple perspectives and to form a new understanding of practice (Loughran & Northfield, 1998). This protocol included: listening to each individual’s initial analysis of a teaching event and subsequent learning; taking turns saying what we heard or noticed while the individual who had shared quietly took notes; taking turns offering speculative comments, connections, related literature, and wonderings; inviting the individual back into the conversation to respond to comments or questions offered by the group or to offer additional details or insights sparked by listening to the group; and writing take-away reflections. Data included audio recorded meetings, teaching artifacts, group notes, and individually written take-aways. Initial data analysis resulted in identifying each individual’s disciplinary values. Data was further analyzed which led to identifying cross-disciplinary themes related to online teaching practices. Key to the emergence of themes was the intentional, collaborative creation of a public homeplace in which cross-disciplinary meaning-making occurred. Implications speak to the role of collaborative self-study methodology as a means for transforming glocal understandings of online teaching practices.

**Keywords:** Online Learning, Self-Study, Cross-Disciplinary, Transforming Practices, Collaborative Conference Protocol



## Introduction

The Cross-Disciplinary Self-Study of Online Teaching Practices team of researchers, a new collaborative inquiry group at a mid-size, rural public university in the United States, sought to support and challenge those who were teaching or preparing to teach online courses. The self-study inquiry group aimed to create a community of cross-disciplinary online instructors who both systematically studied their own online teaching in a supportive community while also collaborating, sharing ideas, and producing scholarship of teaching (Boyer, 1990) that could be shared with others. The goal of self-study of teaching practices is for faculty to be active agents in reframing their practices and beliefs at both the personal and professional level and for improvement-aimed purposes beyond themselves (Loughran & Northfield, 1998; Samaras, 2014). Self-study researchers are faculty who inquire into their own practice, question it, seek to see it from multiple perspectives in order to see and re-see what they do, why they do it, and how else it might be done. Self-study researchers seek to learn from their own and others' instructional experiences.

The online self-study group brought together six faculty from the disciplines of literacy education, educational leadership, special education, nursing, history, and psychology. This group included faculty with varying levels of experience as online educators and self-study researchers. Three researchers from education had previously conducted self-study research, while the three researchers from psychology, nursing, and history were new to self-study methodology. Initial data analysis resulted in identifying each individual's disciplinary values. Data was further analyzed which led to identifying cross-disciplinary themes related to online teaching practices including: communication in the online setting, demonstrating care in the online setting, and reframing crisis events into opportunities for demonstrating care across personal, professional, and structural events. Using a collaborative conference protocol, researchers analyzed their online teaching experiences, engaged in cross-disciplinary meaning making and generated transformed understandings of practice. For the purpose of this paper, the researchers are focusing on the process, relationships, and space which enabled the emergence of these themes.

## Theoretical Framework: Transactional Perspectives

### *Transactional Theory*

Transactional theory suggests that learning occurs when people consider, discuss, and inquire into problems and issues of significance to them (Dewey & Bentley, 1949; Rosenblatt, 1978/1994; Rosenblatt, 2005). Individuals are in a state of transaction with their environments (including their own knowledge and experiences), sources of knowledge beyond the self, and other members of the group. According to Rosenblatt (1978/1994), as individuals read texts, they both simultaneously form the meaning of texts through their interpretations and are changed by the texts. Learning occurs both from within the learner and from shared interpretations that expand the reader's questions and insights.

### *Andragogy*

Andragogy, generally defined as the scholarly approach to the learning of adults, was originally coined by Alexander Kapp in 1833 and later developed into a theory of adult education by Malcolm Knowles (Knowles, Holton, & Swanson, 1998). Andragogy includes five guiding principles: 1) self-concept – an adult learner views



him/herself as a self-directed human; 2) adult learner experience – an adult learner accumulates experiences which becomes a resource for future learning; 3) readiness to learn – an adult learner’s readiness to learn is oriented toward the development of skills related to social roles; 4) orientation to learning – an adult learner seeks knowledge for immediate application to a problem-centered issue; 5) motivation to learn – an adult learner is intrinsically motivated.

### *Textualizing Experience*

As researchers, we used extended dialogue to wrestle with ideas. We listened to each other’s ideas carefully and spoke our own emerging ideas, knowing that dialogue allows ideas to clarify, change, and expand. Participants in a public homeplace develop self-respect, confidence, and a sense of agency through this process. Textualizing experiences helped each researcher develop skills of constructivist knowers as we read our experiences, created new interpretations, and incorporated new insights constructed with critical friends (Edge, 2011). By textualize, we mean that we deliberately took a step back from our lived experiences to examine them in a way similar to how the reader of a print-based text might objectify a texts’ construction, her own reading experience, or her process of coming to understand a text (Edge, 2011; Langer, 2011).

Through textualizing, one can learn to become a constructivist thinker about lived experience, where such thinking is valued and modelled; the ecological underpinnings of the transactional perspective offers a learning environment in which all members become one among equals and where power is shared among all. Educators who are constructivist thinkers are more likely to see their students as capable of thinking and constructing new ideas (Belenky, Bond, & Weinstock, 1997) and to enable their students to see learning as a dynamic, symbiotic, and transactional relationship. Transformative pedagogy is defined as an activist pedagogy combining the elements of constructivist and critical pedagogy that empowers students to examine critically their beliefs, values, and knowledge with the goal of developing a reflective knowledge base, an appreciation for multiple perspectives, and a sense of critical consciousness and agency (Omionota, 2009). Transactional and ecological relationships, andragogy, and the practice of textualizing lived experiences create opportunity for transformative experiences.

### **Feminist Perspectives**

#### *Care*

Teaching is “intimate work” (Bruner, 1996, p. 86). Professional learning that makes a difference in classroom instruction offers educators opportunities grounded in the complex environment of practice while supporting and nurturing reflection and discourse about their developing knowledge, often termed praxis. From a feminist perspective, care and understanding are at the center of teaching and learning (Noddings, 1984). Like the typically female role of a midwife who helps draw new life from the mother, a teacher recognizes that knowledge is created within and drawn from the learner. Such a theory of knowledge creation is a departure from the more traditional and often male perspective of a banker who deposits knowledge within the learner (Belenky, Clinchy, Goldberger, & Tarule, 1986).

#### *Women’s Ways of Knowing*

Expanding the feminist focus on care and understanding, a framework for women’s ways of knowing grounded our research. Belenky, Clinchy, Goldberger, and Tarule (1986) advocate for women to become



constructivist knowers who see knowledge as actively constructed by all human beings. Constructivist knowers move beyond silent receivers of knowledge and act with a sense of agency. To act with agency, women must gain confidence and skill in using information from a wide range of sources to form their own understandings (Colflesh, 1996).

### *Public Homeplace*

Belenky, Bond, and Weinstock (1997) describe spaces within which women learn together and move toward constructivist knowing as public homeplaces or places where “people support each other’s development and where everyone is expected to participate in developing the homeplace” (p. 13). In public homeplaces, participants feel safe expressing their thoughts and envisioning possibilities beyond their current situations. Similar to Close and Langer’s (1995) ideas on envisionment building when reading literature, members of a public homeplace textualize and share their lived experiences and begin to “explore the horizons of possibilities” (p. 3). When reading for information, Close and Langer suggest that the reader “maintains a point of reference” while:

...their envisionments are shaped by their questions and explorations that bring them closer to the information they seek and that help them better understand the topic. As people read, they use the content to narrow the possibilities of meaning and sharpen their understandings of information. Using information gained along the way (combined with what they already know) to refine their understanding, they seek to get the author’s point or understand more and more about the topic. (p. 3)

As the researchers in this study, we incorporated these ideas and read our experiences as texts so that we could explore possibilities and let our questions and explorations help us better understand and sharpen our interpretations of those experiences.

Merging these two broad areas of research, feminist and transactional theories, provided the theoretical framework of our study. This framework created space for each of the authors to grow and to learn personally and professionally both individually and collectively.

## **Research Methods**

### *Self-Study Methodology*

Self-study research is “a reflective investigative practice that springs from personally situated inquiry and generates new knowledge with the critical support of colleagues” (Samaras, 2014, p. 118). Self-study research is self-initiated, improvement aimed, interactive/collaborative at different points, utilizes diverse, typically qualitative, methodologies, and is validated through a process based on trustworthiness (Hawley & Hostetler, 2017; LaBoskey, 2004). Essentially, in self-study, faculty choose to critically examine their teaching in order to develop more consciously driven modes of pedagogic/andragogic activity, as opposed to relying on habit, tradition, or impulse (Samaras, 2002; Samaras, 2014). Whitehead (2004, p. 872) suggested that at its core, self-study stems from the query, “How do I improve what I am doing?” Self-study enables one to “provoke, challenge, and illuminate rather than confirm or settle” (Bullough & Pinnegar, 2001, p. 20). As researchers, we used our public homeplace for extended dialogue to wrestle with ideas. We listened to each





other's ideas carefully and spoke our own emerging ideas, knowing that dialogue allows ideas to clarify, change, and expand. As participants in a public homeplace, we became "critical friends" (LaBoskey, 2004, p. 819) who developed self-respect, confidence, and a sense of agency through this process.

### *Data Collection and Analysis*

Over the course of an academic year, our group of six cross-disciplinary researchers met biweekly. Data collection began at our first formal meeting and included data generated by each individual as well as data generated collectively during research meetings. Individually-generated data included: reflective journals; documented decisions made by the researcher during her online teaching class sessions; communication with individual students via the learning management system and email; teaching artifacts such as instructive letters, videos, and other forms of instructor communication to online course participants; and individually-composed "take away" reflections that were shared with others in a shared Google drive. Group-generated data included audio recordings of all meetings and collective meeting notes composed in Google documents. Audio recordings were later transcribed for data analysis purposes. Examining disciplinary artifacts through multiple data sources and perspectives, we "crystallized" (Richardson & St. Pierre, 2005, p. 963) our data by considering each emerging theme.

Using a modified collaborative conference protocol (Bergh, Edge, & Cameron-Standerford, 2018; Cameron-Standerford, et al., 2013), we sought to intentionally construct a generative, public homeplace (Loughran & Northfield, 1998). Our goals were to examine and create understanding of disciplinary values without assumption and then to re-frame our online teaching in light of those diverse disciplinary values. The creation of a public homeplace began with each researcher identifying and sharing an artifact that represented a disciplinary value unique to her role or profession.

This process of using a collaborative conference protocol included: (1) Textualizing and sharing a disciplinary artifact. Through sharing artifacts which represented our individual disciplines (such as a stethoscope) we sought to generate new glocal understandings of the values inherent within our individual academic disciplines. (2) We listened to each individual's initial sharing of their artifact in light of our own disciplinary values and in the broader context of online teaching. (3) In response to the sharing, we took turns saying what we heard or noticed while the individual who had shared quietly took notes. (4) We then invited the individual back into the conversation to respond to comments or questions offered by the group or to offer additional details or insights sparked by listening to the group. Through the process of (5) re-reading the texts of our disciplinary artifacts, we identified the existence of common or shared disciplinary values that stemmed from the six researchers. We recognized this glocal understanding was created from the merging of our diverse academic disciplines, values and languages in a common experience - our collective self-study research. Discourse within our shared culture resulted in greater (6) connection between each other's experiences, our diverse individual professional knowledge and the collective understanding from which we built new knowledge.

Recognizing evidence of the impact our diverse experiences, disciplines and languages have had on our collective artifacts, we now understand that, "As we write the text, the text writes us" (Clarke, Erickson, Collins & Phelan, 2005, p. 171). To come to this understanding we needed this collaborative self-study to allow the academic diversities unique to each of our disciplines -- literacy education, educational leadership,



special education, nursing, history, and psychology -- an opportunity to surface and become a part of our shared culture.

## Outcomes

### *Creation of a Cross-Disciplinary Public Homeplace*

Through the process of identifying, writing about and sharing our individual disciplinary artifacts, we became more than a group of researchers; we became critical friends who learned from and with one another. Our meeting place became more than a physical location; it was (and is) a space where we could trust one another to listen without judgement, where we could be safely vulnerable to think out loud, wonder, or share moments of “wobble” (Fecho, 2011, p. 53)--that is, moments of uncertainty when we were teetering between previous assumptions, feelings, or understandings and those that we were in the process of experiencing. Sharing these moments of disequilibrium (McLeod, 2009) with the group, and considering them through the cross-disciplinary discourse, connections to literature, and others’ insights allowed us the cognitive, social, and emotional space to reform and to transform understandings. Our bi-weekly research meetings together evolved into a time for us to grapple with professional and then, over time, personal, critical events, celebrations, and wonderings. Looking back, we identified this first artifact activity as a “turning point” in our cross-disciplinary self-study research (Bullock & Fletcher, 2016) as we collectively and purposefully built our cross-disciplinary public homeplace.

### *Cross-Disciplinary Meaning Making*

Ultimately, the collaborative conference protocol guided us to see and re-see our disciplines from diverse perspectives and to form new understandings of our teaching practice (Loughran & Northfield, 1998). In light of an inquiry-based frame, the cross-disciplinary meaning making resulted in our ability to more explicitly see and name what we knew, what we were doing, and why we were doing it. It also helped to reframe existing knowledge in light of cross-disciplinary interpretations which facilitated our ability to recognize and embrace what we did not yet know or do in our teaching practices.

Interestingly, the act of re-seeing our disciplines did not happen because critical friends challenged or questioned our course design, pedagogy or assessment; rather, it was their presence, their attentive listening, gentle probing and prompting, “Can you say more about that?” as well as their “outsider” status to our own discipline that prompted us to begin to see our disciplines through a different lens. The need to consider and explain our inferences to a critical friend helped us to step back further from the lived experience of online teaching. Our envisionment building or “meaning-in-motion” (Langer, 2011, p.17) about what was happening to reconsider explanations in light one another. Critical friends were invaluable “sounding boards” (Schuck & Russell, 2005, p. 107) enabling us to hear ourselves speak, and then to speak again in light of critical friends’ observations, comments, clarifying questions, connections, and wonderings. Through one another’s academic disciplines, we could step further back from our lived experience to imagine new online pedagogical possibilities (Langer, 2011; Walsh, 2009) and collectively formed new inquiry questions for future collaborative self-study research through our new glocal understandings of online teaching.



## Conclusion

Based on our theoretical perspectives, the goal of professional learning for online instructors would be that they become constructivist thinkers and knowers through reading their own experiences, sharing their interpretations, and expanding those interpretations within a trusted community with the intent of improving their teaching practice. Self-study methodology provided a framework for reframing online teaching and learning, while supporting faculty development in the online learning environment. As one researcher wrote in her reflective take-away notes:

I went from being overwhelmed and barely keeping my head above water to feeling empowered and strengthened through these conversations. The interdisciplinary nature of the group helped to feel that it was safe to be vulnerable.... with the bigger goal of improving and using the energy to make positive change in my teaching. (L.VandenAvond, personal communication, March 17, 2018)

Learning that improves teaching practice requires not only new knowledge and skills, but also new ways of thinking and of seeing oneself. As online instructors become confident knowledge constructors, they learn through praxis or trying new practices while seeking to understand why those practices work or do not work. Thus, online instructors become researchers who learn new ways to think about and to carry out their work; they become more deliberate and attentive to their instructional decisions (Cohen, 2011). Instructors in an online setting with a well-developed sense of agency build theory grounded in classroom practice (Bruner, 1996). Through inquiry, they actively formulate questions of importance to them, direct their own investigations, and communicate their newly constructed ideas, thus improving their practice in the process (Liston & Zeichner, 1991).

## Possible Impact or Applications

As institutions of higher education continue to increase online course offerings, self-study methodology enables educators to learn to work across disciplines for common goals and to position themselves as active agents and successful learners of their online teaching practices. Implications speak to the role of collaborative self-study as a means for transforming global understandings of online teaching practices.

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## Moving Beyond to Capture or Not to Capture: Lecture Capture Integration in Learning and Teaching

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### Abstract

Lecture capture is about recording a lecture for use and reuse by learners any time and from anywhere after the actual live event. The reasons for this can include, review for better understanding and revision of the subject matter, and for formative and summative assessment tasks. The lecture capture technology involves the recording of the audio and visual presentation as it happens and then making the recording available to students via their MOODLE course site. The USP is a regional University in the South West Pacific Region with a long history of engagement with open, flexible and distance learning. Spread across 33 million square kilometers of Pacific Ocean, USP is confronted with serious geographical challenges. To overcome some of the challenges of the temporal, spatial and transactional distance between students and teachers, and the teaching institution, the University has explored various innovative learning and teaching practices and technologies to provide educational opportunities to the students in its region. While most of the lectures at the University are offered on its main campus in Laucala Bay in Suva, lectures are also offered at other campuses in the region. Captured lectures allow USP and its students very many benefits other than the opportunity to view a missed lecture or review and revise. With the availability of lecture capture, courses can be taken by students who need to take a course but are not able to attend lectures in person. To capture or not to capture a lecture is not the question. The more important question is what to capture and how to integrate it into the total learning experience of the student to offer a cohesive and coherent learning experience that offers them a seamless and easy to navigate learning environment. This paper describes the content of the rollout of the lecture capture technology initiative at the University of the South Pacific (USP) and early reports on its use and uptake. It further tries to outline the initial challenges and experiences of both the technologists responsible for the roll out, the teachers and the students. It maps out the various scenarios of the use and integration of lecture capture and reflections of stakeholders on the rollout of the technology with lessons learned for others starting along this path.

**Keywords:** Lecture Capture, Lecture Recording, Student Experience, Technology Integration.

### Introduction

In 2017, the University of the South Pacific (USP) embarked on an initiative to have all timetabled lectures video recorded at its main teaching campuses: Laucala Campus, in Suva, Fiji, Alafua Campus in Apia, Samoa and Emalus Campus in Port Vila, Vanuatu. At the Laucala Campus there are 8 lecture rooms and both Emalus Campus (where the School of Law is situated) and Alafua Campus (where the School of Agriculture and Food Technology is located) have 2 lecture rooms each that are equipped with lecture capture technology. The



technology used for this purpose is Opencast, which is an open-source software for automated video capture, processing, managing, and distribution of video recordings. The recordings of all timetabled lectures are automated and are to be made available to students via MOODLE within 36 hours. Each session is of 50 minutes. It begins on the hour and ends 10 minutes to the hour. Once the video is recorded at the venue, it is automatically transmitted to the Information Technology Services on Laucala Campus, where it is encoded and labelled and made accessible to students and teaching staff through their online course page on Moodle.

The benefits of lecture capture technology are many. These include: (a) fostering student engagement, (b) appealing to students' interests, (c) offering multiple opportunities to access content, and (d) providing opportunities for learners to learn at their own pace. (Al Nashash & Gunn, 2013) Researchers document lecture capture technology as an effective learning tool (Dey, Burn, & Gerdes, 2009; Al Nashash & Gunn, 2013). However, since its integration into the system there is little documentation on student feedback concerning the technology at USP. This paper will highlight students' feedback on the lecture capture technology at the USP. This paper concentrates on aspects of a broad research project which touched on Lecture Capture that was carried out by the Centre for Flexible Learning called "Effective use and integration of technologies in support of Flexible Learning at The University of the South Pacific.

## Literature Review

Traditional classroom environments in higher education allow for the whiteboard and a podium for teachers to convey their thoughts and ideas to the students in the class. However, many teachers started adding media to enhance the typical traditional classroom environments such as overhead projectors that allowed them to put slides on them, and then the use of movies and videos using VCR and TVs. These early technologies allowed a lot more of an enhanced experience in the traditional classroom environment to engage the students in the classroom. Today, technological advances have a firm foothold in higher education, with the traditional mode of face to-face delivery of lectures and tutorials embracing the affordances of technology (Kirkwood & Price, 2014). In response to the growing demand from students for personalised learning (Shah, Sid Nair, & Bennett, 2013; Wanner & Palmer, 2015), lecture-recording technology has been adopted by universities to enable a shift from a one-size-fits-all education system towards one where students can personalise and customise their learning (Johnson, Adams Becker, Estrada, & Freeman, 2015).

Lecture-recording systems are present in some shape or form across many universities today but the practices vary among universities. Institutions may offer audio only; audio accompanied by presentation slides or videos; or a combination of video, audio and media files (Phillips et al., 2007). In addition, approaches to lecture-recording can be opt-in or opt-out (ACODE, 2013) meaning that lecturers can either opt in and request that their lectures be recorded, or be required to opt out when the system is set up automatically to record and upload lectures. lecture-recordings entail a digital capture of face to-face lectures to be made available to students online (Woo et al., 2008) and, as such, are long – commonly one hour – and generally unscripted (Australasian Journal of Educational Technology, 2017).

In a worldwide survey completed in 2009, Leoni and Lichti found that "Many students are requesting recorded lecture material outside of their regularly scheduled classroom hours" (p. 18) and while the implementation of lecture capture is widespread, most institutions have only utilized the technology in a small number of



classes. Their study revealed a lack of standardization with lecture capture and a lack of established best practices for lecture content collections, manipulation, and delivery. Other significant findings from this study were that almost half of the institutions use their course management system to share content and just over half record video. The other half used audio only, or audio and content, as part of the captured content. Some professors have resisted employing lecture capture in their classrooms for fear of decreased student attendance, lack of infrastructure, market uncertainty, extra work, and loss of privacy or intellectual property rights (Lecture Capture, 2011; Al Nashash & Gunn, 2013). According to Traphagan, Kucsera, and Kishi (2010), “Class attendance is one of the primary reasons educators hesitate to incorporate webcasting and podcasting into their classrooms” (p. 20).

### **Technical Architecture at the USP**

OpenCast is a flexible, scalable and reliable video capture, distribution, and management system for academic institutions, such as the University of the South Pacific. OpenCast is built by a growing community of developers in collaboration with leading universities and organisations worldwide. OpenCast has 3 Nodes; Admin Node, Presentation Node, Worker Node and a database (MySQL). The admin nodes take care of distribution of work, scheduling task, the presentation node is in charge of distribution of the video and streaming whereas the worker node does the encoding. The worker and the admin node is resource intense.

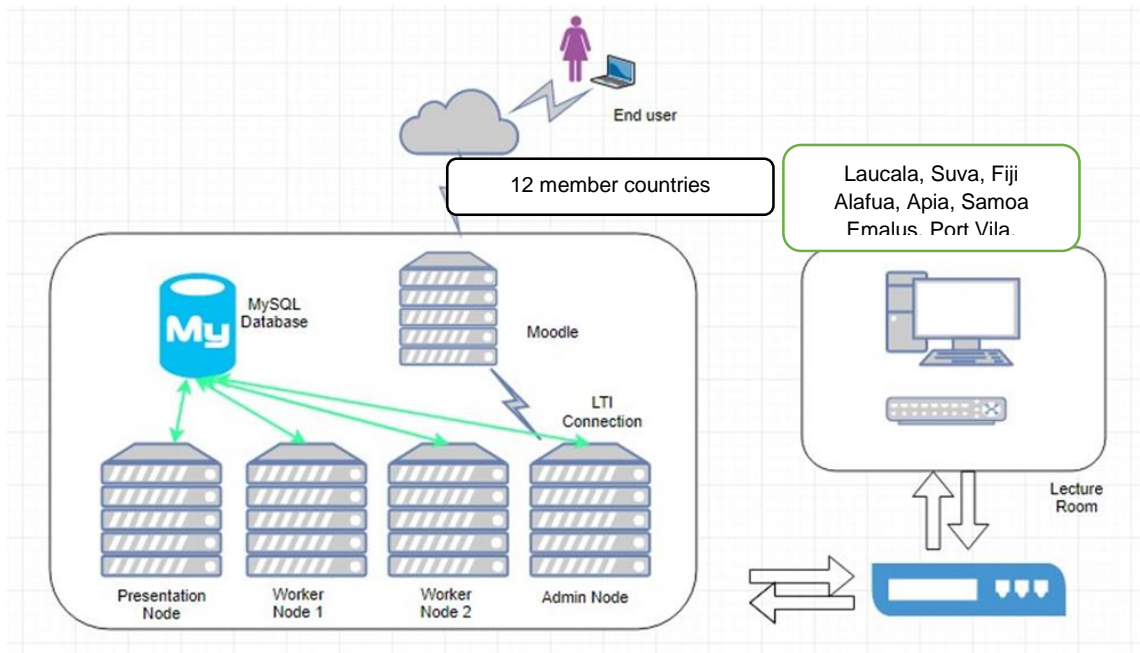
As previously mentioned OpenCast is currently installed in USP’s Laucala (Fiji), Alafua (Samoa) and Emalus (Vanuatu) campuses. OpenCast works with Extron Encoders which record the audio and video files and transfers it to OpenCast where the encoding takes place and the videos are tagged to respective Moodle courses for distribution to enrolled students. Multiple in-house scripts were made to schedule the lectures by taking the timetable data from Banner and having lectures scheduled in those lecture rooms accordingly. Other scripts include identifying and transferring of videos to regional campuses. At USP lecturers cannot opt-in or opt-out of the system as it is mandatory for lectures to be recorded. The Laucala campus houses 3 server architecture. There is a single Admin/Presentation node and two worker nodes. On an hourly basis on average OpenCast in Laucala Campus processes 10 to 12 videos. To ensure that this video is encoded and made available to students in a timely manner, two worker nodes are used while at Emalus and Alafua campuses have a standalone setup whereby all 3 components are in a single node. These two campuses have very low number of video processing hence the standalone setup.

### **Research Questions**

Since the introduction of the lecture capture system at The University of the South Pacific in 2017, the following questions were used for the purpose of this paper:

- What are students’ perceptions about using the lecture videos towards their studies?
- Do the students at the University of the South Pacific have similar views about using the recorded lecture videos as those found in other surveys in the literature?
- Are there any major problems students face in using the videos?





**Diagram 1: Lecture Capture System at USP**

## Methodology

An online survey was prepared to collect data from the University of the South Pacific students using Survey Monkey. After obtaining institutional approval for the research survey a link was distributed to all students in the University's region. The online survey was divided into 7 sections as follows: (1) Background, (2) Devices Used (3) Recorded Video Usage (4) Access & Support (5) Learning & Teaching (6) Attendance, Engagement & Study and (7) Future. The respective surveys contained up to 33 questions to obtain student feedback, which comprised of open ended questions, and ratings using Likert Type questions to determine how students favoured the lecture capture system, the videos and support for learning. The design of the Likert-scaled questions was based on questions used in another survey by Gorrissen et al (2012) which was on the use of recorded lectures and learning technologies. In this survey students were to rate their experience or estimate a frequency of times they would view the lecture capture videos. The surveys were open for almost 3 months which saw 320 students respond from around the University's member countries. For the purpose of this research paper related information was selected to answer the research questions.

## Results

The relevant information selected through the survey will be presented below and organised under the category the questions were organised. The responses from the Likert-scales and open-ended questions will be presented.

### *Student Background*

Out of the 320 students, 203 students (63,44%) indicated they were studying at the main teaching campus Laucala Campus, in Suva, Fiji. There were 24 respondents (7.50%) from Emalus Campus, Port Vila, Vanuatu, while on the other teaching campus Alafua Campus in Apia, Samoa 12 students (3.75%) participated in the

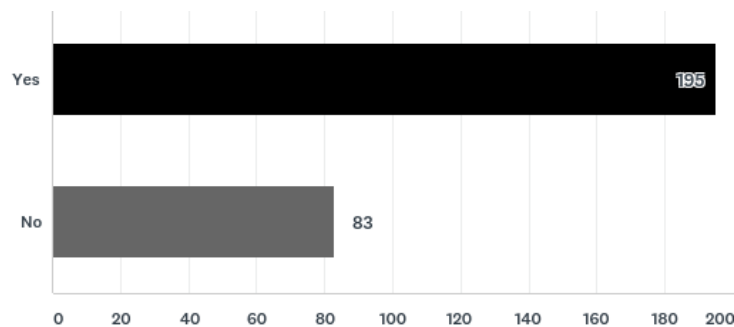


survey. Most student participants in the survey came from the other 2 Fiji campuses in Labasa Campus with 21 student respondents (6.56%) and Lautoka Campus with 26 student respondents (8.13%). There were 2 country campuses, Cook Islands Campus and Nauru Campus, where there were no students who took part in survey. Interestingly there were 2 students who participated from 2 remote centres in Vanuatu which were from Tafea Centre and Santo Centre.

It was noted that 282 respondents (88.13%) had actually viewed and used the lecture capture videos in the course through Moodle.

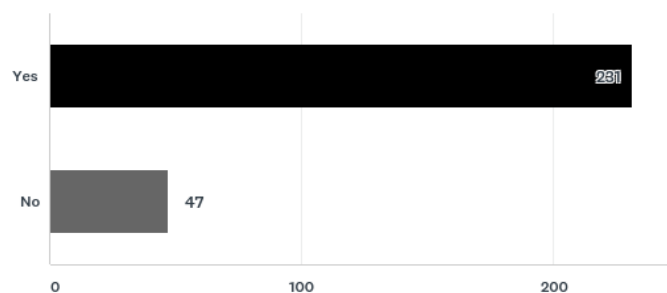
### Devices Used

Students will need to go online to access the videos generated by the lecture capture system. Students were asked about having access to internet and if they relied on using the computer labs at their nearest campus. In Graph 1 below, of the 278 student's responses, 195 (70.14%) indicated they had Wi-Fi/ internet at home.



**Graph 1: Students with Wi-Fi/ internet at home.**

Most of the students indicated they used the computers in the university computer labs which provide free internet. Graph 2 below shows that out of the 278 students who responded to the question in the survey 231 (83.09%) used the PCs in the USP computer labs.



**Graph 2: Students who used the PCs in the computer labs at USP Campus.**

### Recorded Video Usage

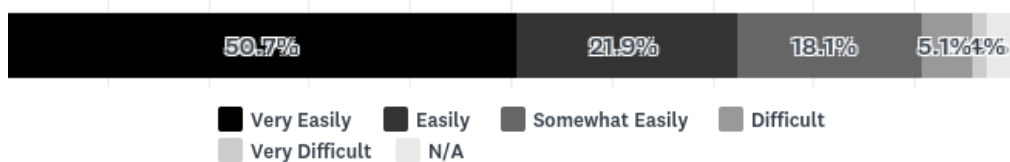
In this section of the survey, a question was asked concerning the frequency at which students watched the lecture videos. The percentage bar graphs below indicate students' response about how often they used the recorded lecture videos. As displayed in Graph 3 out of the 242 student respondents who answered the question the majority "Always" 121 students (50%) and "Sometimes" 91 students (37.6%) how often they watched the lecture videos.



**Graph 3: Students’ response to the how often they watched recordings of lectures.**

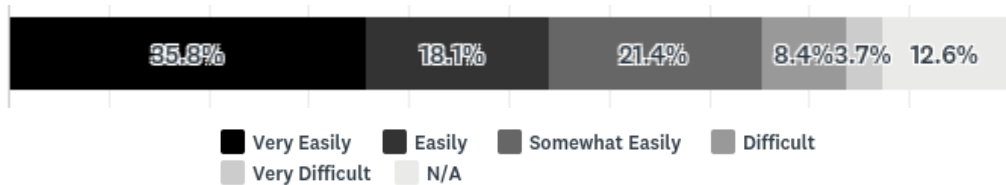
*Access & Support*

Students were to indicate how easy it was to access and find the lecture videos in their course online through Moodle, an LMS used at USP. Students were to rate from “Very Easily” to “Very Difficult” on how they were able to locate the videos on as shown in Graph 4. In general, out of the 278 students, 156 students (72.6%) found it “Very Easily” to “Easily” to locate the videos.



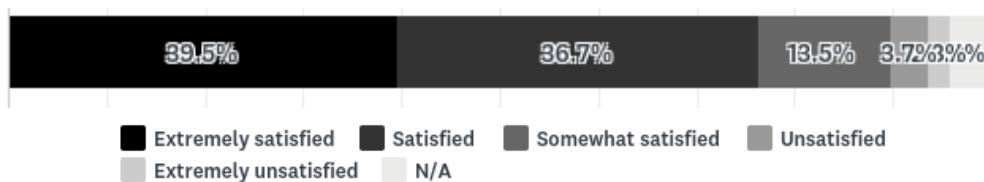
**Graph 4: Students response to finding the lecture videos on Moodle.**

In Graph 5 below, most of the 278 respondents 162 (75.3%) of them could “Very Easily” to “Somewhat Easily” access and watch the lecture videos online.



**Graph 5: Students response to accessing and viewing the lecture videos.**

In regards to the support and information students received when accessing and using the videos, as shown in Graph 6, the majority of students were mainly “Extremely satisfied” (85 students (39.5%)) to “Satisfied” (79 students (36.7%)).

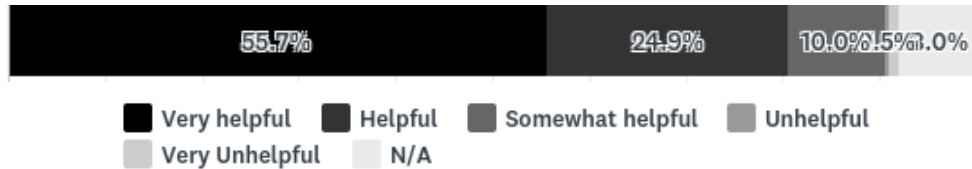


**Graph 6: Students’ level of satisfaction with the information provided about accessing and using the videos.**



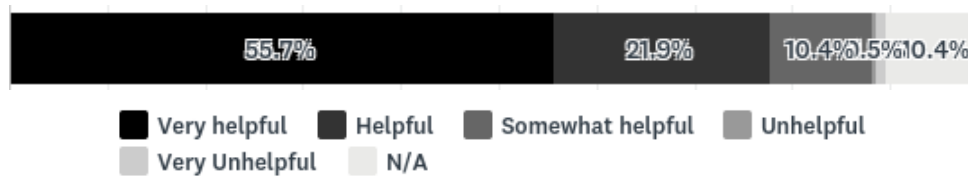
### Learning & Teaching

This section of the survey looked at whether students found the lecture videos helpful to their learning. 278 students had responded to the section of the survey indicating whether they found them “Very Helpful” to “Very Unhelpful” for preparing for exams. Graph 7 shows that most of the 278 students found the weekly lecture videos “Very helpful” (112 students (55.7%) and “Helpful” (50 students (24.9%)).



**Graph 7: Students’ rating how helpful the weekly lecture videos are to their studies.**

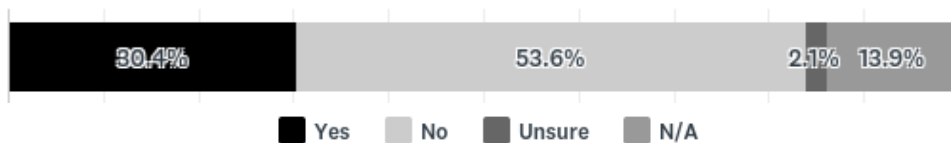
Graph 8 shows most students, 112 (55.7%) thought the weekly videos were “Very Helpful” in preparation for exams.



**Graph 8: Students indicating how helpful the lecture videos were to their studies.**

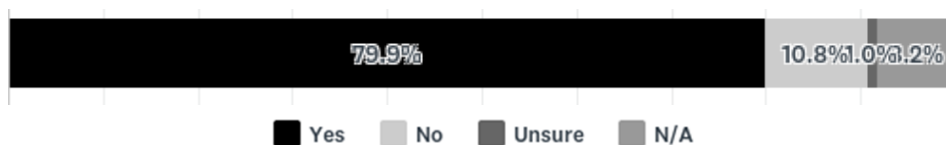
### Attendance, Engagement & Study

In this section students were to indicate how the lecture videos may affect their attendance and studies at USP. They were given a scenario to which they answer “Yes”, “No” or “Unsure”. There were 194 students who completed this section. Graph 9 shows that 59 students (30.4%) chose “Yes” to miss face-to-face classes because they knew it was recorded. Most students selected “No” 104 students (53.6%).



**Graph 9: Would you miss some face-to-face lectures if you knew they were being recorded?**

As shown in Graph 10 the majority of students, 155 (79.9%) do use the lecture videos to catch up with the notes when they are unable to attend lectures due to an issue arising which is out of their control. This does indicate how useful the videos are in these times.



**Graph 10: Would you use video lecture recordings to catch-up with notes when you were unable to attend due to unforeseen circumstances?**



Though students find the recorded lecture videos convenient, in Graph 11 108 students (55.7%) do indicate they prefer to attend the lectures rather than just viewing the recorded lectures.

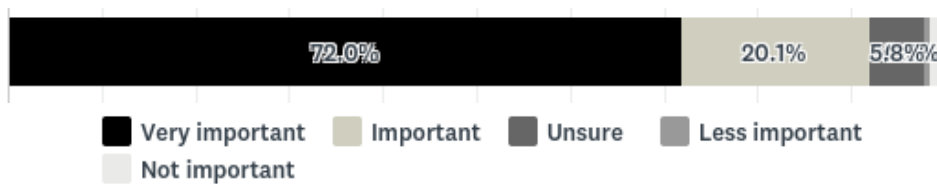


**Graph 11: Do you learn better if you attend the face-to-face lecture rather than the recorded lecture?**

### Future

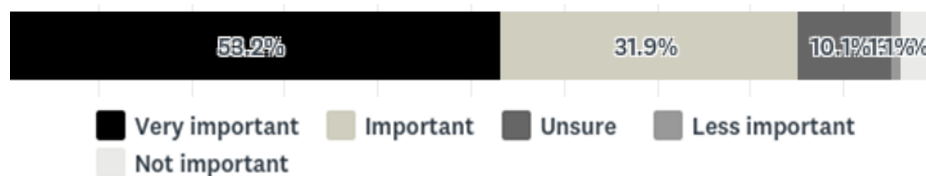
There are various possibilities in how the lecture capture system could be used at USP so in this section students were given a scenario and to rate if it was “Very Important” to “Not important” There were 189 students who responded to this section.

Students saw that it was “Very important” to have “recorded lecture videos available to create more interaction during the teaching sessions” as seen in Graph 12 below with 72% of the student respondents (136 students). “Very few” students 1.6 % (3 students) thought it was not important.



**Graph 12: How important is it to have recorded lecture videos available to create more interaction during the teaching sessions?**

In having “livestreaming of lectures available to all USP campuses for more face-to-face, tutorial or lab demonstration sessions” 100 students (53.2%) thought this was “Very important”, while a further 60 students (31.9%) saw it as “Important” which shows a favourable response to the suggestion as noted in Graph 13.



**Graph 13: How important would it be to have livestreaming of lectures available to all USP campuses for more face-to-face, tutorial or lab demonstration sessions?**

In looking further ahead to connecting students and lecturers in the región, they were to rate if it was important to have all lecture theatres, classrooms, tutorial rooms and labs in the USP region to have a video-conferencing system set-up. The majority of students, as seen in Graph 14, saw this possibility “Very important” (52.2%- 97 students) to “Important” (28.0%- 52 students).



**Graph 14: How important would it be to have all lecture theatres, classrooms, tutorial rooms and labs in the USP region to have a video-conferencing system set-up?**

Though looking into the future, and looking at possibilities, a common response to the open-ended question in this section is that students would like to see “better internet connection in their countries and around the USP campuses.”

### Discussion and Concluding Remarks

It is evident with the uptake of lecture capture that contemporary students are “digital natives and regularly consume media on mobile devices” (Smith & Sodano, 2011, p. 160). Lecture capture allows students today to access digitally stored presentations anytime and anywhere. And as the use of lecture capture technology increases within courses, the ways in which they are used is likely to evolve (Chester, Buntine, Hammond, & Atkinson, 2011).

However, the adoption of lecture capture more broadly depends on access to suitable devices for viewing. Though a high percentage of students had internet or wifi at home it would be important to point out that most of the student respondents were from Fiji where internet and wifi is relatively cheaper than other regional member countries of USP. It is not surprising that 83% of students use the PCs made available in the USP campuses as it is free to use and access the internet and wifi. Given this situation, it is reasonable to ask if lecture capture should be mandated or be seen as an option. With access to lecture capture, there is a possibility that there may be a decline in attendance at the lectures although few students (30%) indicated that they miss lectures because of the availability of lecture video.

Students are generally satisfied with the support they receive in using and accessing the weekly lecture videos. There is an indication that less than 50% of students “Always” use the lecture videos for various reasons in their course. Interestingly, below 40% of students have indicated that the transcripts and subtitles were not entirely useful. A majority of students (70%) use the videos for revision purposes and assignments. As pointed by a student in their response to a question about using the videos stating that it “is effective to my study at USP, as most courses offered haven't got (a) tutor for assistance. I rely mostly on them for my courses. ... (it is much) needed for me as a distance flexible learning student.”

While there is a continuing need for researchers to assess the engagement, attitudes, perception, and/or satisfaction of students with lecture capture, further research is needed to focus on direct measures, such as lecture capture usage and performance in flipped classrooms. Researchers could evaluate the impact of lecture capture technology on measurable student learning outcomes as well as the impact of lecture capture technology on student retention.



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## Online Tests and Feedback Practices: Reality Check

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### Abstract

The integration of online tests and feedback practices has the potential to improve learning outcomes amongst university students in some subject areas and at a particular level of study. However, it seems reality does not always match this assertion. This paper reports on an aspect of a broader research project which investigated the rationale, extent and nature of the use of online tests in a Business School at one Australian university. Specifically, it focusses on the feedback practices of staff, and the perceptions and perspectives of both staff and students regarding such feedback. Data was collected through multiple methods, including an LMS review, surveys and interviews. The findings of the study identified some issues around the nature and extent of feedback, the timing of feedback, the role of feedback as well as its necessity. In particular, the study indicates that staff and students are sometimes at odds regarding the role of feedback. Academic misconduct emerges as a critical issue in shaping how staff view feedback processes and practices around it. Related to this is the students attitude to learning, particularly their motivation for taking online tests. These findings indicate the need to interrogate feedback processes and approaches as part and parcel of the learning design process.

**Keywords:** Online Tests, Feedback, Formative Assessment, Learning Management System

### Introduction

The use of online tests as a method of e-assessment has become fairly widespread in higher education in particular contexts leading to numerous studies about their efficacy (Boitshwarelo, Reedy, & Billany, 2017). While there are other factors that contribute to the effectiveness of online tests, most research strongly suggests that the efficacy of this method of assessment is also highly enhanced by the integration of feedback processes (Nicol, 2007; Nicol & Macfarlane-Dick, 2006; Vasilyeva et al, 2008; Boitshwarelo et al, 2017). This is particularly so where the online tests are used mainly for formative purposes (e.g. Epstein et al, 2002, Gipps, 2005, Kibble, 2007; Nicol & Macfarlane-Dick, 2006). But what is meant by online tests, and what is feedback?

#### *What are Online Tests?*

Online tests broadly refer to any computer-assisted tests in which the deployment and marking (to a large extent) is automated, (Boitshwarelo et al, 2017). In the modern technological era, these are generally facilitated through learning management systems, using some form of 'test tool'. Thus, for purposes of this paper, the definition of online tests largely refers to assessment deployed through such tools, particularly those using questions where auto-marking is possible. The Blackboard LMS platform test tool, for example, has dozens of question types that can be deployed under the test tool, including multiple choice questions,



true or false questions, short answer questions and matching questions. However, by far the most commonly used question type in online tests is multiple choice (Davies, 2010, Nicol, 2007, Simkin & Kuechler, 2005). The test tools usually have different settings to perform different functions including the giving of feedback.

### *What is Feedback?*

The understanding of feedback has evolved from just information given to students about their work to being an integral part of teaching and learning that contributes to the student experience (Dawson et al, 2019; Henderson & Phillips, 2015). This more ecological view of feedback considers the nature, extent and timing of feedback as some of the key features in characterising it (Boitshwarelo et al, 2017). The varying permutations of these features can lead to nuanced and varied feedback practices. These practices also depend on the context within which feedback happens such as the nature and purpose of the assessment task, as well as the teaching approaches. Feedback can be quantitative, that is just giving a grade, and perhaps an indication of which answers were right or wrong. On the other hand, and more preferred (Henderson & Phillips, 2015) feedback can be qualitative in nature, giving more than just a grade. The extent of the qualitative feedback can differ from just indicating what the correct answer is to comments about why something is wrong or right i.e. correctional information. It can also offer praise for correct answers or encourage further study for answers that the students got wrong. Furthermore, in very interactive contexts automated feedback can be blended with offline or non-automated processes. The timing of feedback can be immediate or delayed. The delay can be on the basis of a number of factors such as due dates, when the last student submits or specifically scheduled at a particular date and time.

### *Effective Feedback and Online Tests*

The multifarious understanding of feedback as briefly discussed above begs the question of what is considered effective feedback for online tests. On the basis of their analysis of extensive research, Nicol & Macfarlane-Dick (2006) identified the now widely accepted principles of good feedback practice. These principles are applicable to all forms of assessment. Consistent with these, Boitshwarelo et al, (2017) in their synthesis of recent literature concluded the following specifically with respect to effective feedback practices in online tests:

- That feedback should generally be immediate and corrective, and where appropriate referring students to relevant resources to reinforce learning.
- That the nature of feedback should be such that it enhances learner self-regulation and motivation, building confidence and encouraging deep learning and ultimately optimising performance and enhancing student achievement in future assessments. One of the key ways of doing this is through providing students with opportunities for multiple attempts at a test.
- That it should synchronise and integrate with learning activities, and be used to diagnose problems and improve teaching as well as test and question design.

The above synopsis gives an ideal picture of how feedback can be used to enhance the effectiveness of online tests in the achievement of desired learning outcomes. However, in the context of practice, reality does not always match this ideal for a variety of obvious and not-so-obvious reasons. It is this discrepancy that this paper seeks to explore hence the aim as articulated in the next section.



## **Aim of the Paper**

The aim of this paper is to report on the feedback practices related to online tests in one Business school at an Australian university with a view to gaining understanding of the range, nature and rationale of these practices, and how they align or misalign with what the literature seems to view as good practice. The intention is to contribute to a better understanding of the existing gap between theory and practice and ultimately inform the improvement of practice in a more nuanced way. The report is informed by a broader research project which investigated the rationale, extent and nature of the use of online tests at this school. In the following pages the paper will briefly describe the methods used in the broad research, and then outline and discuss findings related to the feedback practices of staff, their perceptions and perspectives, and those of their students regarding feedback on online tests. The paper will culminate with some recommendations and/or implications for practice.

## **Methods**

### *Context*

The study that informs this report was carried out in 2017 at the then Business School at Charles Darwin University, a dual sector (Higher Education & Vocational Education and Training) institution. The study focused on Higher education(HE) units (known as subjects, courses or modules in some institutions) which are predominantly delivered online or in blended mode. CDU offers fully online delivery for HE units to external students (usually comprising well over 50%) and blended learning for internal ones. Thus, almost all the HE units, with the exception of mostly a few postgraduate research units, are online reliant.

Owing to its online reliance in the delivery of education, CDU has quite a high usage of online tests. Analytics data obtained from the learning management system(LMS), Blackboard Learn, known as Learnline at CDU, at the beginning of 2017 indicated that well over 5,000 online tests, including both deployed and archived online tests, were stored within the LMS, demonstrating the widespread use and potential impact of online tests to both students' learning experiences and assessment practices. Of these online tests, close to 45% were attributed to units in the CDU Business School. Thus, while the school uses a variety of assessment methods and approaches, online tests seemed to be common across disciplines and levels of study hence the focus on the school.

### *Data Collection*

The broad question for this research project was: What are the online tests practices of staff at CDU, their perceptions and those of their students? To achieve this, multiple approaches to data collection were used to gain multi-faceted information from different perspectives as described below.

### *Learning Management System*

To understand the online tests practices of staff the Learnline test tool, a tool that allows staff to create and/or import, deploy and manage tests online, was reviewed for all test activities and information in the various units. Learnline provided a wealth of information in terms of the what, the where, the when, and the



how of the different test activities in the units. The data collected included a number of elements such as the following:

- Learning outcomes mapped to online tests and their cognitive levels
- The number of deployed online tests in each unit
- The number of graded versus ungraded online tests
- The weighting of graded online tests
- The types of question used (e.g., multiple choice)
- The frequency of tests (e.g. weekly)
- Whether random blocks or question pools were implemented
- The number of attempts at a test allowed
- Question display, whether all at once or one at a time
- Location within the unit
- Feedback settings and type
- Test availability
- Time restrictions
- Question ordering
- Question source and whether publisher test banks were used

Our interest in this paper is on data related to feedback.

### **Student and Student Survey**

In addition to the Learnline review, two online surveys were run for students and staff: the survey of students in the CDU Business School was focussed on their perceptions and experiences of online tests and included questions on feedback. 122 students (about 6% of the school's student population) responded. Similarly, the survey on staff of the school focussed on their use and perceptions of, and experiences with online tests, with some questions focussing on their feedback practices and beliefs. 21 staff members responded to the survey which constituted about 50% of the staff in the school.

### *Staff Interview*

Semi-structured interviews were conducted with six selected CDU Business School staff from disciplines in the school where there was wide usage of online tests. The interview schedule, which was partly informed



by findings from the data collection methods above, were used to gain rich in-depth qualitative information in relation to the use of online tests, with feedback discussed quite critically

## Findings

The findings below are a result of distilling feedback-related data collected through the methods described above.

### *Feedback Settings and Types*

Of the 78 units reviewed in Learnline 93% of the online tests provided feedback to students following submission mostly in the form of a score, sometimes indicating which questions had the correct answers. Only 8% of the total online tests gave both the score and qualitative feedback to students. This applied to both publisher test bank-sourced questions and staff-developed questions. In terms of the immediacy of feedback, the dominant practice was the giving of immediate feedback after submission in the form of a score per question; this was the default setting for creating an online test within Learnline.

Indeed, this scenario was reflected by students' response in the survey where only 9% of students indicated that they received developmental feedback from online tests - that is feedback that provides more than just a score and/or the wrongness and/or rightness of answers.

### *Students View of Feedback*

Responding specifically to the question of 'what type of feedback they wanted,' the students, mostly pointed out that:

They would like feedback in terms of:

- The score, and indication of what questions they got right or wrong
- Communication of the correct answer where they have gotten an answer wrong
- An explanation of why the answer is right or wrong, although most students seemed to only want an explanation only when they have gotten the answer wrong.

In terms of explanation of correct answers, one student indicated that 'Explanation of the correct answer and for more complex questions how the answer was reached what chapter is the question related to in the prescribed book.' Another student, said: 'It would be good if the lecturer could go through the results in the following tutorial so that you could understand what you did not understand. This would not take long.' Probably a related comment was this one: 'MCQs can be ambiguous if they are applying a concept to a real-life scenario, rather than directly asking about the [text] theory. Therefore, narration would be helpful feedback.' This is interpreted as need for feedback that assists students to nuance application of concepts of which a tutorial (an avenue for 'narration'), rather than just written comment, would be most suitable. Clearly there is varying degrees of expectation of feedback from the simple to the comprehensive, and to a limited extent interactive.



### *Staff View of Feedback*

More broadly staff agreed with the self-regulatory and formative assessment roles of online tests with nearly 79 % of staff agreeing that online tests help students to keep up with their studies and 64% believing that online tests prepare students for other assessment tasks. However, there is less agreement in terms of perception and practice of feedback, which is a practice that underpins the above roles. Only 50% believed feedback is essential for effective online tests and with only 50% indicating that they, in fact, design online tests with written feedback in addition to marks, an interesting outcome given that only 10 % of units had written feedback from the LMS review. Part of the reluctance to give feedback is explained by this comment: “I am not keen on giving student feedback on the correct answer as this will mean having to generate new questions each iteration of the unit”. A strategy that is often used in conjunction with feedback to facilitate the formative role of tests is multiple attempts at taking a test and about 71% staff agreed that it is an effective learning tool for students. However, 57% of staff had grave concern over this strategy indicating it encourages collusion/cheating by students in tests, a problem which is believed to be rampant.

Further insight about perceptions on feedback was gained from the interviews. While the importance of feedback was not denied, there was a view that a number of factors either mitigated against engaging in ideal feedback practices or make it unnecessary, in some instances. For example, some staff acknowledged that while feedback can be improved through identifying and categorising areas of poor performance, it is not done due to time constraints. This relates to the broader issue that was expressed consistently that the amount and quality of feedback is resource dependent. There was also a view that some tests or questions do not need feedback and that students need to be proactive and revisit textbook if they perform poorly instead of expecting feedback from lecturers (otherwise this creates lots of work for lecturers). Some staff also intimated that feedback they give is unlikely to be used by students, as once they have marks they are not interested in anything else. Regarding when feedback is given, a view was expressed that in some instances, feedback may need to be delayed to avoid collusion especially where the test is scheduled across different time slots or is available for longer periods.

### **Conclusions, Implications and Recommendations**

The findings outlined above, while not extensive, indicate a number of issues. Firstly, it is clear from reviewing Learnline that the feedback that is associated with the tests is mostly basic i.e. a score, and perhaps the indication of which answers were correct or wrong given immediately as per the default settings of the LMS test tool. Secondly, from the student survey, it was revealed that most students would like more feedback than they are currently given, but whether they would use that feedback productively is another question. Contrary to the students’ desire, staff, though acknowledging the importance of feedback, are reluctant to give more qualitative detailed feedback because they consider that it is:

- Not sustainable i.e. requires time and resource to design and implement and follow up or
- Not necessary because students can take responsibility of their own learning i.e. where they find that they have not performed well they can go back and remedy their weak areas.
- Not likely to be utilised
- Compromises integrity of tests, particularly in cases where the test either has to be reused or is taken at different times.



Clearly there is a gap between what is recommended in the literature and the practices investigated at the school. The literature as discussed earlier recommends a more qualitative and developmental approach to feedback, that is highly integrated with the learning process, and perhaps scaffolded by the teacher, while also giving agency to learners (Boud & Molloy, 2013; Boitshwarelo et al, 2017). There is also a gap between what the students desire and what lecturers can offer i.e. a difference in expectations. It is the view of the researchers and the author that the reasons given by staff for engaging in limited feedback practices are somewhat justified, given the prevailing pedagogical approach and contextual factors. The issue of academic integrity does complicate matters even further and is probably much more systemic than this paper can address. The gaps in practice identified here are not unique and have been articulated by others and recommendation given for more effective approaches (e.g. Boud & Molloy, 2017; Henderson & Phillips, 2015; O'Donovan, Rust, & Price, 2016). What is perhaps significant about these findings is their specificity to online tests.

Underlying these gaps, it seems there are three critical issues that emerge from the analysis:

- Limited clarity on the purpose of the online tests
- Lack of explicit communication of the role of staff and students with respect to feedback.
- An apparent heavy use of summative assessment approaches in what should primarily be formative assessment.

It is thus suggested that resolving these issues would go a long way in closing the gap. The principles of feedback (Nicol & Macfarlene, 2006) and, more specifically, their implementation in e-assessment contexts (Nicol, 2007), might provide robust guidance, in this respect. Thus, rather than simply giving more feedback, these issues imply a more nuanced shift in pedagogical approaches as recommended below:

- Explicit communication of both the purposes of online tests in a unit, and expectation on both students and staff. When the purpose of a test is clearly communicated to students and their role vis-à-vis the lecturer's role regarding feedback is clarified, then the issue of discrepancy of expectations would be minimised. For example, if an online test is primarily for self-assessment of understanding of concepts as they are learnt, then the expectation might be that the student takes a greater responsibility to respond to the feedback, regardless of whether it is quantitative or qualitative, giving them self-regulatory agency. In contrast, for more challenging or developmental tests, the teacher could be expected to play a greater role and scaffold the process by integrating it into the teaching and learning cycle.
- The use of feedback, of whatever nature, should be a basis for dialogue and further learning and be of relevance to subsequent assessment (Carless et al., 2010; Boud & Molloy, 2017). This relates to the scaffolding mentioned above and takes a view that feedback is not the end-point of teaching and learning of a particular topic but merely the start of another spiral cycle.

There are contextual implications of these shifts from the curriculum design, implementation environment, and learner perspectives. The way curriculum is designed can constrain and/or afford good teaching practice (Boitshwarelo & Vemuri, 2017), including feedback processes. If feedback is an afterthought in the curriculum process, then there is bound to be gaps and frustrations on both students and staff. However, when feedback becomes a 'necessary characteristic of any given curriculum' (Boud and Molloy, 2013, p707), then online



tests become more than just tests but opportunities for self-regulation, intervention and dialogue, increasing sustainability for the lecturers and ownership by students, as well as reducing concerns about, and possibilities of academic misconduct. This has implications for how online tests relate to other assessment tasks, how the teaching is sequenced and how the learners are scaffolded to develop capacity for self-monitoring i.e. the whole learning design.

The implementation environment is complex and some aspects of it are often beyond the control of the lecturers e.g. mode of delivery, class sizes and nature of the student cohort. It is obvious that if the implementation environment is resource strapped, good assessment and feedback practices will be compromised. However, the problem of resources is a systemic one and will probably always exist. Therefore, a continued awareness of these constraints and accordingly frontloading some of the work through smart curriculum design and appropriate planning can circumvent some of the problems.

In the case of CDU — having a mix of external and internal students, international and domestic students, mature students and school leavers — finding a formula that works for every student becomes a challenge. However, this goes back again to how curriculum is conceptualised and developed: if curriculum becomes content-heavy and is just a series of transmitted discrete concepts then it won't be agile or flexible enough to accommodate diversity, eventualities, and emergent needs. Consequently, learning turns into a pressure cooker where some students may find themselves engaging in survival mechanisms such as surface learning and academic misconduct. Thus, a more flexible and less prescriptive curriculum allows for a more agile learning design, making possible the tailoring of strategies of feedback practices, including allowing learners to elicit feedback as needed. This implies that students' feedback literacy needs to be enhanced, also (O'Donovan et al, 2016).

In summary, it has emerged from the discussion in this paper that a gap exists between students and staff conception of how feedback should be handled. Additionally, staff at the CDU Business School had reasonably justified reasons for limiting their feedback practices consequently leading to a less than ideal situation. However, with the current curriculum approaches and the prevailing circumstances this conundrum will be near impossible to resolve. Thus, the paper has suggested a significant shift in curriculum practices and pedagogy to allow for a more explicit and organic engagement with feedback.

The discussion in this paper has only addressed what is only an aspect of a broader study on online tests. Therefore, acknowledgement is made that feedback is not isolated from other online test practices (Bearman et al, 2016). These broader practices which will be discussed comprehensively elsewhere in a separate paper. However, feedback is a key pedagogical practice which, if properly conceptualised and implemented, can positively transform the use of online tests. It is hoped that the lessons teased out from these findings would motivate practitioners to think more strategically about how they enhance the effectiveness and efficiency of feedback in online tests, particularly in open and distance learning contexts where flexibility is of paramount importance.



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## Every Contact Counts - Prison Officer Education in Ireland

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### Abstract

The Higher Certificate in Arts in Custodial Care (HCCC) is the entry-level qualification requirement for all new Recruit Prison Officers in the Irish Prison Service (IPS). It is a Level 6 two-year blended learning programme jointly developed and delivered by the Irish Prison Service College (IPSC) and Waterford Institute of Technology (WIT). In late 2018, Ireland's National Forum for the Enhancement of Teaching & Learning in Higher Education offered a funding stream for programme enhancement, through which the HCCC team were successful in procuring funding for the 'Every Contact Counts' project. The project began in April 2019 and seeks to address the challenges unique to the programme context, design and delivery. Following ethical approval, the first phase of the project comprised qualitative analysis with programme staff. The following paper presents the context of prison officer education in Ireland, the underlying philosophy of the HCCC and the findings of this research as they relate to the online elements of programme delivery. It is important to note however that the topic of online delivery within the programme represented less than 10% of focus group data. The more dominant topics of discussion were the challenges and opportunities of delivering at Level 6, embedding teaching and learning in the work practice of custodial care, and managing the unique dynamic that these elements bring to the face-to-face classroom. From an online perspective, the experience of the participants reflected (in part) a study of Irish academics' perspectives on professional development (Slowey, Kozina & Tan, 2014). Participants recognised a need to upskill for online delivery but lacked the time or a sense of 'academic capital' to engage in teaching and learning professional development. It is hoped that the development of policies for digital teaching and learning (National Forum, 2018) will pave the way for a co-ordinated and strategic approach that will facilitate staff professional development in online teaching and learning.

### Introduction - Changing Modes of Prison Officer Education

The Council of Europe establish standards for the performance and development of prison staff. They state "prison staff carry out an important public service" (Council of Europe, 2006) and recognise that the role of the modern professional prison officer is a highly complex one. The care versus custody debate has shifted to one in which the entanglement between social care and the provision of safe custody through the maintenance of order is situated in the concept of dynamic security. The mission of the Irish Prison Service (IPS) is to provide "safe and secure custody, dignity of care and rehabilitation to prisoners for safer communities" (Irish Prison Service, 2019). To ensure the delivery of services the modern professional prison officer requires counselling skills, to work as carer and role model and to manage social order through policing



skills. In this context the Council of Europe recommended “recruitment, training and conditions of work shall enable them to maintain high standards in their care of prisoners” (Council of Europe, 2006).

Researchers who looked through the prison walls have identified the complexity of the staff roles in the prison environment (Crawley, 2004; Liebling et al., 2010; Lygo, 1991) The prison environment has come under increased scrutiny which tends to focus on the quality of services delivered, the people who deliver them and management of prisons and imprisonment (Bennett, 2015). In recognition of the need to provide prison staff with a professional qualification, the IPS, in conjunction with Institute of Technology Sligo, designed and delivered the Higher Certificate of Arts in Custodial Care (HCCC), a bespoke NFQ Level 6 learning programme for all new entrant Recruit Prison Officers (RPO). The introduction of the HCCC responds to the Council of Europe recommendation that “before entering into duty, staff shall be given a course of training in their general and specific duties and be required to pass theoretical and practical tests” (Council of Europe, 2006).

Prior to the introduction of the HCCC the training and induction for prison staff was managed through the Irish Prison Service Training and Development Centre (IPSTDC). Induction training was nine weeks in duration, during which prison officers received prison craft skills from prison officers who had extensive experience in the operational environment. This model was similar to other jurisdictions (Bolger & Bennett, 2012). Alongside the transition to the HCCC, the IPSTDC became the Irish Prison Service College (IPSC), resulting in an upgrade to the Instructor competition. A third-level qualification became a desirable requirement for staff assigned to the IPSC. In 2016, Waterford Institute of Technology (WIT) was awarded the tender to co-develop and co-deliver the HCCC, with the first Recruit Prison Officers (RPOs) undertaking Semester One in Spring 2017.

Three key principles underlie the current programme’s design and delivery. These are that it is work-based and applied, that it is underpinned by reflective practice, and that it is delivered in blended learning mode. In relation to the first principle, Semester One is delivered in full-time mode between two Irish Prison Service sites. RPOs then complete Semesters Two, Three and Four in blended mode while working full-time. Thus for all semesters ‘on the job’ applied learning and classroom learning are contemporaneous. The second principle of reflective practice aims to achieve three things. These are to enhance RPO awareness of the values and habits that they bring to their professional practice and that the Irish Prison Service espouses; to improve RPO responses and learning from on-the-job situations (Argyris & Schön, 1995), and to improve RPO report writing ability. An additional benefit of reflective writing is the potentially positive mental health effects that the process can bring to dealing with stressful and distressful events at work (Moon 2004, Bolton & Delderfield, 2018).

The third principle of the programme delivery is blended learning. Semester One is delivered almost entirely in a face to face mode. Following that first twelve weeks, which are delivered throughout the year on a rolling basis (i.e. seven groups completed Semester One in 2018), RPOs participate in a ‘Passing Out’ ceremony in recognition of successful completion of Phase One of training. In subsequent semesters, RPOs work a full-time shift pattern in a Dublin-based prison while completing the remainder of the HCCC. Semesters Two to Four of the programme are delivered in a blended mode, with approximately one-third of the contact time delivered face-to-face with the remaining one-third delivered through self-paced online learning (Troha 2009).



The programme is delivered across three sites: The Irish Prison Service College in Portlaoise, Wheatfield Prison Educational Facility in West Dublin, and a WIT Dublin-based venue. Academic and support staff are based in WIT's Waterford campus and the Irish Prison Service Phibsboro campus in Dublin. Creating a team community of practice across all of these sites, when programme colleagues do not meet in their daily work lives, is a challenge. Over thirty colleagues from both organisations are directly involved with the management and delivery of the programme. The HCCC teaching and management team comprises tutors, management and administrative staff from the Irish Prison Service and academic, management and support staff from WIT. The experience and expertise of colleagues is diverse, with many moving between different roles within their organisations. This includes for example prison officer and tutor roles within the IPS or project management and lecturer roles within WIT. This reflects Whitchurch's idea of 'the rise of the blended professional in higher education' (2009, p. 407). In addition, the programme relies heavily on colleague support in a variety of key roles, from WIT's Registration Office and Centre for Technology Enhanced Learning, to Professional Prison Officer colleagues in Midlands Prison who work with each new group of recruits during their first weeks on the HCCC. The scale of the programme has grown rapidly, with over 370 Recruit Prison Officers (RPOs) registered on the HCCC over the past two years, including over 85 RPOs who have completed the programme and will be conferred in November 2019.

Prisons have an obvious security imperative and this places access restrictions both on computers and the internet when on prison campuses. It is not possible to bring a phone or laptop to work when in the operational environment, and there is a strong firewall on the internet access available on organisational computers. As a result, part of the organisational culture of communication in the IPS is a lower use of and reliance on email compared to WIT. This is just one example of organisational difference between the two partners, which together with the multi-campus nature of the programme, the size and diversity of the student body and team involved in programme delivery and the complex and challenging nature of the prison context, makes for a fascinating and ever-evolving teaching and learning experience.

### **Research Methodology**

The project was granted ethical approval from Waterford Institute of Technology and the Irish Prison Service in March 2019. The broader philosophical approach in this study lies within this framework of post-positivism and adopts a social constructivist analysis. Shared principles of the post-positivist tradition include the view that reality is multi-layered and complex (Cohen, Manion and Morrison 2011, p. 17) and that 'strategies that take the subject's perspective are central' (Briggs, Coleman and Morrison 2012, p. 23). Within the post-positivist paradigm, emphasising the experience of the individual, lies constructivism which asserts that people develop subjective meanings of their experiences, and that these meanings 'are negotiated socially and historically' (Creswell 2013, p. 25). Appropriate to this approach, nominal focus groups (Varga-Atkins, McIsaac & Willis 2017) were conducted across four sites; Wheatfield and Phibsboro, which are prison campuses in Dublin, the Irish Prison Service College in Portlaoise, and WIT in Waterford.

Three topics were discussed for approximately half an hour and then each participant wrote down on a post-it note one element of the programme they wished to maintain and one change they would like to see on the programme. The three topics were providing induction support for new staff joining the programme; the co-creation with students of teaching & learning resources and professional development needs and requirements. Staff responses to these topics overlapped and following analysis of both the post-it notes,



and the focus group transcription data, three key themes were identified as follows: the Staff Experience; the Student Identity and the Team Dynamic. Each of these three themes is now addressed in turn from the perspective of online learning.

### **The Staff Experience**

Slowey, Kozina and Tan (2014) note that ‘despite the centrality of teaching in higher education, academic staff are primarily appointed on the basis of their disciplinary knowledge’ (p. 13). The team on the HCCC reflect this appointment practice and include both experienced and early career lecturers from WIT and experienced prison officers and tutors from the IPS. Members of the teaching team bring both their discipline expertise and operational environment expertise and experience to the programme, with a diversity of pedagogical knowledge and backgrounds. In terms of digital capacity, the programme delivery staff have a variety of experience with virtual learning environments (VLEs) and online teaching and learning. WIT’s VLE currently is the Moodle platform. The following statements represent the range of previous engagement with the VLE facility:

‘This Moodle is a fantastic tool that I didn’t know anything about until this year because I never used it’.

‘I had done a good bit of mature learner, blended learning and reflective practice so that’s why I was, kind of, fitting in to [the module]’.

The general experience however is limited, with Irish Prison Service staff having no experience of using a VLE for the design and delivery of Semester One which is mostly delivered in the prison context and face-to-face. The majority (though not all) WIT staff have experience of using Moodle as a learning tool, and two of the team have developed and delivered blended learning modules in the past. The prospect of delivering on a blended learning programme for the first time is recognised as a challenge:

‘I suppose coming in the big thing was – ‘this is blended learning now’. This is going to be completely different to the delivery of our regular lectures here in WIT and that was something that fazed me and it was, I won’t say a fear but, you know, there was a huge concern over that’.

Another colleague noted of the VLE that

I’ve definitely gotten better and it looks nicer. It’s a better, sort of, presentation of the material. But, again, I wouldn’t claim any, kind of, real detailed knowledge -

The impact that varied staff digital capacity has on the student experience is acknowledged:

And inevitably for the ... student, that is, I’m sure bleeding obvious that, you know, from us on our side there’s this unevenness and mixed abilities maybe, if that would be the word.

WIT staff repeatedly emphasised the benefit of the support offered by WIT’s Centre for Technology Enhanced Learning



I availed of some help from [my colleague in the CTCL office], in particular, he was very good to me ...

We do have a great CTCL office, you know? Like, [my colleague there] has been helpful to me, do you know what I mean, that we do have support there when we go looking for it.

Two points arose from this. First, while support is available, there is not a systematic approach to preparing staff for the transition to delivering content online. Second, that when individual staff identify professional development opportunities that would benefit their practice and organisation, they are not always enabled to undertake it. This first point was articulated by a staff member when discussing the availability of professional development opportunities.

... it becomes very piecemeal and very uneven. Some of us are very good at some things and crap at others and so on. Because there's no shape on it or no strategy or no, there's no goal even as such so development to what exactly or for what or what are you trying to get to? There's none of that so something a bit more structured would certainly create a consistency that's not there now.

The National Forum for the Enhancement of Teaching and Learning (2015) note that 'the focus on digital capacity building has shifted decisively towards questions of professional development of academic staff in their teaching roles and to the organisational factors that must be addressed in order to embed scale and sustainability' (p. 2). Challenges and barriers to engaging in professional development for online learning reflected recent survey results of the sector more broadly, where 'lack of time was the most common reason given for not participating in professional development' (Slowey, Kozina & Tan, 2014, p. 36). Irish Prison Service staff recognise that management are there to support them in undertaking professional development:

- VOICE 1: I genuinely think that the management here are very supportive of that kind of thing.
- VOICE 2: They're very open.
- VOICE 1: Like within the teaching strategies, we have that coming up-
- VOICE 3: Yeah, we do that.

However, the reality of the demands on the Irish Prison Service College, both in delivering the HCCC, and in providing continuous professional development (CPD) to existing staff across the service, means that the opportunities for the teaching team to engage in review processes or professional development is limited:

The bottom line is there's too many groups coming in to allow us to sit, configure what's working, what's not working, have a bit of professional development time. We're on about professional development, the whole organisation. We're the ones who do all that training - but we don't get it ourselves.

This is mirrored by the WIT experience, where this participant expresses a desire for professional development, but lacks available time to undertake it:

Actually having a little more training around both blended learning and then the use of online resources. Because, I suppose I did a few sessions with [the CTCL office] but...it's hard to find the time to do that. That's the biggest resource that we lack, you know? I'm not doing anything more because ...I'm at full capacity and that's it.

### **The Student Identity**

IPS staff acknowledged the challenge faced by the student cohort upon entry into the Irish Prison Service, in that they must quickly develop and accommodate the roles of student and Recruit Prison Officer. Transition of this nature is consistent with Stryker's (1991; 2008) sociological psychological theoretical perspective of identity, which recognises that as individuals within a modern society undertake a range of different roles, they can therefore develop a diverse range of identities. These can manifest across time and different contexts (Hamilton, 2017), as evidenced here by the move of the student away from a civilian identity to that of a Recruit Prison Officer.

They're coming into a uniformed, disciplined organisation and it's something you said earlier on, even sitting at this table you have blue shirts on this side-and you have yourselves on that side. Where you said we're prison officers and you're civilians.

However, it was noted by WIT staff that this transformation in professional identity posed a challenge to the extent to which a learner or student identity was formed. Indeed, the student or learner identity (from a Higher Education perspective at least) is one that is only fostered briefly at certain time points in this initial phase. A further significant transition occurs with the 'Passing Out' ceremony in recognition of successful completion of Semester One and the start of the Recruit Prison Officers working in their designated prison. While on duty they work as part of team with professional prison officers and take on similar levels of responsibility. The challenge this transition in identity appears to create is that they then tend not to identify as recruits or students. Spending time in a classroom to complete a qualification appears to create an additional and unnecessary stress burden for these work-based learners, especially in a context where the merits of academic study are not readily recognised.

They leave Semester One and then they start operating as a prison officer, even though there are an RPO, everything that they do is the same as a prison officer...I asked .... 'What is the difference between a recruit and a prison officer?', and he said, 'No difference. Zero difference'. I said, 'Ah, that's it. That's it. That's the problem'.... They're talking on this extra responsibility and having to work...study in the evenings, all of this, and...nobody knows what it is, nobody even cares.

The challenge of developing a coherent student or learner identity is exacerbated by the fact that much of the programme is delivered and assessed asynchronously in a blended learning format. There are no written examinations beyond Semester One of the programme, with continuous assessment strategies employed instead. RPOs are not required to attend the actual higher education institute to which they are registered and complete the programme outside of a recognised shared learning environment. There is also considerable reliance on online delivery in particular to ensure that core programme content is covered and that RPOs have access to library resources, support and feedback when completing assignments and a platform to upload continuous assessments. This reliance can be challenging for many RPOs who lack basic



digital skills or experience and confidence in using a VLE. Coupled with this is the fact that despite working long shifts there is little opportunity to engage with coursework on the job, due to limited access to computer facilities and necessary security measures. IPS staff, for example, cannot bring mobile phones or laptops into a prison campus.

They come and tell us, and said about Moodle, 'Could you give us a handout of where to click and do all that stuff?' ...So, in class, could we have an actual like printout of a slide to say, 'Look, go here, go here, click here'. Because there's some guys there who are literally just going to click into Air Lingus to book flights, that's all they do...And they wouldn't do that.

The unique nature of this cohort represented a significant change in normal teaching practice for most WIT staff, who spoke positively of meeting the requirements of working professionals and of the need to tailoring their style of delivery to the needs and preferences of the RPOs.

To get that academic material they could connect with the practice of the prison officers, to make it relevant and understandable and all of that, that's a major challenge.

This did also bring some challenges, including managing a strong male dynamic in the classroom, delivering to a student group un-used to higher education and coping with students with an apathetic or even cynical attitudes to the programme. Perhaps more significantly however these issues, in conjunction with the cohesive nature of the RPO student group, could also mask considerable variation within the groups.

I had dealt with prison officers for years...what it meant, I suppose, is just that you're sort of braced for the cynicism... I have found the dynamic of the groups to be different.... they do reflect, sometimes you get all the issues coming back in the assignments that doesn't come up in the class...I think it's a risky assumption to make, to work off a stereotype that... there's a typical learner in this classroom or is a typical person.... there's a mix.

### **Team Dynamic**

Participants articulate a frustration with the inability to meet and review teaching and learning practice. IPS colleagues recognise the need to meet regularly for review purpose:

So we come together for the HCCC meetings now. There was not-, at a time we had no meetings going on here, and we literally had to put the foot down, the whole lot of us and said, 'Look, this is not good enough for us, to be moving forward'.

We're grossly understaffed. That's one of the big issues. And because we're grossly understaffed, we didn't have time to have these meetings.

Colleagues from both the IPS and WIT recognise the potential benefits of a community of practice:

I think definitely team meetings, like, just being able to get this room for an hour a week where anybody who wants to come in and just talk about what they're doing, what the challenges are, you know, what we're each doing to, kind of, overcome things like that. Like, I might say,



you know, 'I had this issue', and you might say, 'Oh, you know, I actually got it around it this way', so that there be a peer, kind of peer-led learning, I suppose.

There's so much crossover. I think that is really important to have that link, to be able to chat within the lecturing staff community.

## Conclusion

A key aim of the 'Every Contact Counts' project is to contribute to wider discussion on online teaching and learning, to advocate for enabling policies to support staff and ensure our students can 'work, live and learn in a complex world that is increasingly digital' (National Forum 2014). Several findings from this study are relevant to this aim. Firstly, while the programme delivery staff had a variety of experience with online teaching and learning, this was mostly quite limited. Irish Prison Service staff typically had no experience of using a VLE. In addition, while the majority of WIT staff have experience of using Moodle as a learning tool, delivering on a blended learning programme for the first time was recognised as a major challenge. Though support was available, there was not a systematic approach to preparing WIT or IPS staff for the transition to delivering online, nor were opportunities to pursue professional development consistently facilitated.

The presence of multiple, changing and sometimes conflicting professional and student/learner identities among the RPOs was a challenge for staff. The blended learning nature of programme (including the significant reliance on online delivery) and the heavy RPO workload appears to contribute to this in a meaningful way. It will be valuable for the project team to explore these issues and potential resolutions in more detail with the RPOs directly. Finally, WIT and IPS staff both expressed a desire to meet more regularly to support the development of a community of practice and review teaching and learning practice and ensure. This is an important finding in terms of the 'Every Contact Counts' project as our ongoing aim is to enhance digital capacity on the HCCC through building a supportive community of practice from the bottom up.

According to the National Forum for the Enhancement of Teaching and Learning in Higher Education (2014), 'building digital capacity in higher education is about developing 'skills, competences and attitudes that enable people to work, live and learn in a complex world that is increasingly digital'. However, the European Commission's High Level Group on the Modernisation of Higher Education in their 2014 report note that 'there remains a culture of conservatism within European higher education which needs to change', and while innovative online teaching and learning is developing across the sector 'this is happening to a large degree in an uncoordinated bottom-up approach'.

The National Forum in 2018 published a guide to developing enabling policies for digital teaching and learning. The Enabling Policies Project identified five topics 'which represent emergent policy areas for digital teaching and learning approaches as they are characterised as having wide pedagogical, institutional, legal, ethical and regulatory implications' (2018, p. 1). Under the curriculum design topic for example, an enabling policy that both mandates and facilitates academic staff to undertake training in the use of new e-learning technologies will be welcome.



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## Designing Transformative Online Learning Environments: A Case Study

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### Abstract

Transformative learning has long been proven to be of foremost importance in adult education. Its emphasis is on critical reflection, contextual understanding, and reflective discourse with others that, when utilized properly, can lead to civic engagement and, possibly, societal change. The literature is ripe with conditions for transformative learning to occur amidst varying approaches from several proponents such as Mezirow (1994), Taylor (2001), Dirkx (1997), and more. Applying the theory to online education, however, poses greater challenge because of its unique learning environment—teachers having less control of the teaching-learning situation and the self-directed nature of online learning. How can transformation to a desired direction happen in online students? What online learning practices best support transformative learning? Studies on transformative learning in online education is yet scanty and is in need of more research-based application ideas other than the generally accepted value of critical reflection in student journals. The purpose of this study was to examine how online learning environments can be designed in ways that allow transformative learning to take place and thus create greater impact in society. Using a single case study design, a fully online graduate school was chosen due to its purposeful transformative learning approaches in its classes. Documentary and discourse analysis, as well as student interviews, were conducted to scrutinize 9 graduate online programs, which cater to students in more than 40 countries around the world. Results showed curricular and co-curricular elements of the online learning environment that contributed to transformative learning outcomes. Classroom practices such as reflective thinking, affective learning, digital storytelling, fieldwork, contextualized learning experiences, and devotionals were found to have contributed to transformative learning. Moreover, schoolwide practices such as faith-based curriculum and student participation in mission exhibition and online weeks of prayers were, likewise, found to have supported transformative learning. This study proves that transformative learning is best accomplished in an online environment with a holistic approach, starting with the design of curriculum, to the general school environment, and then to the teaching and learning events in the virtual classrooms. Recommendations for further study focused on conducting longitudinal studies of online students to determine actual outcomes of transformative learning. (Note: Actual videotaped activities of online students will be shown to provide ideas on how transformative learning is conducted in students' contexts.)

**Key Words:** Transformative Learning, Online Learning, Transformative Pedagogy, Whole Person Approach, Case Study



## Introduction

“Education is a human right with immense power to transform” (Annan 1999, 4). These were the words of the former UN Secretary General, Koffi Annan, as he addressed the state of the world’s education system. Recognizing education’s power to transform, transformative learning theory was conceptualized in an effort to explain how learning, as evidenced by changed or transformed perspectives, takes place among adult learners.

Transformative learning, according to Mezirow (1991), is “a process of construing and appropriating a new or revised interpretation of the meaning of an experience as a guide to awareness, feeling, and action” (33). Its emphasis is on critical reflection, contextual understanding, and reflective discourse with others that, when utilized properly, can lead to civic engagement and, possibly, societal change. As a pedagogical approach, transformative learning has been utilized in varied educational settings, particularly in eliciting change in perspective among students and, more importantly, in guiding them to act on their new understandings.

A review of empirical research, however, found that the practice of transformative learning is almost exclusively confined to traditional educational contexts (Taylor, 2007). The uniqueness of the online learning environment—teachers having less control of the teaching-learning situation and the self-directed nature of online learning—poses greater challenge in implementing transformative learning. How can transformation to a desired direction happen in online students? What online learning practices best support transformative learning? Studies on transformative learning in online education is yet scanty and is in need of more research-based application ideas. This study is then an attempt to examine how online learning environments can be designed in ways that allow transformative learning to take place and thus create greater impact in society.

## Review of Literature

Since the beginnings of transformative learning theory in the seminal writings of Jack Mezirow in 1978, several learning theorists and researchers have contributed to the development of the concept, such that it has become the “most researched and discussed theory in the field of adult education” (Taylor, 2007, 173). Currently, the theory is being approached in various ways such as Freire’s emancipatory approach, Mezirow’s cognitive-rational approach, Daloz’s developmental approach, Dirkx and Healy’s spiritual approach, and, more recently, whole person approach (Piercy, 2013). This review, however, focused mainly on the approach used in this study—Mezirow’s and whole person approach. A review of some empirical studies that utilized “transformative pedagogy” were also included.

## The Process of Transformative Learning

Transformative learning is based on constructivist assumption that learners make meaning, and hence learn, by interpreting and reinterpreting their sense experience based on their frames of reference or worldview (Mezirow, 1994). This worldview is formed by “a set of paradigmatic assumptions that derive from the individual’s upbringing, life experience, culture or education (Christie, et al., 2015). Adults resist learning when things do not comfortably fit to their meaning structures, but with their strong urgent need to



understand the meaning of their experience, they “strive toward viewpoints which are more functional: more inclusive, discriminating and integrative of their experience” (Mezirow, 1994, 223).

Mezirow argues that “particular points of view can become so ingrained that it takes a powerful human catalyst, a forceful argument or what he calls a disorienting dilemma to shake them” (Christie, et al., 2015, p.11). As adults are confronted by a disorienting dilemma, they go through a critical reflection of their assumptions, examining their origins, nature, and consequences, until their meaning structures are transformed and learning takes place (Mezirow, 1994, p. 223). The following phases were then identified for transformative learning to take place (Mezirow, 1991, 168-169):

1. A disorienting dilemma
2. Self-examination with feelings of guilt or shame, sometimes turning to religion for support
3. A critical assessment of assumptions
4. Recognition that one’s discontent and the process of transformation are shared and others have negotiated a similar change
5. Exploration of options for new roles, relationships, and actions
6. Planning a course of action
7. Acquiring knowledge and skills for implementing one’s plans
8. Provisionally trying out new roles
9. Renegotiating relationships and negotiating new relationships
10. Building competence and self-confidence in new roles and relationships
11. A reintegration into one’s life on the basis of conditions dictated by one’s new perspective

As can be observed, critical to the process of transformative learning are critical reflection of assumptions, discourse to validate beliefs, and reflective action on the new insights gained from the transformation of meaning structures.

#### Whole Person Approach and Transformative Learning

Learning theorists have increasingly recognized the importance of including the spiritual aspect of man in the learning process and called this approach “whole person approach” (Piercy, 2013). Spirituality is viewed and defined by many differently but there is a consensus among them that “people are spiritual beings in their essence” and teachers must recognize that a “concern for issues that affect the human spirit is an integral part of a teacher’s calling” (Rosebrough & Leverett, 2011, 21). They believe that by connecting to the transcendent, teachers can realize goals beyond the academic and even the social.

Schauffele and Baptiste (as cited in Piercy, 2013) acknowledge the Judeo-Christian Bible as the basis for the belief that learners are spiritual being and argue that a biblical understanding of human nature should be incorporated in learning theory. Jesus’ words in Mark 12:30, “Love the Lord your God with all your heart and with all your soul and with all your mind and with all your strength” (NIV) indicates that human nature has at least four aspects—physical, emotional, cognitive, and spiritual—thus providing a framework for understanding whole-person learning. Similarly, the goal of transformation aligns well with the Bible, as mentioned in Romans 12:2 (ESV), “Do not be conformed to this world, but be transformed by the renewal of your mind . . .”



## **Transformational Pedagogy**

Transformational pedagogy is defined as “an act of teaching designed to change the learner academically, socially, and spiritually” (Rosebrough & Leverett, 2011, 16). It empowers students to examine critically their beliefs, values, and knowledge with the goal of developing a reflective knowledge base, an appreciation for multiple perspectives, and a sense of critical consciousness and agency (Ukpokodu, 2009). Transformational teaching includes a concern for a person’s ultimate welfare and potential, teaching students as well as subjects, going beyond the curriculum and addressing their need as unique individuals.

Teaching practices that foster transformative learning include “providing students with learning experiences that are direct, personally engaging and stimulate reflection upon experience (Taylor, 2007, 182). Using open spaces for dialogic learning and immersion in authentic learning experiences were also proven helpful (Ukpokodu, 2009). Affective learning, which relies on critical reflection, can change perceptions and lead to transformation (Singleton, 2015). The use of action research, which addresses a dilemma with its spiral process of planning, acting, observing, analyzing, reflecting and then evaluating, also supports transformative learning (Christie, et al., 2015).

## **Transformative Learning in the Online Environment**

The distance factor as well as the self-directed nature of online education can make transformative learning difficult to accomplish. Paradoxically, online classes have advantages that actually make personal transformation feasible. Online discussion forums, for instance, can become richer as they extend beyond limitations of time, giving students the opportunity to go deeper in their critical reflection. The relatively egalitarian online environment, resulting from the obliteration of conventional notions of power and authority in the classroom, provides an appropriate venue for teaching approaches that critically examine societal patterns of power and dominance. Students are also found to feel a greater willingness to disclose information (e.g., personal experiences, beliefs) online, perhaps because of the level of anonymity afforded by the Internet, thus making them open to new ways of looking at things (Meyers, 2008).

Although studies are few, some transformative strategies for the online environment have been identified. These were “(a) create a safe and inviting environment; (b) encourage students to think about their experiences, beliefs, and biases; (c) use teaching strategies that promote student engagement and participation; (d) pose real-world problems that address societal inequalities; and (e) help students implement action-oriented solutions” (Meyers, 2008, 220). These and the benefits of online discussion mentioned earlier have been found to support transformative learning.

## **Methodology**

### *Research Design*

Observing learner transformation in actual practice, particularly in an online environment, can be a daunting experience because of the intricacies of how change occurs in the personal or inner world of an individual.



To provide for a more focused study of the phenomenon of transformation, this study chose the case study method in qualitative research, more specifically a single case study design.

Qualitative research is best done when researchers look out and try to understand the meaning people create out of their world and the experiences they encounter daily in their environment (Merriam, 2009). Case study design fits this study as it allows for “an intensive holistic description and analysis of a single stance, phenomenon or social unit” (Merriam, 1998, 21). A single case could be representative when it represents situations and conditions that take place daily or which usually happen in other places.

### *Population and Sampling*

This study focused on an academic institution that was purposeful in implementing transformative learning not only in its individual classes but also school-wide. The chosen university is a Christian graduate level institution with fully online program offerings. The population of the study then constituted all the fully online students of the university, who come from more than 40 countries around the world.

### *Data Collection Procedures*

To ensure that the phenomenon under investigation is not explored through a single lens, but rather through a multiplicity of lenses that allows all details of the phenomenon to be discovered and clearly understood, different sources of data were used in the study (Simons, 2009). This study then scrutinized the university in three levels: institutional, course, and individual student level, while looking at both curricular and co-curricular data sources.

Since the subjects of the study were fully online courses and their students, course materials, interactions, and submissions were accessible for review even after the classes were over as they were archived in the institution’s course management system. This enabled the researcher to conduct documentary and discourse analysis of the archived data sources of 9 graduate online programs of the institution from 2016 to 2019. For purposes of triangulation, the students were also interviewed.

### *Trustworthiness, Researcher Reflexivity, and Ethical Considerations*

Using multiple methods and data sources strengthens the credibility and trustworthiness of a qualitative study (Merriam & Tisdell, 2016). Researcher influence on respondents is almost nil because of web-based data gathering. Researcher reflexivity is further taken care of by writing analytic memos (Saldana, 2015) to reflect on the findings as they emerge from the data, making sure that transparency and accountability are observed. Ethical considerations were strictly observed, particularly in terms of participant safety through voluntary participation and anonymity. The survey was conducted independent of the academic departments of the respondent institution to minimize possible academic, psychological, or relational harm that could result from participating in this study.





### *The Context of the Study*

The study was conducted in a small recognized university that offers fully online graduate-level programs to international students in more than 40 countries around the world. The school is fully grounded in the principles of Christian education. A careful examination of the school's philosophy reveals its support of transformative education using whole-person approach.

### **Discussion of Findings**

The study approached the chosen university in its totality by examining all school activities in and out of the virtual classrooms. Both curricular and co-curricular aspects of the school were examined to determine how they support transformative learning (TL). Discussed first are the results of the documentary and discourse analysis conducted in the curricular activities, followed by an examination of the co-curricular activities of the school. Results of the open-ended student interviews are interspersed in the results of the other analyses to see if they concur with each other.

#### *Transformative Learning in the Curricula and Course Materials*

An examination of the school's curricula revealed that all courses were mandated to be faith integrated with emphasis on whole person development. The curricula were centrally prepared and carefully implemented in all courses. The course materials examined were the course syllabi, content, and the learning activities of the online classes. Of the 94 courses that made up the 9 graduate programs, 83 (88%) courses were found to have transformative learning in their design. The details of these are discussed next.

**The Course Syllabus.** The initial intent of integrating TL in the course can be observed in the kind of objectives teachers create as they define the outcomes of the course. Although objectives alone are not an assurance that TL will take place, they can serve as learning targets for every course participant. It was observed that 88% of the courses had learning objectives that could lead to TL. Only the highly quantitative courses did not show TL in their objectives. An example of this objective stated "Develop a supervisory plan that addresses a specific need or issue in an actual school setting, based on biblical, ethical, and accepted principles of instructional supervision" (Ed Course 1). In all the TL objectives, students were expected to be active participants in problem solving in real-life settings.

**The Course Content.** A cursory examination of the textbooks and content pages revealed the possibility of achieving TL in the classes because of the direct connection of the contents to actual life experiences. Some contents may be highly technical but the application section of the lessons called for decisions and/or actions on the part of the students. Just like objectives, having lessons that are applicable to real life experiences may not be an assurance that TL will take place, yet they can lead students to experience transformation. Here was an example of a student's comment on the content, "I must admit that after reading the lecture and watching the videos, I had to evaluate myself as an educator. . ." (Student 3, 10/23/17)

**The Learning Activities.** It was in the learning activities section of the online courses that clearer evidences of TL were observed. This section included discussions, reflections, projects or assignments that called for



student's personal response, like evaluation of personal beliefs vis-à-vis contents and processes learned in class or implementation of possible solutions to societal issues. The richness and variety of learning activities in the online programs reviewed provided many opportunities for students to experience TL. As can be gleaned from the following examples, the personal impact of the TL strategies used was seen as students discussed dilemmas, solved real-life problems, considered possible options, and reached consensus in class.

1. *Touching head, heart and hand through affective learning*

A class discussion on inclusive instruction made a strong appeal on the students' affect. As a result, here was a student's response, After reading the overview of this course, I was struck and awoken. The fact that I am a Christian teacher, I should follow Christ's example in handling his students. Therefore, I resolved to open my eyes, heart, and arm wide open to my students who need special attention. I should be more patient to them. . . . (Student 2, 10/30/17)

2. *Environmental awareness through digital storytelling*

One public health course on environmental health required an activity called Individual Investigative Assignment, where students were asked to study a facility in their vicinity whose operation or existence has implications for environmental health in the community. They had to conduct research and report back to class their findings through pictures or videos in the form of digital storytelling. The use of these rich media made a big impact on students as they were touched to see the realities in various places, much better than mere descriptive words by others. As one student said, This lesson really touched the issues closest to my heart. . . . (Student 3, 9/6/18).

3. *Strengthening reflective and critical thinking through reflective journals*

The centrality of critical reflection in TL has already been well emphasized. This was evident in this example of a reflective journal entry in one online course:

Because of this course, I found out that there are many more things I need to improve in my life . . . My mind is opened up to see the diverse needs that the students with disabilities have in the classroom. I want to improve my way of life, thinking, speaking, and acting towards those who have disabilities. I need to heighten my sense of awareness to those who are around me so that I could be more effective in this teaching profession. I want to improve my spiritual relationship with the Master Teacher because it is only through Him that I will be molded and become the teacher He wants me to be. (Student 13, 12/17/17)

4. *Adopting learning to real-life experiences by contextualizing learning*

In an online environment, the use of students' contexts as learning labs strengthens the value of the theories learned in class as students see their applicability in their personal experiences. This strategy was used in an activity in a business course: Describe a merger model of your choice that you have observed in your context and answer the following: (a) Determine if the merger company was ready

for this synergistic strategy! (b) Explain whether it was a successful merger or not. (Bus Course 3). In this activity, teachers kindle curiosity in learners to address controversial topics within a supportive, nurturing context (Rosebrough & Leverett, 2011).

5. *Inspiring community engagement through fieldwork*

Going out to the field to apply what was learned in class may not be easy to do in an online class but several classes in the observed school had this activity as part of their requirements. An education class required students to observe classrooms in actual school settings to practice and apply classroom observation principles learned in class. A theology class on teaching Bible required students to use chosen strategies in actual Bible classes. A public health class on community development asked students to identify a community in their contexts whose problems they will help address. Students in a business class on project management developed actual projects that addressed the needs of the field. These activities were major outcomes of the classes, had accompanying discussion forums for class presentation and feedback, and required written field reports to be submitted.

6. *Solving real-life problems through problem-based learning and action research*

Action research is usually triggered by a problem one wants to address just as individual transformation can begin with a disorienting dilemma. Both leads to resolving the dilemma and make changes for the better (Christie, et al., 2015). The impact of this activity can be seen in the reflection of a student in a class that had action research as a major outcome, “It was a great experience to be able to examine the problem of lack of class participation among the islanders and propose solutions to the teachers. I can now see my usefulness . . .” (Student 7, personal interview).

7. *Spiritual and character development through devotional activities*

Being a Christian school, all classes were expected to begin with a devotional activity. A variety of approaches were used, which included presenting Bible-based messages, singing songs, praying together, and reach out activities. One class highlighted the value of having good influence on others as part of the devotional activity: “As we study this week’s lesson, may we value the importance of building relationships that inspire people to be the best they could. This week, find at least three new friends whom you want to influence for good. Post their names in the Devotional Forum and we will pray for them” (Ed Course 1). As a result, the students became aware of their own influence and their responsibility for others.

### **Transformative Learning in Class Interactions**

Communicative skills are considered essential to achieve TL “so that internal and external conflicts, which result from changes in perspective, can be resolved via rational discourse rather than force” (Christie, et al., 2015, 12). To examine the existence of TL in the virtual classrooms, the courses that showed the highest interactivity in each program were subjected to discourse analysis. The focus of the analysis were the functions and structures of language use (Trappes-Lomax, 2004). To align with transformative learning



theory, discourses were analyzed on the basis of the 11 phases or levels of critical reflection identified by Mezirow (1991).

Results showed that all the courses selected from each of the programs of study had at least 5 disorienting dilemmas that students had to deal with and these were discussed extensively in the forums, together with projects to deal with some of them. Of the 95 discussion questions prepared in four courses, 57 or 60% was leading to TL. One observation, however, on the levels of reflection reached in the virtual classrooms was that 89% of the discourse on TL questions reached up to phase 4 (relating discontent to others) only. Phase 5 (exploration of new options) followed at 77%; while phase 6 (planning a course of action) was reached by 56% of the discussions. Does this mean that TL was not complete? It was not clear because evidences for later phases were not easily observable in mere written posts.

It was also obviously evident that the quality of student responses or reflections relied heavily on the kind of questions teachers asked. The teachers' questions that called for TL made use of higher order thinking skills, were open-ended, connected to real-life experiences, and called for students to make a stand or take action on issues.

### **Transforming Lives through Co-curricular Activities**

It is uncommon to find school-wide co-curricular activities for online students. Participating from a distance on a voluntary basis and outside academic requirement could be difficult to expect from busy and employed adult online students. But the school chosen for this study had such activities and these were well participated in by online students. The co-curricular activities were mainly spiritual in nature but they were not meant to proselytize. The Online Week of Prayer, for example, is organized yearly for students of any religion to listen to inspiring messages, reflect on them or discuss selected topics, pray together, and share testimonies like personal conversion stories to inspire others. The impact of such events can be seen on the testimonies given by students, like "This will be one of the most memorable experience in my christian journey . . ." (Student 8). "It's a blessing to be a part of this online community of faith . . ." (Student 15). In one instance, online students had mission exhibition as they shared their own outreach activities to their surrounding communities. These events align well with Dirkx's (1997) idea of nurturing the soul that leads individuals to greater levels of self-awareness and consciousness of society.

### **Conclusions and Recommendations**

Transformative learning is an excellent approach in reaching the ultimate purpose of education—transforming lives and societies for the better. The nature of online education, however, makes its implementation challenging. But as this study found, there are many ways, transformative learning can happen online, both curricular and co-curricular, classroom level or school-wide. This study proves that transformative learning is best accomplished in an online environment with a holistic approach, starting with the design of curriculum, to the general school environment, and then to the teaching and learning events in the virtual classrooms. Evidences of transformation, however, were only limited to students' written works. To really see the actual outcomes of transformation, further research can focus on longitudinal studies of online students' experiences.



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## Interactive e-Learning Tools and Pedagogy for Engaging STEM Education and Skills Development in the Digital Era: Challenges and Opportunities

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### Abstract

This paper presents and discusses e-learning tools and instructional approaches that are well adapted to habits of modern youth and the most advanced pedagogies. The tools promote exciting novel ways to engage students in interactive learning of STEM concepts in the context of their practical applications and acquire professional skills online. The learning and training activities and virtual laboratories (v-Labs) immerse students in digital learning environments such as an Energy Efficient Smart House, Golf Course, Biomanufacturing Facilities, Automotive shop, and Leonardo Da Vinci's Distillation Laboratory. Students are involved in cross-disciplinary learning STEM subjects related to classical mechanics, solar energy, energy efficiency, Internet of Things (IoT), conventional and smart home appliances and systems, engines and turbines, bioprocessing and much more. Microeconomics and environment protection issues are considered as well. The assignments are designed in a way that students acquire practical skills while gaining theoretical knowledge and developing deep understanding. Students' and teachers' feedback - and our and our partners' observations - revealed that:

- ◆ Educational content capitalized on students' real-life experience helped learners comprehend STEM subjects and convince them that STEM knowledge and skills are within their grasp.
- ◆ Online experimentation prior to on-site hands-on practice enabled users to perform training and job tasks meaningfully, faster and with fewer mistakes.
- ◆ Project's hybrid laboratories were effective in engaging students and acquiring practical skills based on deep understanding.
- ◆ Reconfigurable self-guided online assignments made it possible to personalize learning activities and adapt them to student backgrounds and educational needs.
- ◆ Gamified learning activities were effective in engaging and motivating students and improved their overall learning experience, as well as in facilitating informal learning.

In summary, v-Labs are easy to use, and science becomes fun to learn. All interactive resources run on PCs and mobile devices and can be easily integrated into online courses including MOOCs.

**Key Words:** Virtual Laboratories, Activity-based Learning, STEM Education, Skills Training, Biopharmaceutical Education and Training, Sustainable Energy



## Introduction

The fast-changing digital technologies have a profound effect on our everyday life and transform workplace. These technologies bring unprecedented opportunities for delivering education and gaining knowledge and skills. In the modern digital society, STEM careers are often referred to as the jobs of the future, driving innovation, social wellbeing, inclusive growth and sustainable development. Nevertheless, in 2018 in the USA only 24% of teenaged boys and 11% of girls were willing to pursue a STEM career (Kim, 2018).

Outstanding challenges to quality STEM education include old-fashioned content and outdated teaching technology of its delivery are among them. Often STEM concepts are taught to students in a too academic (methodical yet dry and boring) format. This intimidates students and discourages them from pursuing a STEM career as science contexts appear rather complicated and irrelevant to real life and students' everyday experience (Kurfiss 1988, Learning (2017).

Our online learning and training systems and activity-based pedagogy have been designed to equip teachers with e-learning tools and advanced pedagogical strategy that match the learning preferences of students of digital generation and are capable to involve teens and young adults in gamified contextual STEM learning. All educational systems discussed in this paper facilitate contextual learning and are based on a constructivist theory of teaching and learning (Dimock & Boethel, 1999). They are designed in such a way that students are able to construct meaning based on their own experiences and convert information into knowledge through active observations, processing and interpretations (Cooper, 1993, Wilson, 1997).

With the current trend when students are moving from PCs to tablets and smartphones, all applications we discuss here are cloud-based, they support both mouse and touch screen functionality, and can run on mobile devices under Windows, iOS or Android OS and do not require any plugins or expensive hardware. This paper presents and discusses the examples of e-learning tools and approaches aimed to encourage digital natives - teens and young adults who increasingly rely on technology in their day to day life activities - to learn STEM concepts in the context of their practical applications and acquire professional skills online in an engaging interactive way.

## Activity-based Contextual Learning

The activity-based immersive learning and training environment built around a "Virtual Energy Efficient Smart House" (v-EESHouse) (Fig. 1) has been designed to provide an interactive context for cross-disciplinary learning and teaching of many STEM topics related to solar energy, energy efficiency, Internet of Things (IoT), as well as to microeconomics and environment protection. The v-EESHouse consists of a series of interlinked virtual laboratories (v-Labs) that allow users to explore energy consumption by major home systems and appliances, get familiar with the IoT technology, and the use of solar energy for domestic needs. Thus, educational content and all learning activities are closely relevant to everyday experiences and engage students in studying STEM subjects in the context of their applications. The focus of V-labs on whole phenomena rather than on an isolated science topic helps students construct a deeper understanding of the world around them. Such a cross-disciplinary approach links the variety of fundamental scientific concepts and practical issues (e.g. Sun's seasonal path and its affect on the length of daytime in different regions, the dependence of electrical power generated by solar panels on the Earth's axial tilt and local variations in the



atmosphere, the laws of thermodynamics and refrigerator operation, heat flow and convection and energy losses, etc.). Consequently, energy consumed by house systems and home appliances is linked to utility bills and hence naturally stimulates the energy-responsible behavior as well as brings up environmental issues.

Highly interactive and interconnected simulations form pillars of the v-EESHouse and all other cloud-based e-learning environments described in this paper. Each simulation incorporates a solid science/math model that accurately reproduces a design and operation of actual devices/systems, natural processes, or learning situations. The v-EESHouse e-learning system enables instructors to create blended (or hybrid) laboratories that synergize learning effects of hands-on and online experimentation. In such labs, simulated parameters may be synchronized with measured physical data. Beyond academic education, hybrid experiments involving cyber-physical systems (CPS) and IoT technology were employed for the professional training of technicians of utility industry and IoT service providers.

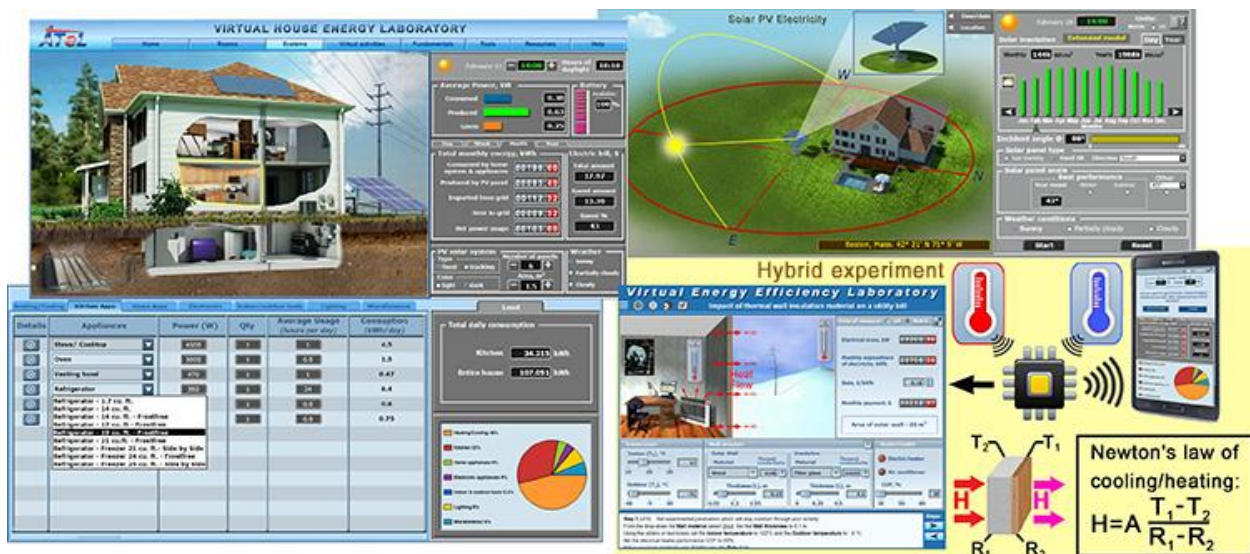


Figure 1. Screenshots of the v-EESHouse e-learning environment.

The Dash Board (bottom right) dynamically displays amounts of energy consumed by the household, produced by solar panels, imported from and sent to grid, total electric bill amount and saved amount. Any system changes (e.g., a type, number and size of solar panel, weather condition, and electrical power load immediately affect the readings. The Load Calculator (bottom left) allows users to estimate how replacements of various home appliances, lightings, utility systems, etc. affect the energy consumption and a utility bill. The hybrid laboratory (bottom right) comprises the v-lab for investigating factors affecting a two-layer sandwich-type wall connected with physical thermosensors. Using a smartphone, students may control the virtual home appliances and residence HVAC systems and observe the results of these actions.

The v-EESHouse and other e-learning environments and individual v-Labs have been probed at different educational levels from middle and high schools to universities in the USA, UK, Tanzania, Ghana, Russia and some other countries. At the higher education level, these resources, in addition to science/engineering students, were tested by liberal art majors. The online activities proved to be useful for general public education and for professional training of employees of utility companies and IoT service providers. Depending on instructional patterns, settings, and audience, v-Labs and their components have been used for (i) homework and control assignments with traditional and blended courses, (ii) preparing students for





hands-on work in real labs and workplaces, (iii) lecture demonstrations, and (iv) performance-based assessment of students' ability to apply gained theoretical knowledge and skills for solving practical problems.

### **Adaptable and Personalized Learning**

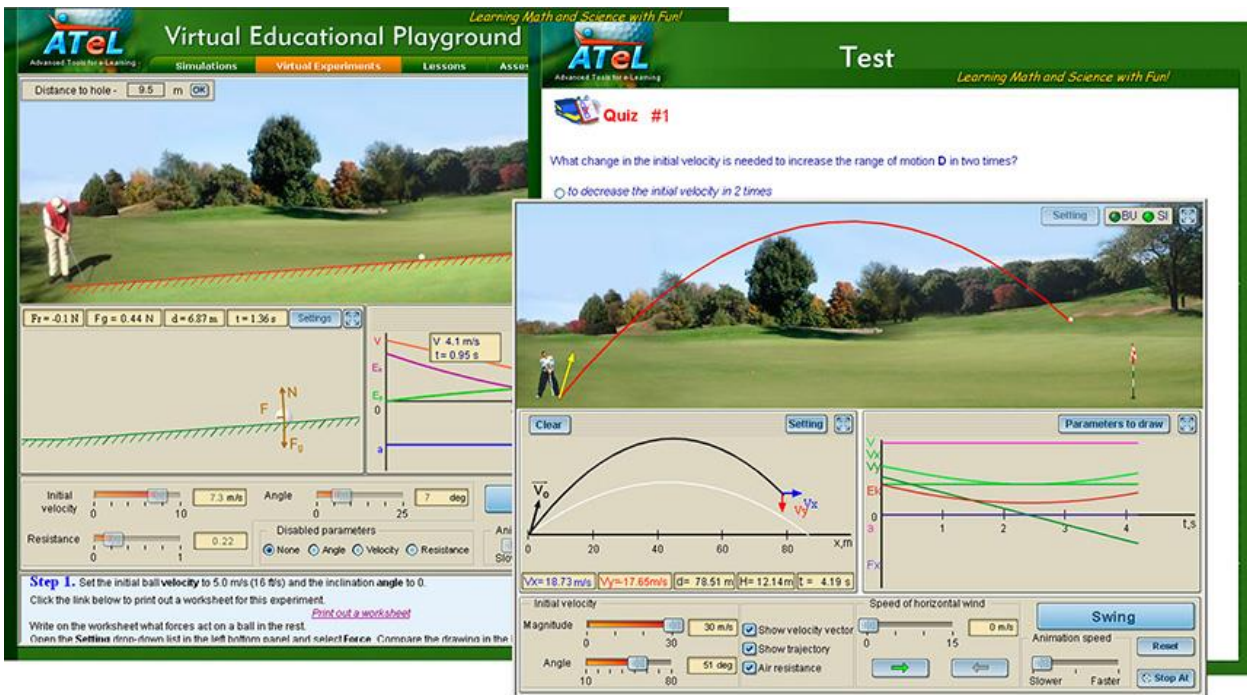
One of the outstanding challenges in maximizing learning outcomes is to use a personalized e-Learning (U.S. National Plan, 2017). In contrast with a conventional "one size fits all" approach, our applications allow instructors to tailor and optimize learning objectives, content and assessments to be meaningful and appropriate for each individual learner. The employed concept of reconfigurable Self-contained OnLine Guided Assignments (SOLGAs), makes it possible to assemble student activities from cloud-based simulations and distributed component and adjust them to student ages, backgrounds and educational levels (from middle school to university).

Simulations are key components of a SOLGA, which is an integrated self-directed learning (or training) unit designed to achieve particular learning or training objectives. In addition to a main simulation, a SOLGA includes a step-by-step performance instruction, optional worksheet and task related documentation, links to databases, as well as an embedded assessment and associated multimedia learning resources for just-in-time learning. It may also include synchronized auxiliary simulations that extend the functionality of the main simulation (e.g. visualize hidden processes or explore phenomena from different perspectives). Simulations can exchange data and be synchronized with each other. The student is expected to follow a thorough set of step-by-step instructions to accomplish an educational assignment. The SOLGA framework may incorporate third-party simulations and other multimedia resources. The v-EENSHouse activities can facilitate the self-directed asynchronous learning, as well as synchronous instructor-led and/or collaborative learning. SOLGAs could also be easily integrated with various offline and online courses including those delivered via MOOC (massive open online course) platforms.

### **Gamified Learning**

Gamification is a proven way to involve youth and young adults in learning STEM and keep them engaged (Linch, 2017). We have implemented this approach in our e-learning module "Golf: Virtual Educational Playground". It has been designed to help students study classical mechanics. Rather complex topics as vectors, trajectory, velocity, acceleration, momentum energy, resistance, etc. are studied in the context of golf game. Student assignments may require learners to make a prediction or solve a physics problem and instantly check the result by playing the game. In order to incentivize learners, rewards such as points, badging, leaderboards, etc. are used. The module consists of two parts: 'Putt' and 'Chip shot' (Fig.2). The virtual lab 'Putt shoot' facilitates a wide range of activities focused on uniform and non-uniform motion along a straight line. Students observe and measure the impact of an initial ball velocity, inclination angle, and friction between the ball and the court ground surface on ball movement.

The 'Chip shot' v-Lab enables students to investigate projective motions. how angle and magnitude of the initial ball velocity, air resistance, wind speed and direction affect the ball trajectory, the elevation and the distance traveled. The learners can also explore forces acting on a ball. Graphics and diagrams bridge game-like activities with traditional subjects of physics and math and help students study and understand the concepts of vector, trajectory, velocity components, etc. Depending on scenario the level of assignment varies from very basic to advanced.



**Figure 2. Screenshots of e-learning module “Golf: Virtual Educational Playground”. Both v-Labs ‘Putt’ (left) and ‘Chip shot’ (right) include a game panel (top) and two panels underneath for monitoring ball movement and dynamically presenting charts. Each panel can be zoomed-in to full screen.**

### Learning Science in Historical Context

Unfortunately, science history is rarely taught in schools and even in higher education programs due to the lack of time (or motivation). In the meantime, exploration of scientific subjects in historical contexts, especially when a famous person is involved, often offers a “motivational hook”, which can encourage student to learn science. Undoubtedly, Leonardo Da Vinci is one of the most outstanding, mysterious and fascinating personalities of all times.

The educational module Distillation in Historical Context (Fig. 3) has been designed to spark an interest in science by considering some chemical and physics topics in historical contexts involving Leonardo Da Vinci drawings and inventions. It is based on three original drawings of antic distillation devices called alembics, which bear the author’s notes and are stored at the [Biblioteca Ambrosiana](#) di Milano (Da Vinci, 2003).

Students embark on their journey with a brief introduction to Da Vinci’s bio, artworks and inventions. By exploring the design, operation and volatilities of the alembics along with Leonardo’s notes students can understand how the genius worked on his inventions. Students can zoom in the picture to scrutinize drawings, and read Leonardo’s backward mirror writings translated into English, compare an original drawing with the corresponding 3D models, zoom and rotate the models, and view their cross-section. AR (augmented reality) implementations of the drawings for handheld tablets or smartphones are available as well. Students have a chance to investigate how the distillation occurs in each device and analyze how Da Vinci worked to improve his invention and consecutively overcame alembic shortcomings.



**Figure 3. Screenshots of virtual labs on distillation that enable students to explore the distillation and its applications in historical context from Da Vinci's to modern time.**

Students conduct authentic distillation experiments online using either Leonardo's alembics or modern chemical glassware. and thereby journey from medieval devices to contemporary laboratory equipment. Students collect virtual data and study such processes as evaporation, boiling and condensation in various liquids. They also investigate distillation processes in the binary systems of water and ethanol, toluene–benzene and some others.

## **Developing Knowledge, Practical Skills, and Deep Understanding**

### *1. Automotive technology*

The integrated virtual environment “Automotive Technology” (Fig. 4) is another example of an e-learning system that allows students to develop theoretical knowledge and practical skills together. It has been designed to help students study the construction and functionality of the major systems and components of diesels, internal combustion engines, turbines, and power plants. The combination of a variety of tools and resources in one system serves to aid in mastering practical skills, acquiring technical knowledge and learning fundamental principles enables instructors to seamlessly link training and learning into a single educational process that fosters a student's deep understanding of basic principles and cause-and-effect relationships in engine design and operation.

(a). Gauges in the middle panel display the major engine parameters such as fuel consumption, torque, power, rotation speed, pressure, oil and water temperatures and oil pressure. The right panel dynamically presents thermodynamic diagrams of engine operation. The screenshot (b) shows a fragment of the virtual experiment that enables automotive engineers and technicians, as well as car drivers who are eager to know more about vehicle maintenance, to explore how piston ring wear impacts engine performance and efficiency. The v-Lab “Thermodynamic Cycles” allows the student to explore in detail the Carnot cycle (c), Otto cycle and Diesel cycles, as well as to compare them with each other (d).



**Figure 4. The virtual experiment “Influence of Compression Ratio on Engine Operation Cycle” performed at the v-Lab “Internal Combustion Engine Design and Operation”**

The set of automotive technology v-labs enables students to investigate the connections between processes and events taking place inside an engine or turbine and the thermodynamic cycle it operates on, observe and analyze parameter changes at any stage of the cycle. This helps students better understand how these systems operate and what affects power and efficiency of different types of engines and turbines. By varying process parameters (e.g., temperatures, pressure, compression ratio, injected heat, etc.) and monitoring the visualized system response, the student can comprehend both the virtues and the shortcomings of various engines, system limitations, requirements to device maintenance, and much more.

## II. *Bio manufacturing*

Virtual learning environments and v-Labs are especially useful in teaching students the fundamentals of processes with long timescales such as, for example, cell culture growth in biopharmaceutical manufacturing operations. Additionally, there is minimal feedback on the status of the culture during operation. Performing authentic experiments in a virtual environment with instant feedback and the opportunity for multiple repetitions allow students to develop an understanding of key relationships between critical parameters and help them better cement core concepts and process flow. The cloud-based interactive and comprehensive e-learning environment “Virtual Upstream Biomanufacturing” (v-UBio) has been developed and implemented to address the needs of biopharmaceutical education and professional training. It includes a set of simulation-based v-Labs, virtual production line, as well as online lessons, assessments, a glossary, and supporting materials. The v-UBio enables students to gain skills in performing typical workplace procedures, such as cell counting, inoculation, cell growth in bioreactors of different volumes, and much more. Students can also master the aseptic techniques of cell culture, and enhance their understanding of precautions and requirements to prevent cross contamination. The use of the latest Web technologies made it possible to allow an instructor to monitor, in real time, how remote students to perform a virtual task online and instantly intervene when necessary. An embedded authoring tool enables the instructor to modify the experiment on the fly.



v-Labs can be linked and combined with handheld Augmented Reality objects (e.g., interactive AR bioreactor).

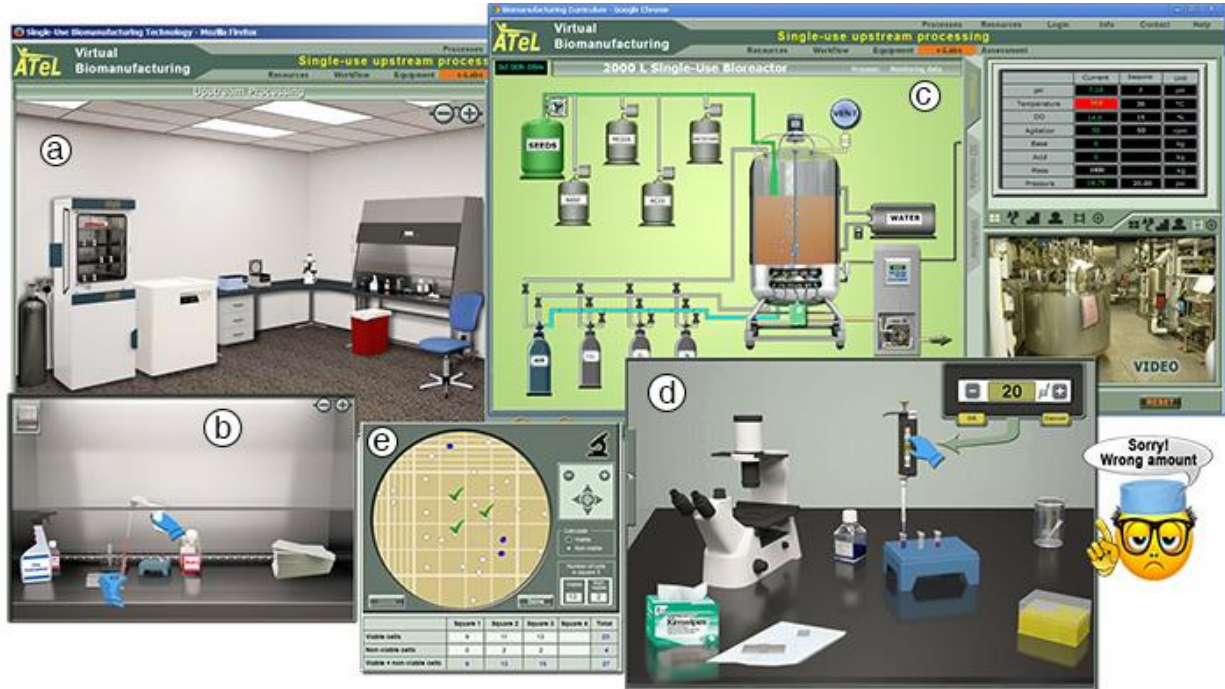


Figure 5. Screenshots of the e-learning modules that make up the “Virtual Upstream Biomanufacturing” environment.

The v-Lab ‘Inoculation’ (a) helps students better understand the process and gain the practical skills necessary to perform the initial cell growth task. One of emphasizes is placed on aseptic techniques and culture transfer procedures (b). A series of ‘Cell Growth’ experiments (c) requires students to assemble the system, calculate and set up process parameter, as well as monitoring the process and keep it on track. The virtual exercise ‘Cell Counting’ (d) helps students develop skills for accurate and consistent cell counts. An animated assistant avatar (bottom right) provides immediate feedback, tips and comments. The v-UBio environment also includes an interactive upstream process flowchart diagram that allows students to explore all upstream processing procedures in great detail, learn the requirements for executing the procedures, view relevant video clips, graphs, tables, and other relevant multimedia resources. This helps students build the ultimate “big picture” of upstream processing.

### Work in Progress

We have recently initiated the research on what pedagogical principles are most efficient in providing different groups of students with the appropriate learning experience. The v-EEHouse is being modified (in cooperation with university faculty from Ghana, Tanzania, and Nigeria) to fit local Sub-Saharan African realities and promote the use of renewable energy sources and clean cooking techniques. Interactive e-learning resources are also adjusted to specific requirements of African schools and universities. The goal is to help African students acquire knowledge and skills demanded at local job markets and contribute to sustainable socio-economic development through digital delivery strategies. Potentially, this approach may help transform the entire way of how education is gained and delivered in developing countries and globally. We also seek to promote efficient energy technologies and sources for African households and agriculture.

## Conclusion

A comprehensive and consistent examination of the impact of the described tools and pedagogy on students' learning of STEM subjects and their attitudes towards pursuing STEM careers were beyond the scope of our projects. Nevertheless, students' and teachers' feedback via questionnaires and surveys, as well as our partners' observations have brought us to the following conclusions:

- ◆ Educational content that capitalizes on students' everyday or/and workplace experience helps break traditional prejudices that some teens often have towards science and convince them that STEM knowledge and skills are within their grasp and useful in real life.
- ◆ Online experimentation prior to on-site hands-on practice had a proven positive effect on students' performance in actual labs and workplaces. The students felt more comfortable with equipment, knew how required procedures have to be executed. and fulfilled training and job tasks meaningfully, faster and with less mistakes.
- ◆ The skills, coupled with knowledge of processes and equipment operation, were more transferable and could be successfully applied to solve problems and carry out tasks different from the practiced tasks.
- ◆ Hybrid laboratories demonstrated a potential to enhance student engaging and connect the development of practical skills with a deeper understanding of underlying scientific and engineering concepts.
- ◆ Easy reconfigurable self-guided online assignments were very useful and efficient in individualizing the learning experience and adapting student activities to different cognitive styles and ways of learning that helped keep users engaged. In addition, the SOLGA concept made it possible to reuse complex simulations – most expensive components of quality interactive curricula.
- ◆ Gamified learning activities were effective at engaging and motivating students and improved their overall learning experience, making it fun and enjoyable.
- ◆ Gamified v-Labs and the labs based on a real-life context familiar to students provide extended (practically unlimited) learning opportunities and resources for informal education.
- ◆ According to feedback of faculty of the Department of Chemical and Biological Engineering at Tufts University, the virtual distillation lab combined with hands-on experiments on studying binary systems promoted deeper understanding of the distillation process and factors affecting its outcome.
- ◆ Testing the Solar Energy v-lab at the Massachusetts Institute of Technology (MIT) revealed that learning activities were more beneficial for deepening students' conceptual and technical understanding (e.g. factors affecting the efficiency of a solar power system) rather than helping them better memorize particular laws and perform scientific/engineering calculations (e.g. manually calculate solar insolation.)

In summary, V-labs are easy to use, and science becomes fun to learn.



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We thank Prof. Bruce Van Dyke (Quincy College, MA) and Prof. Garry Mullett (Springfield Technical Community College, MA) for their contribution to the development of the virtual laboratories and testing them with their students. We are also immensely grateful to MIT Professors Robert Jaffe and Michael Cima who designed excellent online activities based on our v-Labs and integrated them into their MIT courses, one of which was released on the MOOC platform EdX. Their - and their students' - detailed feedback and recommendations were extremely useful to us. We would also like to express our gratitude to Dr. Osei Darkwa (Teletech Institute of Technology, Ghana), and Prof. Leonard Fweja and Dr. Catherine Mkude (Open University of Tanzania and MOOCAfrica) for their collaboration and valuable discussions.

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## Harnessing the Potential of Online Learning to Build Effective & Sustainable Lifelong Learning Frameworks: Case Studies from Ireland and Singapore

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### Abstract

This paper examines one private training provider's experience building an effective online framework for lifelong learning. With a focus on delivering training for the pharmaceutical manufacturing industry, and using the analytical lens of behavioural economics, it draws on this experience to model the development of a mature workforce over a seven-year case study (2012-2019), across two locations (Ireland and Singapore), involving 2,000 workers. Contextual data for the paper were drawn from relevant economic policy and employment literature for each case study location, from relevant pharmaceutical sector publications, and from original training documentation generated during the seven-year case study. This paper is broadly practitioner research using case studies as illustrative of real-world phenomena. The perspective is reflective, rational enquiry with the aim of better understanding the successes achieved for replication in the future. The case study data are presented and analysed using Bereday's four stages in both methodology and structure: description, interpretation, juxtaposition, and comparison, augmented with a fifth initial stage 'intuition' as suggested by Cirigliano (Cirigliano,1996). The study aims to better understand the underlying motivations and drivers of experienced workers who wished to make a mid-career change. This is achieved by testing the effectiveness of the training provider's established framework for online programme delivery and analysing participant feedback. Insights into current programme effectiveness as well as areas for improvement lay out a process that could be implemented across a range of next-generation, high-tech industries, in many countries. The conclusions are based on interpretation of the data using the analytical lens of behavioural economics, and offer insights into how governments might harness the potential of online lifelong learning for experienced workforces, to transform lives and societies.

### Key Findings Include:

- Proof of the robustness of the previously developed Sourcing, Education & Career Coaching (SEC) framework.
- Successful outcomes (completing the programme and/or finding a job) were independent of the individual's years of work experience or highest previous academic qualification.
- Satisfaction rates with the programme screening and delivery were generally higher than the number of students who had a successful outcome from the programme at the time of survey. It appears that many currently unsuccessful participants remained



optimistic about their future potential and, therefore, provide an engaged cohort for further intervention.

- Nudge Theory (from the field of behavioural economics) could provide insights to increase the percentage of students with initial successful outcomes, as well as ways to further develop currently unsuccessful participants.

**Keywords:** Online Learning Initiative, Lifelong Learning, Behavioural Economics, Prospect Theory, Loss Aversion, Nudge Theory

## Introduction

This paper aims to examine the success of a current online framework for lifelong learning, and consider areas for further development. The private training provider in question reskills experienced workers from other industries to meet the skills shortages currently being experienced in both Ireland and Singapore's pharmaceutical manufacturing industries. The pharmaceutical manufacturing industry is a key pillar of the Irish economy (17% of GDP, 45% of exports, \$50 Billion Capital Asset Replacement Value, and employing 50,000 workers) (IDA, 2015). Likewise, in Singapore, it is the fourth pillar of their economy (5% of GDP, \$15 Billion Capital Asset Replacement Value, and employing 6,000 workers) (EDB, 2019).

The opportunities that pharmaceutical manufacturing industry growth and ongoing investment brings to both Ireland and Singapore are numerous, and include:

1. Employment - one of the most obvious opportunities this level of investment brings is well-paid locally-based jobs.
2. Development of an industrial "cluster" - as pharmaceutical companies expand their operations, the number and range of specialist supporting companies who offer services to the industry will increase.
3. Specialised workforce - the presence of specialised manufacturing sites means the workforce develops to reflect that need through flexible vocational education programmes.
4. Financial - at a Government level, strong high-tech industries are needed for a strong economy. At an individual level, these local jobs are well-paid, stable, and secure.

Over the past seven-years, this private training provider's vocational education (VE) programmes have been delivered to experienced workers with five to twenty-five years' work experience, who are returning to employment or changing their career. They are particularly focused on individuals appropriate for operator and quality technician roles in the pharmaceutical manufacturing industry, since this is where significant skills gaps occur when the industry expands in a given location. These online programmes also provide a pathway to academic accreditation at Bachelor degree level.

### The Key Objectives of This Online VE Are:

1. To help governments and industry build local talent pools of operator and quality technicians
2. To support the expanding pharmaceutical manufacturing industry



3. To utilise online VE to teach the quality systems necessary to consistently manufacture safe and effective medicines for patients
4. To give individuals the knowledge and skills needed to make a successful career change into the pharmaceutical manufacturing industry

This paper will focus on three different groups across two locations - unemployed workers in Ireland, employed workers in Ireland, and employed workers in Singapore. It aims to objectively measure the success of the current Sourcing, Education & Career Coaching (SEC) framework and identify areas for further improvement. Insights into current programme effectiveness as well as areas for improvement will lay out a process that could also be implemented across a range of next generation, high-tech industries, in many countries.

### **Background and Previous Research**

The private training provider has developed VE programmes that are academically accredited as Continuous Professional Development (CPD) certificates leading to a BSc degree in the Manufacture of Medicinal Products (Level 7). Programmes have been validated, approved, and accredited for an online delivery format. Curriculum development is rooted in delivering career-focused VE to meet specific industry sector requirements.

Previous work in this area was reported by the author at the Research Work Learning Conference 2015 in Singapore. The main finding from that work was that while current theory and Government strategies support the building of a knowledge-based economy through lifelong learning of its workers, it appears that neither employers nor workers want to invest their time and effort once the resource is hired or the job is secured (Creaner, 2015). That paper also raised the question of whether a nation can develop a knowledge-based economy without the emotional support of its citizens and employers for lifelong learning. (Creaner, 2015)

This study further builds on the conclusions of that paper, and aims to uncover more insight into the drivers and motivations of experienced workers using VE to facilitate a mid-career change. Previous data gathering, research, and analysis of student statistics and feedback to the training provider has led to the development of a three-stage process - the SEC framework - Sourcing, Education, Career Coaching.

#### *Sourcing*

Sourcing and screening of candidates is the process by which the training provider assesses whether a candidate is a good fit for the programme and for a career in the industry. Rather than selecting candidates exclusively on their previous academic achievement, each candidate is assessed for their overall suitability for a career in the industry, with a focus on their transferable skills gained across a wide range of work experience. To help establish this, a phone call is conducted with every candidate prior to their acceptance onto the programme. This rigorous screening process results in only 300 people (6%) of the 5,000 initial applicants being accepted every year. This combination of sourcing and screening is a key component to having only the most suitable candidates being enrolled.



### *Education*

This is the part of the SEC process where the technical modules are delivered in a virtual environment. The modules utilise a variety of learning methods including short videos, lecture notes, self-assessment quizzes, and reflective questions each week to deliver the technical knowledge needed for working in this highly-regulated industry. This is accompanied by regular weekly contact from a course coordinator (i.e. pastoral support) to maintain accountability and motivation by the student to progress through the course.

### *Career Coaching*

In response to feedback from previous students, an online career coaching module was added. Since these students are experienced workers looking to make a mid-career change, some are apprehensive about how easily they'll be able to find a job in a new industry and others are overly-confident. This module has been designed to normalise those different mindsets and it includes a step-by-step process for navigating the complex path to finding a job in a new industry. The end of module assignment is a simulation of a job application (using a real job advert) and each student is given specific feedback on areas for improvement in future job applications.

When this was first introduced (as an elective module), less than 25% of students chose to take it. After proving its effectiveness, it has now become a mandatory component of the overall mid-career change programme. It was observed that a significant proportion of students display the Dunning-Kruger Effect (where they believe their abilities in a particular area are greater than they actually are) (Kruger & Dunning, 1999) and they believe, as experienced workers, that they already possess the necessary job hunting skills to secure a new job. Many are shocked by the amount of information they were previously unaware of and, as a result, students are overwhelmingly positive about the module's content. Using the SEC framework, a robust system for finding and training local workers has now been established. This study is aimed to objectively assess the success of this framework before going on to look at areas for further improvement.

### **Conceptual Framework**

This paper is broadly practitioner research using case studies as illustrative of real-world phenomena. The methodology for comparison of the three case study groups draws heavily on Bereday's model of comparative styles and their predispositions (Bereday, 1964). In Bereday's model, 'everyday' comparability is distinguished from socially-scientific or laboratory methods. The everyday comparability approach fits with individualistic practitioner research in that it favours establishing relations between observable facts, noting similarities and graded differences, drawing out universal observations and criteria, and ranking them in terms of similarities and differences.

In everyday comparability, the view is subjectively from within and deliberately without perspectives detachment. It focuses on group interests, social tensions, impact factors and collective beliefs, patterns, and behaviours as experienced by the author. In terms of analytical steps, this paper uses Bereday's four stages as illustrated by Jones (Jones, 1971), as follows:

- Stage 1: Description of each case using a common approach to present facts
- Stage 2: Interpretation of the facts in each case using knowledge other than the author's



- Stage 3: Juxtaposition for preliminary comparison using a set of relevant criteria
- Stage 4: Simultaneous comparison, emergence of conclusions and hypotheses

The perspective in this paper is the author's own as the private training provider of vocational education programmes in the two case study locations, mindful of the particular risks of insider research (Rooney, 2005).

## Research Methods

As part of the validation and quality system metrics for this academically accredited programme, the training provider carries out an annual survey of students. The data gathered for this paper are quantitative. The limitations of quantitative studies - as potentially statistically relevant due to large data sets while being humanly irrelevant, missing the contextual details surrounding the results - are acknowledged. However, in this case, in the straddling between insider-actor mode and outsider-observer mode (Robson, 2011), and due to the research question in hand, the research generated provides a large enough basis on which to build observations. This is a descriptive study where the subjects are only measured once after course completion. The training provider surveys an average of 200 students per year, out of a total student population of 300 students. Students answer 60 questions across five different categories to establish a full profile of the answers in relation to each other and in relation to other students, past and present. The five categories are:

1. Employment status update
2. Application screening process feedback
3. VE programme feedback
4. Career coaching programme feedback
5. Recommendations for future improvements to the programme (this section provides some qualitative data through open-ended written responses)

The following demographic data are also gathered from each respondent:

1. Age (using 5-year bands through 24-50 age range) \*
2. Highest previous qualification (Levels 5-9)
3. Exam results for each module
4. Employment outcome

\*Years of work experience assumes commencing work at 20-years old

The data for this paper were gathered directly by the training provider using tools including Survey Monkey and Typeform. The data has been processed for ease of reading using Microsoft Excel. For data organization, interpretation, analysis and presentation, the total answers have been processed into descriptive statistics (i.e. summary statistics broken down answer-by-answer, year-by-year).

## Results

Data analysis began by looking at student “satisfaction” surrounding the full SEC process (i.e. screening process, the delivery of the online study materials, and technical support during the programme).

Metric Measured	2017 % Agree	2018 % Agree
The application screening process was good	94%	94%
Benefited from being able to complete the programme from home	91%	92%
Information was clearly presented in the programme	90%	91%
The final assignment requirements were clearly understood	89%	90%
Understood what the course would involve before starting it	88%	88%

When asked about their attitudes and outlooks on lifelong learning, career advancement, and future job security, the following data resulted:

Metric Measured	2017 % Agree	2018 % Agree
Motivation for getting a rewarding career had increased	84%	95%
Ambition to get a better-paid job had increased	86%	95%
Determination to succeed had increased	87%	94%
Ambition for career advancement had increased	84%	93%
Confidence in the future had increased	78%	92%
Confidence in their future job security had increased	75%	89%

Engagement with life-long learning had increased	82%	86%
Enjoyment of further study had increased	76%	85%
Ambition to achieve mastery in their chosen career had increased	78%	83%

**Table 2. Analysing key metrics surrounding student’s attitudes to lifelong learning, career advancement, and future job security for the 2017 and 2018 student years.**

The number of experienced workers who had a successful outcome, defined as completion of the programme and/or getting a job by the time of survey, is noted in Table 3 below. This confirms the high percentages of successful outcomes for 2017 and 2018 (82% and 76% respectively) and the robustness of the online SEC framework for lifelong learning.

Metric Measured		2017	2018
Total:		304	318
Successful Outcome (Total):		251 (82%)	243 (76%)
	Number who completed and got a job:	101 (33%)	102 (32%)
	Number who completed but didn’t get a job by the time of survey:	81 (26%)	75 (23%)
	Number who got a job but didn’t complete:	69 (22%)	66 (20%)
Unsuccessful Outcome:			
	Number without either “successful outcome:	53 (17%)	75 (24%)

**Table 3. Comparison of 2017 and 2018 looking at students and their outcomes in the case study of “Unemployed Workers in Ireland”**

An analysis of the survey feedback data indicated that successful completion of the VE programme and finding a job were independent of a student’s years of work experience or their previous highest academic qualification.

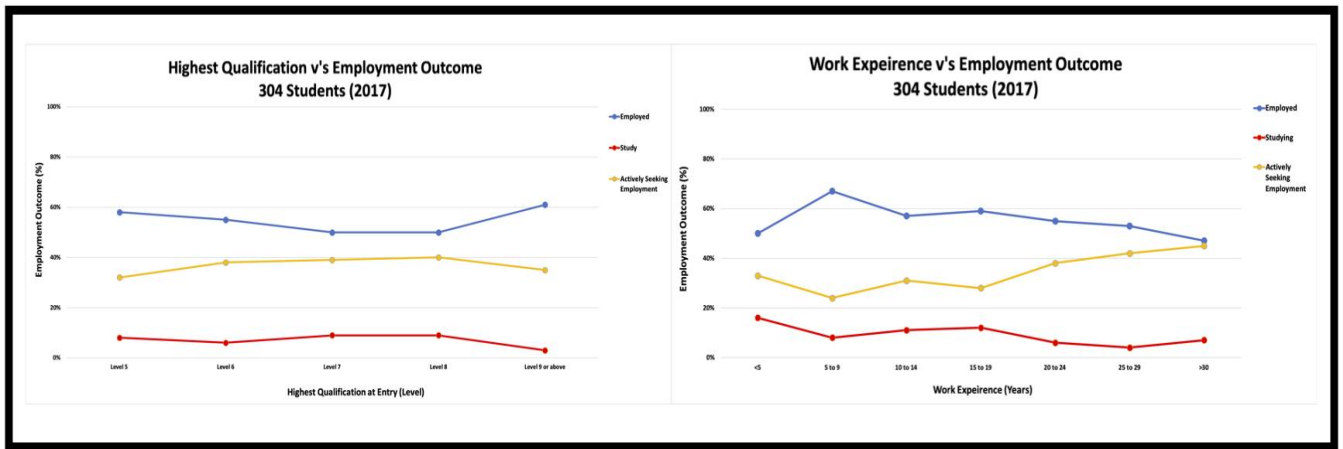


Figure 1. Analysis of “Employment Outcome (%)” as it relates to “Work Experience (Years)” and “Highest Qualification at Entry (Level)”

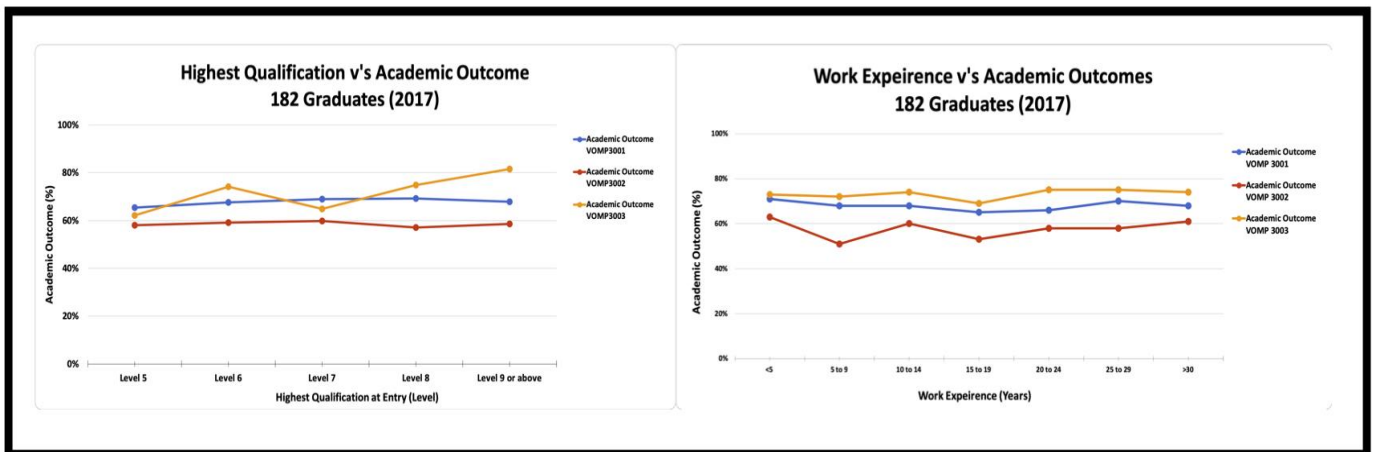


Figure 2. Analysis of “Academic Outcome (%)” as it relates to “Work Experience (Years)” and “Highest Qualification at Entry (Level)”

Bereday (Bereday, 1964) suggests that setting cases out in juxtaposition using criteria or variables that emerge naturally from the data, will identify areas of convergence and areas of difference. Following this process, the variables and findings are presented in Table 4.

Variable	Unemployed Workers Ireland	Employed Workers Ireland	Employed Workers Singapore
Size of Audience	950 survey responses	20 survey responses	150 survey responses
Nature of Survey	Looks at the 5 areas outlined in the Research Methods section	Looks at the 5 areas outlined in the Research Methods section	Only measures traditional academic validation and quality systems metrics

Academic Qualification of the Programme	Level 7 academically accredited CPD Certificate	Level 7 academically accredited CPD Certificate	Singapore WSQ (Workforce Skills Qualification) Certificate
Completed the programme	55% of students completed the programme	74% of students completed the programme	75% of students completed the programme
Found Employment by the time the survey was taken	54% of students found a job after the programme (more than half of these found employment whilst still studying on the programme)	70% of people were in employment when the programme started. Only 40% of students are actively looking for a job in Pharmaceutical manufacturing after completing the course	This metric was not measured as part of the survey
Satisfaction of students	This analysis shows that more students were generally satisfied with the programme, than had a successful outcome from it. i.e some students were happy even though they didn't complete the programme or get a job	100% of respondents believed that overall the training was beneficial to them even though only 70% completed the programme and only 40% of them were actively looking for a job at the time of the survey	>80% of people reported at least 1 form of positive metric about the programme. 94% of students agree that overall the programme was beneficial to them

**Table 4. Cross-comparison of variables across the three case study groups (in the two locations) including sample size, qualification, % completion, % employment, % satisfaction.**

The processed data has surfaced three main questions:

1. Why did some people complete the programme and others did not (when all were capable of doing so)?
2. Why did some people get a job and make a mid-career change during/after the programme and others did not (when all were capable of doing so)?
3. Why are people equally happy with the programme irrespective of whether they have had a successful outcome from it or not?

### Theoretical Frameworks for Analysis

In order to answer these questions and better understand the reasons why a number of students did not achieve a successful outcome (and with a view to increasing that percentage), a discussion in the area of human decision making was explored, focusing on the field of behavioural economics. The aim of the field of behavioural economics is to understand and apply the “human factor” to the decision-making process in economics, unlike classical economists who construct their theories on people making simple rational/logical decisions and choices (i.e. the theoretical concept of the logical/rational “Economic Man”). The analytical



lens of behavioural economics in understanding the “how” and “why” of human factors in decision making, and in particular Bounded Rationality, Prospect Theory, Nudge Theory and the Dual System Planner-Doer model to interpret the data about successful outcomes for this group, will lend insight into building a sustainable and effective online framework for lifelong learning.

### *Bounded Rationality*

The founder of modern behavioural economics was Herbert A. Simon, who won the Noble Prize for Economics in 1978 for this theory of Bounded Rationality. He suggests that humans are satisficers and not optimisers i.e humans are bound by three things when making a decision:

- Amount of information available
- Their cognitive limitations
- The amount of time they have

Herbert Simon’s work was further built upon by Daniel Kahneman and Richard Thaler, both of whom also won the Noble Prize in Economics (2002 and 2017 respectively) for their contributions to this field.

### *Prospect Theory*

Prospect Theory was developed by Daniel Kahneman and Amos Tversky in 1979 after completing detailed research to explain how people make decisions that involve risk and uncertainty. This resulted in developing models to explain Loss Aversion and the Sunk Cost Fallacy.

#### *Loss Aversion*

Where “Losses loom larger than gains” in our minds (Kahneman & Tversky, 1979), suggesting that the psychological pain surrounding a loss is twice as powerful as the happiness that surrounds a gain.

#### *Sunk Cost Fallacy*

Sunk Cost Fallacy is where individuals will continue a behaviour or project to avoid a loss of time, effort, or money they have previously invested or “sunk” into a project and they will keep sinking time, effort, or money into the project to avoid having to cut ties. Research suggests that humans are sensitive to sunk costs after they have decided to pursue a reward.

### *Dual-System Planner-Doer Model*

The Dual-System Planner-Doer Model is about self-control in decision making and how humans appear to utilise a dual-system for making decisions. This was identified by Thaler as the Planner-Doer Model in 1981 and it was developed upon by Kahneman (& Tversky) as the System-1/System-2 Model in the book “Thinking Fast and Slow” (Kahneman, 2008). The theory explains some people’s ability to invest effort now or to plan/wait for a future benefit. This model further explains the theory of Delayed Gratification.

#### Delayed Gratification Theory - the Stanford Marshmallow Experiment

In the 1960’s, Walter Mischel tested 4-year old children’s ability to demonstrate delayed gratification (commonly known as the marshmallow experiment). Following up 10-years later, he



found that the ability to demonstrate delayed gratification at this early age was a valid predictor of success in adult life.

*Nudge Theory*

Nudge Theory was developed by Richard Thaler and Cass Sunstein in 2008. It suggests that the framing of a choice can significantly change the decision that people make, and so “choice architecture” can help people make “better” choices for themselves (Thaler & Sunstein, 2008). Nudge theory has now been adopted by several government agencies, including the UK Government’s Behavioural Insights Team. It is hypothesised that nudge theory design can provide the basis for future improvements to increase the number of successful outcomes from this VE programme.

**Analysis of Results and Discussion**

*Analysis of Results*

Following the juxtaposition of the three groups within the two case study locations (Stage 3 Bereday) in Section 5, a simultaneous comparison is now conducted for the emergence of conclusions and hypotheses in tabular form below (Stage 4 Bereday). This is focused on considering the decision making process for these students looking to make a mid-career change, through the analytical lens of behavioural economics. The three tables below are constructed with each of the three key questions (outlined Section 5) and are examined separately against each of the relevant behavioural economic theories.

Behavioural Economic Lens	Why did some people completed the programme and others did not (when technically all of them could have)	Possible Nudges for Further Research
<p>Prospect Theory (Loss Aversion):-</p> <p>Losses loom larger than equivalent gains in our minds.</p>	<p>Students who completed the programme would have felt “loss” if they hadn’t.</p> <p>Students who did not complete the programme had more inertia to change (or had less self-control) than those who completed the programme. They were not driven to complete by a feeling of “loss” and they did not feel there was sufficient “gain” to be realised from completing the programme to reward the effort that was needed to do so.</p>	<p>Promote the idea of loss if students are considering not finishing the programme (e.g. by not completing an end of module assignment) by noting future/lifetime lost earnings from not joining an industry that pays 30% above average for manufacturing jobs.</p>
<p>Prospect Theory (Sunk Cost Fallacy):-</p> <p>Research suggests that humans are sensitive to sunk costs after they have made the decision to pursue a “reward”</p>	<p>For students who completed the programme, once they decided to pursue this “reward” they would keep investing time/effort or money until it was realised.</p> <p>The students who did not complete did not feel that they had invested sufficient time/effort or money to trigger their sunk cost fallacy.</p>	<p>Trigger feelings of “Sunk Cost” based on the time/effort they have invested to that point, relative to the amount that will be needed to finish the programme (e.g. to complete the final end of module assignment)</p>

	The students who did not complete either decided that the “reward” they were pursuing was not something they now wanted or their needs had changed.	
Dual-System Planner Doer Model:-  Ability to invest effort now and plan/wait for a future benefit (Delayed Gratification)	Students who completed the programme displayed an ability for Delayed Gratification (Marshmallow Effect), i.e. they had a more developed Planner/System 2 ability and were prepared to put in the necessary effort to realise the long term reward of a CPD certificate than those who didn’t finish.  Those who did not complete the programme are similar to the children who “failed” the marshmallow experiment, i.e. who didn’t have a strong enough ability for Delayed Gratification and instead had a more dominant System 1 approach to human decision making.	This behavioural economics strategy requires further research to be able to find the right “nudge”. An answer may be found in conducting a new experiment similar to Thaler’s experiment on increasing sign-ups and contributions to personal pension plans (Thaler, 2015).
Bounded Rationality Theory:-  Suggests that humans are satisficers and not optimisers.  Humans are bound by 3-things: 1) Amount of Information 2) Cognitive Limitations 3) Amount of Time	Students who didn’t complete (which can be explained by their lack of a feeling of loss or their lack of a System 2 ability) epitomise the underlying way humans make decisions - aiming for a satisfactory outcome, not an optimal one - i.e. it could be due to having stronger satisficer tendencies than optimiser abilities.  This means when students had to make a decision about completing the programme - using the 3 things that humans consider when making a decision - completing the programme was not determined to be the most satisfactory outcome, even though in the long term it was the optimal one.	A nudge could be considered to address the “moment before drop out”. Just before dropping out a student will often show signs of “overload”. A proactive nudge by the pastoral support team at that moment could be enough to get the student past the “insurmountable barrier” that is in their mind at that point in time. A model could be based on the Behavioural Insights Team’s study into student dropouts. (Halpern, 2015)

**Table 5. Comparison of why some people finished the courses and others did not, through the analytical lens of Bounded Rationality, Prospect Theory, and Dual-System Planner-Doer Model, with suggested Nudges to increase successful outcomes.**

Behavioural Economic Lens	Why some people got a job and made a mid-career change during/after the programme and others did not (when all of them could have)	Possible Nudges for Further Research
Prospect Theory (Loss Aversion):-  Losses loom larger than equivalent gains in our minds.	Students who got a job and made a mid-career change during/after the programme would have felt “loss” if they hadn’t.  The students who did not get a job during/after the programme had more inertia to change (or had less self control) than those who got a job. They were not driven	Promote feelings of loss if they do not embrace the job hunting process (i.e. making 5 job applications each week), by noting their future/lifetime lost earnings from not joining an industry that pays 30%

	<p>to get a job by a feeling of “loss” and they did not feel there was sufficient “gain” to be realised from getting a job to reward the effort that was needed to do so.</p> <p>Given the large difference between unemployed and employed workers in getting a job, this indicates that being in employment is a big factor in triggering a student’s loss aversion.</p>	<p>above average for manufacturing jobs as soon as possible e.g. graphs and tables to reflect delay in getting a new job versus lost lifetime earnings</p>
<p>Prospect Theory (Sunk Cost Fallacy):-</p> <p>Research suggests that humans are sensitive to sunk costs after they have made the decision to pursue a “reward”</p>	<p>Students who got a job and made a mid-career change during/after the programme, once they decided to pursue this goal they would keep investing time/effort or money until it was realised.</p> <p>The students who did not get a job did not feel that they had invested sufficient time/effort or money to trigger their sunk cost fallacy.</p> <p>The students who did not get a job either decided that the “reward” they were pursuing was not something they now wanted or their needs had changed.</p> <p>Given the large difference between unemployed and employed workers in getting a job, this indicates that being in employment is a big factor in triggering a student’s sunk cost fallacy.</p>	<p>Trigger feelings of “Sunk Cost” based on the time/effort they have invested to that point in completing the technical learning on the programme relative to the amount more that will be needed to embrace the job hunting process (i.e. making 5 job applications each week)</p>
<p>Dual-System Planner Doer Model:-</p> <p>Ability to invest effort now and plan/wait for a future benefit (Delayed Gratification)</p>	<p>Students who got a job and made a mid-career change displayed an ability for Delayed Gratification (Marshmallow Effect), i.e. they had a more developed Planner/System 2 ability and were prepared to put in the necessary effort to go through the long term process of getting a job than those who didn’t.</p> <p>Those who did not get a job are similar to the children who “failed” the marshmallow experiment, i.e. who didn’t have a strong ability for Delayed Gratification and instead had a more dominant System 1 approach to human decision making.</p> <p>Given the large difference between unemployed and employed workers in getting a job, this indicates that being in employment is a big factor in triggering a student’s System 2 ability.</p>	<p>An answer may be found in conducting a new experiment based around the “Back to Work” scheme nudge, implemented by the Behavioural Insights Team to help increase the number of unemployed workers getting back into employment within 3-months by training/monitoring their System 2 abilities over 2-week job hunting planning cycles - trimmed a million days off unemployment benefits which over a year (Halpern, 2015)</p>

<p>Bounded Rationality Theory:-</p> <p>Suggests that humans are satisficers and not optimisers.</p> <p>Humans are bound by 3-things:</p> <ol style="list-style-type: none"> <li>1) Amount of Information</li> <li>2) Cognitive Limitations</li> <li>3) Amount of Time</li> </ol>	<p>Students who did not get a job (which can be explained by not triggering their feeling of loss or their lack of System 2 ability) epitomise the underlying way humans make decisions - where we aim for a satisfactory outcome not an optimal one - i.e. it could be due to having stronger satisficer tendencies than optimiser abilities.</p> <p>This means when these students had to make a decision about getting a job and making a mid-career change (using the three things that humans consider when making a decision) getting a job and making a mid-career change was not determined to be the most satisfactory outcome, even though in the long term it was the optimal one.</p> <p>Given the large difference between unemployed and employed workers in getting a job and making a mid-career change, this indicates that being in employment is a big factor in triggering a student satisficer or optimiser abilities.</p>	<p>A nudge could be considered to disrupt the “satisficing” mindset of taking a non-pharmaceutical job just because they were offered it first (or not making a mid-career change at all), e.g. making a career change involves a significant person in the student’s life, and experimenting with getting both of these people (experienced worker and their “partner”) to sign-up to an “optimising” commitment for a period of time.</p>
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**Table 6. Comparison of why some people got a job and others did not, through the analytical lens of Bounded Rationality, Prospect Theory, and Dual-System Planner-Doer Model, with suggested Nudges to increase successful outcomes.**

Behavioural Economic Lens	Why are people equally happy with the programme irrespective of whether they have had a “successful outcome” from it or not	Possible Nudges for Further Research
<p>Prospect Theory (Loss Aversion):-</p> <p>Losses loom larger than equivalent gains in our minds.</p>	<p>The students who had a successful outcome got what they came for, and therefore did not feel “loss”. It is clear as to why this was a positive experience and their happiness was reflected in the survey feedback.</p> <p>Those students who did not feel any loss from not achieving a successful outcome did not have a negative experience, and so were “not unhappy” - not dissimilar to the way children who went home happy after having had only one marshmallow.</p> <p>These students would have done a post-hoc rationalisation and therefore didn’t feel any loss for the marshmallow they never got for the work they never did.</p> <p>This “not unhappy” mindset would have been difficult to distinguish from “being happy” in the survey feedback due to the way in which the questions were framed.</p>	<p>Various Governments have already adopted “nudge” approaches to policy units as they are effective and inexpensive tools that bring about great rewards, e.g. the Behavioural Insights Team UK studies into happiness and well-being measures. (Halpern, 2015)</p> <p>This analysis shows that more students were generally satisfied with the programme, than had a successful outcome from it, i.e. more students who take this mid-career change programme are</p>

<p>Prospect Theory (Sunk Cost Fallacy):-</p> <p>Research suggests that humans are sensitive to sunk costs after they have made the decision to pursue a “reward”</p>	<p>Students who had a successful outcome got what they came for, once they decided to pursue this mid-career change goal, had a positive experience and their happiness was reflected in the survey feedback.</p> <p>Those students who did not have a successful outcome did not feel that they had invested sufficient time/effort or money to trigger their sunk cost fallacy. So they did not have a negative experience, and so were “not unhappy” - not dissimilar to the way the children who went home happy after having had only one marshmallow.</p> <p>These students would have done a post-hoc rationalisation along the lines of that effort/reward ratio for the first marshmallow had been zero effort and all reward, however to get the second marshmallow required additional effort (above zero) and it would not have justified the reward.</p> <p>This “not unhappy” mindset would have been difficult to distinguish from “being happy” in the survey feedback due to the way in which the questions were framed.</p>	<p>“happy” and have had a positive experience from it than simply those who had a successful outcome or got a job.</p> <p>These students with an “unsuccessful outcome” still have a positive frame of mind and have ambitions for a better career, have developed an enjoyment for lifelong learning, and have hopes for the future etc, all of which can be tapped into going forward by other initiatives.</p>
<p>Dual-System Planner Doer Model:-</p> <p>Ability to invest effort now and plan/wait for a future benefit (Delayed Gratification)</p>	<p>Students who had a successful outcome got what they came for and had the necessary Delayed Gratification abilities to get the “second marshmallow” - and it is clear as to why this was a positive experience and their happiness was reflected in the survey feedback.</p> <p>Those who didn’t have a strong ability for Delayed Gratification and instead had a more dominant System 1 approach to human decision making, did not feel any loss and so did not have a negative experience, and were “not unhappy” in a way not dissimilar to the children who went home happy after having had only one marshmallow.</p> <p>This “not unhappy” mindset would have been difficult to distinguish from “being happy” in the survey feedback due to the way in which the questions were framed.</p>	
<p>Bounded Rationality Theory:-</p> <p>Suggests that humans are satisficers and not optimisers.</p>	<p>Students who had a successful outcome got what they came for and made a successful mid-career change had a positive experience - their happiness was reflected in the survey feedback.</p> <p>Those students who did not have a successful outcome still met their satisficer requirements in their decision making process and so did not have a negative experience, and so</p>	



<p>Humans are bound by 3-things:</p> <ol style="list-style-type: none"> <li>1) Amount of Information</li> <li>2) Cognitive Limitations</li> <li>3) Amount of Time</li> </ol>	<p>were “not unhappy” - not dissimilar to the way that children who went home happy after having had only 1 marshmallow, could be deemed to have had stronger satisficer tendencies than optimiser abilities.</p> <p>This “not unhappy” mindset would have been difficult to distinguish from “being happy” in the survey feedback due to the way in which the questions were framed.</p>	
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**Table 7. Comparison of why people were overall satisfied with the programme even if they did not achieve a successful outcome, through the analytical lens of Bounded Rationality, Prospect Theory, and Dual-System Planner-Doer Model, with suggested Nudges to increase successful outcomes.**

## Discussion

### *Analysing the Success of the SEC Framework:*

The data gathered shows that overall, students are extremely satisfied with both the operational procedures and the content of the VE programme. Successful outcomes (either completing the VE programme or getting a job) for students are seen to be independent of their years of work experience and previous academic qualifications. This suggests that the online SEC framework is successful in both finding appropriate candidates and comprehensively training them for a career in this high-tech and highly-regulated industry.

When the online Sourcing methodology of the SEC framework is applied to the initial pool of enquiries, it leads to approximately 6% being accepted and enrolled as students. It is suggested that this methodology is creating a normalised pool of candidates who are all a good fit for the pharmaceutical manufacturing industry (and that the industry is a good fit for them). If this online framework can be successfully applied to this high-tech and highly-regulated industry, it is suggested that it could be applied more widely to identify and train workers for other industries.

### *Looking to Behavioural Economics to Improve Success*

With successful outcomes independent of the work experience or highest previous academic qualification, 82% of 2017 students and 76% of 2018 students completed the programme and/or got a job. To better understand how to improve on this success, an analytical lens of behavioural economics was applied. Not only do the theories set out possible explanations for unsuccessful outcomes, they provide areas where Governments, policy-makers and other private training providers might look to implement strategies and nudges to increase overall success metrics.

### *Explaining Overall Satisfaction*

This analysis shows that more students were generally satisfied with the programme, than had a successful outcome from it (i.e. more workers who take this mid-career change programme are “happy” and have had a positive experience from it than simply those who completed the course or got a job).

One hypothesis is that, through the introduction of the career coaching module (the “C” in the SEC framework), participants are gaining confidence in basic job hunting techniques. With this knowledge, they



feel confident that they will secure a role, even when they haven't done so by the time the survey is taken. This level of confidence in the future and satisfaction in the process means that, even with a current "unsuccessful" outcome, this group remains positive and engaged. These students still have ambition for a better career, hopes for the future, and enjoyment for lifelong learning - all of which can be tapped into going forward with new initiatives. These experienced workers are not shutdown to the lifelong learning process and are open to maintaining their engagement with it.

Further work and follow up is needed to track success metrics over a longer period of time and to identify if there are additional areas of support (or nudges) that could be provided to this group to ensure that their motivation remains consistent throughout their lifelong learning path. This data might also be useful to help Governments and policy-makers to identify nudges that reframe the benefits of lifelong learning / mid-career change for their citizens and increase the percentage of successful completions (and therefore the pool of resources available) for attracting the next generation of high-paying high-tech industries into areas experiencing a downturn in their traditional or sunset industries.

## Conclusion

This paper has presented an online framework for finding appropriate candidates and training them for technician level jobs in a high-tech and highly-regulated industry. Through this study, that framework has been validated and could now be transferred to other industries looking to encourage experienced workers to make a mid-career change, in support of industry expansion. To better understand and increase the success metrics of this online framework, the field of behavioural economics was examined. Explanations were found for some of the more surprising outcomes of the study, and methods by which future users of this SEC framework might adapt it to improve overall success were proposed. Governments, policy-makers, and other private training providers can take this versatile online SEC framework and build upon it, tailoring it to their specific needs. Different industry sectors and cultures will likely have to experiment to find those nudges that best move their audience to positive action. It is proposed that this online SEC framework can be an important step in harnessing the potential of lifelong learning to support sustained and productive industrial growth.



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## A Digital Footprint from Eire to Oz: Advancing Internationalisation through a Collaborative Online International Learning Project

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### Abstract

George Bernard Shaw said, “The greatest problem with communication is the illusion that it has been accomplished.” The challenge facing education today is to establish transformative communications between students in the world’s diverse cultures. In our global economy, international business and communication skills are essential. While technology makes collaboration possible, human interaction and understanding of cultures, values and lifestyles also play an important role. A Collaborative Online International Learning (COIL) program uses strategic partnerships as the potential for virtual mobility through collaborative teaching and research and enhancing a better understanding of internationalisation. St. Mary’s University College Belfast, Ireland and The Royal Melbourne Institute of Technology University (RMIT), Melbourne, Australia have been working together on a COIL project since October 2018. The online collaborative relationship provided an opportunity for both tertiary institutions to offer students ways to meet their virtual international peers. The extension of overseas COIL projects with other tertiary institutions and industry groups beyond just Northern Ireland and Australia will undoubtedly enhance students’ opportunities to gain further knowledge, strategic and critical thinking skills, online intercultural communication and improve employment skills. It will also enhance the Continued Professional Development (CPD) opportunities for academics, using digital literacy skills. The presentation will reflect on a research-based teaching concept for an interdisciplinary and international context to university studies. It engages with COIL to embed an internationalised curriculum in different subject disciplines as part of a university wide strategic change project, using International Marketing at St. Mary’s and Public Relations at RMIT. It consists of three joint assignments, followed by collaborative student presentations, using a telecommunication application in a live stream. It will also represent an important road map for those designing innovative approaches to international learning, preparing learners for forward thinking and success in a globalized world. In 2019, forty students across the two institutions participated in this student-centred approach. Task based interactions were developed, through online communication technologies, education entrepreneurial and innovative approach. The learning outcomes were analysed through qualitative research methodologies, such as questionnaires, focus groups and interviews. The report will conclude by examining the current status, the challenges and progress towards increasing global competence, pedagogical digital and intercultural competence of teachers and students. It is the intention of the researchers, to publish the results of the framework and establish a reusable framework for any discipline within higher education, in a shared world.

**Keywords:** Student Collaboration, International, Online/Blended Learning, Innovative Strategies, Cross-Cultural Communication.



## Introduction

### *Nature of the Problem*

Both institutions delivered the theoretical aspects of marketing either within the international context or through complex public relations campaigns, but the problem existed over the ability to contextualise communication and define intercultural knowledge and understanding by the participating students globally.

### *Previous Work*

The RMIT lecturer had completed a COIL project during 2018 with a University in the Netherlands. Whilst the St. Mary's University College lecturer completed the COIL course orientation through the State University of New York (SUNY) during the summer of 2018.

### *Purpose*

In 2019, St Mary's College University in Belfast, Northern Ireland and RMIT University in Melbourne, Australia successfully executed their first COIL project together. Each University was already committed to driving internationalization strategies within their home institution, but also wanted to focus upon the student journey towards globalization: ultimately for them to be able to work in professional practice in an international context. During a three-month period, teams of students worked on a well-defined process to gain an understanding of how best to market their university to the students of the other, conducting research, and delivering communication packages for use by the respective institutions. The project was formally graded at four assessment sections. Invaluable lessons were learned by staff and students involved, and the process developed should act as a template for future projects and cooperation. This will be of interest to those developing and executing COIL projects.

In order to market the opportunity for this period of study abroad (the 'Study Abroad Program'), both institutions needed to take account of the different cultural and communication frameworks and expectations of the respective target audiences (prospective students for the Study Abroad Program). The availability of a package of Public Relations (PR) and marketing materials, in a specified format, and available through appropriate channels, matched the information needs, cultural positioning, and messaging expected by the respective target audiences (one in Australia, the other in Northern Ireland), so that the students could make an informed and correct decision concerning their Study Abroad Program.

By offering the opportunity for composite teams made up of individuals from both institutions, students could discover the expectations of their peer's opposite information, format, communication and expectations, from their sister university. Together, the team collated two packages of information wholly appropriate to the expectations of the respective target audiences. Through a combination of research into the different cultural values and expectations of each target audience, students gained a hands-on experience in the operationalization of communications within an international environment. Aspects of the project included the use of conceptual models to identify and test the information requirements specific to each geo-cultural group target audience; work in an international team to deliver two complementary PR packages reflective of the requirements identified for each target audience; and gain a hands-on understanding of intercultural knowledge and understanding consequent upon working in a multidisciplinary and intercultural team.



The output of each team was presented to, and offered to, the respective marketing organizations of their universities for potential use in the marketing of their respective Study Abroad Programs.

### *Informative Overview*

The St Mary's College University in Belfast, Northern Ireland and RMIT University in Melbourne Australia wanted to be involved in executing a COIL project with all staff agreed, the chance of success of any enterprise was heightened by the provision of a robust roadmap for such a project, including well-defined tasks, timelines, and assessment, for which students would be expected to take ownership of, and deliver on the expectations and deliverables agreed. In practical terms, a steering team was formed, to include staff in both institutions responsible for COIL coordination, and staff responsible for managing such a project. A detailed project scope was then jointly drawn-up and agreed, with common learning goals, and roadmap students were expected to follow. This needed to comply with the different curriculum and assessment requirements of both institutions, and also deal with the logistics of different semester times, grade deadlines, and accreditation. The key purpose of the project was to given students (and staff); the opportunity to work with students in two very different geographies, time zones, and cultures, in several teams of six to eight students, two from RMIT University and four from St Marys' College University, to hopefully enable them to build intercultural communication, knowledge and understanding while executing a fairly heavy project workload to tight deadlines, using a variety of digital communication tools and with deliverables being formally assessed at four points in the process.

The project was prescribed in a jointly-owned student manual which asked teams to develop a marketing communication package of collateral materials to best market each university to the students of the other. The specific criteria for the learning goals included:

1. Discover and understand the information requirements for specific stakeholder groups involved in the development of, and participation in, the target study abroad programs.
2. Apply tools and techniques to gain knowledge and understanding of the intercultural differences which exist between the appropriate target audiences.
3. Execute a project to understand the various messaging styles, positioning techniques, and execution strategies required to position the necessary public relations communications to the appropriate target audiences.
4. Work in an international team with participants based in two geographically distinct areas.
5. Deliver public relations content to successfully support the marketing of target study abroad programs to the appropriate target audiences, and presentation to appropriate stakeholders.

Each team was tasked to undertake four distinct assignment activities, each of which would be assessed and contribute to a final overall grade:

- Introductory Task: Team Contract, Code of Conduct, & Team Biography
- Assignment 1: Research report on intercultural communication
- Assignment 2: Public relations packages for use by each university
- Assignment 3: Presentation and an overall Report which includes personal reflection on intercultural learning.



In addition to providing physical documentation and collateral, each team also had to make a live final presentation in both institutions using telecommunications applications. The standard of the work was extremely high, yet the value to staff and students in terms of lessons learned and the sheer experience of successfully working through and completing a live project was judged to be even higher. All students agreed that this was a good experience they had participated in during their time at university, and they realised that their participation and delivery better prepared them for entering professional practice.

This presentation fits not just with the conference focus on globalization, but discusses the strategy used to develop, execute and assess the project, as well as demonstrating some of the many lessons learned and Key Success Factors which enabled the project experience to deliver a higher degree of intercultural competence to all involved. This is more a guide to success based on staff and students working together, and gives the student view in terms of their reflections and anecdotal feedback.

#### *Contribution of the Paper*

The paper will be disseminated at the World Conference in Online Learning in Dublin during November 2019 to distinguished peers in this academic field. The institutions are intending to coordinate another COIL initiative during the next academic year and will look to share the findings and good practice with colleagues at both academic establishments.

#### **Research methods**

Each student team was tasked to undertake four distinct tasks as described above, each of which would be assessed and contribute to a final overall grade. In addition, specific rules were also put in place for the sake of consistency throughout the process, and these included:

- The course assessment comprises a total of three Team assignments
- All the assignments are compulsory, and their submission is necessary for students to receive a grade
- All members of each Team must contribute towards the completion of each assignment
- When submitting an assignment, each Team needs to send a breakdown of the contribution of each Team member towards the completion of the assignment.

For the Introductory Task, students had to construct a contract between them to define procedures as to how they would work together; a code of conduct including mutually agreed-upon rules governing acceptable practices, communication, language and discipline; and also a biography of each Team. The formal assessment was based upon the submission of three specific documents in a specified format, and in particular each Team member had to sign the contract agreed between them.

Each team was tasked to undertake four distinct tasks, focused on the development of a Public Relations package to market their university to the other. Each would be assessed and contribute to a final overall grade. Specific competencies were tested within these assignments, including the high level competencies: (1) Carrying out research, (2) Working on a project, and (3) Working in an international/intercultural environment. The degree to which these competencies had been developed was tested using specific



assessment criteria linked to the task (assignment) areas:

1. Conduct a target audience analysis and identify the specific cultural impacts and interpretations which must be taken into account when developing messaging materials, styles, and channels for those specific target audiences
2. Demonstrate knowledge and understanding of intercultural differences needed to be respected in the development on intercultural communications
3. Demonstrate appropriate use of derived messaging, styles and communications channels to maximize impact upon the target audiences involved
4. Exhibit aspects of team building and communications management in order to successfully execute and conclude an international project

For Assignment 1, students had to conduct a critical cultural self-assessment inclusive of a list of cultural differences/challenges and possible solutions they faced as a Team; the organizational structure and the culture of the university to which the students belong was explained in the context of Mintzberg and Hofstede; conduct a survey which answers the question on how international students wish to be informed about the university abroad; report the findings of the research; and a Creative Brief that would then be used to develop Public Relations materials.

For Assignment 2, students had to deliver Public Relations materials for each target audience derived accurately from the Creative Brief; materials for the target audience in Australia, and the target audience in Northern Ireland, must align with the intercultural knowledge and understanding gained during the course; the quality of the materials produced is reflective of the standards of professional practice.

For Assignment 3, in a Team Pitch Presentation and Reflection Report, these materials were presented by each Team in an international video conference (Zoom) to the various stakeholders involved. Each team was required to provide an insight into the decision-making and project processes used; specific intercultural knowledge and understanding acquired; the PR packages are described and their selection and use justified; lessons learned and any areas for improvement are described; a reflection is provided by each student stating the 'good, bad, ugly points' of the course; the degree to which the project has delivered intercultural knowledge and understanding; what the student personally enjoyed most and disliked the most and why; and finally, what the student would do differently if he/she had to repeat the project.

## **Results of the Research**

In developing a new joint COIL project together during 2019, educators at the St Mary's College University in Belfast, Northern Ireland and RMIT University in Melbourne Australia needed to ensure that students could receive a final grade for their work which would be valid within the existing curriculum and acceptable within the academic program at both universities. As a result, a series of three formal assessment sections were put in place, supported by detailed rubrics, to enable educators to assess and ultimate grade the work of students



involved as the project progressed. This also ensured that timely and comprehensive feedback was given enabling the project to stay on track within what was a very demanding timeframe. Activities graded ranged from formal written reports, to presentations and reflections. This will be of interest to those developing and executing COIL projects.

The challenge confronting educators was to familiarize students with an assessment guideline and to receive feedback on each stage of their work, as well as to ensure that their project was being kept on track, with any corrective action being taken in a comprehensive and timely manner. The Report gave insight into the decision-making and project processes that were used; specific intercultural knowledge and understanding that was acquired for each other's culture; definition of the Public Relations packages developed and justification of their selection and use; the lessons learned; and any areas for improvement of the project process used. The packages ranged from blogs, websites, video to a virtual field trip.

In addition, within this Report, each Team member included a personal (individual) and group reflection on the learning experience. This included a reflection on the project and learning outcomes; the degree to which the project has delivered intercultural knowledge and understanding for the student; what the student personally enjoyed most and disliked the most, and why; and what would be done differently if the project had to be repeated. The lessons learned, and the impact participation will have on their future careers was said to be invaluable.

## **Conclusion**

### *Advantages*

The overall project sought to discover and understand the information requirements for stakeholders wanting to participate in the respective study abroad programmes and has the advantage of significant relevance to international departments in universities or tourism in the respective countries. The students were able to apply tools and techniques to gain knowledge and understanding of the intercultural communications differences which exist between the two target audiences in a unique way, through qualitative data collection with one another. The students researched the various messaging styles, positioning techniques, and execution strategies required to position the necessary communications for the appropriate target audiences and to work in an international team with participants based in two geographically distinct areas. During the final live stream presentations, the groups were able to present and deliver public relations content to successfully support the marketing of study abroad programmes to the appropriate target audiences, and present these to appropriate stakeholders.

“As a whole, the COIL project has taught us many useful lessons that we will use in the future and therefore will improve our employability skills.” SMUCB/RMIT Team Group.

From the beginning of the project, an open and transparent environment needed to be established between the two teams of each group, where no question was considered stupid and no opinion disregarded. There needed to be an openness and transparency to discuss queries and concerns and encouraging all teams to contribute opinions and ideas enabled the students to effectively make decisions as a team and was conducive to a well thought out and successful project.



The leaders had to keep the team well informed of the project status through regular communication along the way ensured the project was kept on track and consistent, this was achieved by frequent communication between teams via:

- Facebook Messenger
- Skype and Facebook video calls
- Email
- Google Hangout

Digital platforms were used for easy and instant regular communication between the teams via video calls for global team meetings. Similarly, the need for more use of Google Drive and Email to create and share individual group documents and assessment components.

The importance of intercultural knowledge and understanding could not be understated and throughout the project the students acquired an understanding of how to effectively and appropriately interact and communicate with individuals from different cultures. Students gained greater knowledge and understanding of Irish and Australian cultural rules, biases and values, especially as a result of the project research and all the component which informed the creative brief. Furthermore, communication differences have been particularly highlighted throughout the project. The relationship between language and culture was seen to be deep rooted and the likelihood of miscommunication and ambiguity, especially through slang and colloquialisms. As a result, students and teachers had to gain a greater understanding and knowledge of how to minimize this likelihood by withholding judgement and instead focus on patience, listening, tolerance, curiosity and reflection. Overall, students also gained cultural self-awareness skills. They had to acquire an awareness of the influence of each other's way of life, perceptions and communication styles in their interactions with each other.

*Student Feedback:*

“When communicating with the students in Melbourne we found that although we have many differences in our cultures, we have very similar senses of humour and were able to use it in our meetings to develop relationships.”

“We got the opportunity to learn about new cultures, met new people, worked well as a group, and developed new skills.”

“We learnt of the importance of teamwork. Belbin states that a group do not work together to achieve a common goal, whereas a teamwork with one another, sharing information to ensure that they are able to reach this common goal. We feel that we worked as a team.”

“Overall the project was a great learning experience for us all, it was completely different than any work we had previously completed during our course and therefore we gained new skills and learnt many lessons.”

“We have all found that this has enabled us to develop better time management skills.”

“We learnt about the benefits and drawbacks of teamwork and built on both our teamwork skills and self-confidence. As a whole the project has enticed us to part take in a study abroad programme and has taught us many useful lessons that we will use in the future and therefore will improve our employability skills.”





“Due to the coherent and easy to follow structure of COIL, it resulted in a group project that reinforced skills that are relevant to both group and individual work, including, but not limited to, the ability to: Break complex tasks into parts and steps, plan and manage time, refine understanding through discussion and explanation, give and receive feedback on performance, challenge assumptions and further develop communication & leadership skills.”

### *Limitations*

Regular communication was essential to ensure everyone in the team was on the ‘same page’ and understood the expectations of the project. In many cases, frequent communication was required to ensure the detail of work produced and structure of assessment components was clear and consistent across all team members. Time management was a huge factor for this project due to groups of students partaking in teaching practice outside the normal university time in class and arranging suitable times due to the variation in time zones. One of the key challenges involved students learning how to coordinate the different schedules of each of the individual team members in the group in order to maintain regular communication and online team meetings. Indeed, the students found that video calls were often easier and have one person from each country-based group take the lead in the conversation and speak on behalf of their respective group. The remaining team members contributed their opinions, ideas and thoughts as required. This is where having a Team Liaison for each country-based group proved beneficial. In a few cases, the result was miscommunication and differences in understanding of project requirements delayed the progress of the project at times. Students learnt that it was often crucial to ensure everyone was clear on the project requirements before they could proceed with their activities. As stated previously, the need for an open mind, patience and awareness of their own cultural differences were considered key lessons learnt throughout the project process. Intercultural communication skills were needed to work successfully in an international team and produce the deliverables required.

### *Student Feedback:*

“Another aspect of completing the group project that surprised us was the length of time it took us to complete each section even though the workload was split up amongst six people. There was a lot of time spent organising the assignments and putting the different sections together at the end.”

“The same number of students from each university would also be beneficial.”

“Established set times should be agreed between the two universities for students to video call.”

“It is also crucial to give each member a role as soon as possible, as this will push each team member to understand their role quickly, while giving them time to complete their work with more efficiency.”

“While completing this project we as a group realised the importance of giving each other feedback and guidance, as they were good factors of motivation and teamwork.”

“Another difficulty of ours was decision-making and a lesson that we all have learned while completing this project is to have a list of options, discuss each options benefits and drawbacks and conclude instead of just



suggesting decisions on the spot. This would make it far easier to come to an agreement and would take less time.”

“Things like picking a group name and creating a logo also help create a sense of identity for the group, which in turn fosters the commitment groups need from their members in order to succeed.”

### **Possible Impact or Applications**

A key area of improvement is the sheer logistics, time zones and cultural differences. These are real obstacles to overcome in such a professional environments. Although it was the first pilot COIL project between these two countries, course coordinators need to have the same understanding of the task requirements before presenting them to students to minimize any confusion, miscommunication and differing interpretations. After students connected in real time for their interview, most used chat rooms to continue to engage each other on a personal or collegial level to follow up on collaborative assignments.

The need for clear guidelines are necessary when developing the PR packages so students understand the extent to which the creative materials need to be developed. A better understanding of the level of cross-communications and collaborative working environment that is expected within the global teams needs to be emphasised to students attempting the project in the future. Although the freedom each group had to decide on the frequency of team meetings and other communication was advantageous, clear expectations from coordinators would have helped coordinate communication better. The overarching expectation was that co-ordinators should take part in team meetings, every two to three weeks, so that everyone is familiar with the agreement requirements. Generally, providing greater in-class opportunities to work on the assessments will also enable future students to work collaboratively to complete the project.

Overall, the COIL project has fostered a greater appreciation of different cultures and valuing these differences to offer important learning opportunities. The key success factors were reviewed and lessons learned over the past year, in delivering a successful COIL project involving students in Eire and Oz.

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## Work Matters: Distance Graduates and the Employability Discourse

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### Abstract

Employment is one of the most salient issues for graduates and the literature on graduate outcomes is almost exclusively dominated by the theme of employability. As higher education has become a conduit for economic growth, graduate employability has become a significant area of higher education policy. Producing graduates continues to be one of the most important ways in which universities contribute to the economy. This paper examines the employability discourse with a focus on recent distance graduates. The study was implemented over a four-year period; 2012-2015, on undergraduate degree programmes in the Open Education Unit at Dublin City University (DCU). Participants are those who graduate with an honours primary degree (n=268). Findings are drawn from institutional records, an online survey (97 respondents) and 17 semi-structured interviews. This 3-stage approach was effective in assessing the employability outcomes of graduates. While quantitative data was analysed descriptively using SPSS, qualitative data was analysed thematically. Findings indicate that distance graduates successfully transition into graduate level employment. However, they often struggle to identify with their new role and relate suffering from 'imposer syndrome'. Although outwardly successful in the transition, they often continue, in some cases for many years, to internally identify with the role they previously held. The paper posits that while employability is largely positioned within economic discourses, primarily in human capital terms, employability is also influenced by opportunity and inequality in a structural framework.

**Keywords:** Higher Education, Graduate, Employability, Social Class, Distance, Transition.

### Introduction

Education has long been seen as a route to social mobility and economic prosperity. Consequently, improving access to higher education (HE), in order to build national prosperity, is a key tenet of government policy (HEA 2014). Ireland has experienced a dramatic expansion in HE participation with the progression rate from second level currently at 72% (HEA, 2018). However, research indicates that a differentiation continues in relation to course level (McCoy et al. 2014), field of study (Watson 2013) and institutional status (Iannelli 2011), with those from lower socio-economic groups often completing non honours degree courses at non university institutions; factors which can impact their employability. Those who complete their HE study on a part-time or distance basis face additional challenges. As well as limited course choice, their time frame for completion is invariably longer, as they often work full-time while studying. Additionally, these students are older to start with, and have delayed participation often for reasons related to social class (Corxford & Raffe 2014, Delaney & Brown 2017).



The focus of this paper is how those who have completed an honours degree by distance education experience the graduate labour market. The paper begins by considering the employability discourse and research on non-traditional graduate employability. Non-traditional students are those who are normally underrepresented in HE in relation to their number in the overall population (Field & Morgan Klein 2013). For the purposes of this paper the term non-traditional refers to adults and those from a lower socio-economic background. The methods of the study are then outlined. Data is drawn from three sources; institutional records, an online survey and semi-structured interviews.

A concern is the need to operationalise the complex concept of class. Although there is no single agreed definition of social class, occupation and educational attainment are the most widely used indicators in census classification and other research. In the context of this paper 'working class' refers to those from lower socio-economic backgrounds. This meant establishing the occupation and educational attainment of the graduates' parents, at the time the graduate completed compulsory education (Delaney & Farren 2016). Socio-economic background (SEB) data is not normally collected for adult learners (in Ireland, adults are defined as those over the age of 23), who are usually classified on the basis of their own principal economic status. However, this metric can obscure the social class of origin of adult students. The socio-economic classifications employed in this research are those used by the Irish Central Statistics Office (CSO).

The aim of this study is to establish:

- The transition experience of distance graduates into graduate level employment
- The role of social class on employability

The paper discusses how employability, while largely positioned within economic discourses, is also influenced by opportunity and inequality in a structural framework. While this study is based in Ireland, it has wider ramifications. Social equality, higher education and graduate employability are issues facing all developed countries.

### **The Graduate Employability Discourse**

Employment is one of the most salient issues for graduates and the literature on graduate outcomes is almost exclusively dominated by the theme of employability (Elias & Purcell 2013; Holmes 2013; Tholen 2013, Tomlinson 2012). As higher education has become a conduit for economic growth, graduate employability has become a significant area of higher education policy (HEA 2018; OECD 2018). An employability discourse therefore tends to prevail in any discussion of graduate outcomes. York (2004) defined employability as:

“a set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy”. (York 2004, p. 8)

The discourse is dominated by two distinct positions: mainstream and alternative (Tholen 2013). The mainstream position suggests a positive relationship between investment in education and labour market outcomes. Human capital theory (Schultz 1971), signalling theory (Spence 1973) and the skills framework



(Dearing 1997) are positioned within the mainstream view. The alternative, or critical account position, argues that employability is not solely determined by human capital. Rather it is influenced by opportunity and inequality in a structural framework (Brown & Hesketh 2004). Critical account theorists argue that mass HE is perpetuating the structural inequalities it was meant to eliminate (Tomlinson 2010). Therefore, the social mobility potential of HE expansion remains under-realised.

#### Non-Traditional Graduates and Transitioning to the Graduate Labour Market

Elias & Purcell (2013 p 14) define graduate employment as ‘the extent to which they (i.e. the graduate) are required to use the knowledge and skills they had developed as undergraduates’. Many factors can impact the likelihood of working class and/or mature graduates obtaining graduate employment. One of the ways in which graduates can aid their transition to graduate level employment is through low paid or unpaid internships (Watson 2013). This option is rarely open to mature graduates who often have financial commitments (Delaney & Brown 2017; Purcell et al. 2007). The additional costs associated with participating in such internships; clothing, travel etc. can also render them inaccessible to working class students (Carroll 2011).

Recruitment strategies can often discriminate against working-class graduates (Carroll 2011). Screening practices, such as limiting interviews to those who have obtained a certain classification in their final award, or the introduction of screening for academic performance at second level, may militate against them. Additionally, graduates who are less geographically mobile due to financial constraints or family commitments may find it difficult to secure graduate level employment (Ciarns, Growic and Smyth 2013; Olson 2014). Mature graduates can also experience age discrimination (Purcell et al. 2007), though Siivonen and Isopahkala-Bouret (2014) contend that age can be a positional advantage or disadvantage in the labour market, depending on how it is intertwined with other factors such as social class and the state of economic growth at any given time.

The focus of the existing literature tends to be on the outcomes for non-traditional graduates (working-class/mature) of full-time programmes. The impact of completing a university degree on a part-time basis is somewhat under-explored (Purcell et al. 2007). However, there are some notable exceptions. While many distance graduates experienced enhanced chances of promotion (Draper et al. 2014; Fahy et al. 2008; Pate and Miller 2012), this was more prevalent for those who were already working in the field of their studies, or employed by the state. Draper et al. (2014) highlight difficulties graduates experience in being ‘taken seriously’ in a new role, by colleagues who knew them in their old role.

This paper builds on the research discussed above by considering in some detail the process of transitioning to graduate level employment by online distance graduates.

#### Methods

This paper employs a case study methodology to explore the employability experiences of distance graduates from Dublin City University. The research was implemented over a four-year period; 2012-2015, on undergraduate distance programmes in DCU. Participants are those who graduated with an honours primary



degree (n=268). Findings are drawn from institutional records, a web-based survey (n=126), and 17 face-to-face, semi-structured interviews. Ethical approval was obtained from DCU's Research Ethics Committee.

### *Data Collection*

Institutional records, primarily application forms, are employed to provide the socio-economic characteristics of the graduates at the point at which they commenced their studies (Delaney & Farren 2016). The survey was developed and issued to graduate cohorts after they graduated, each year from 2012-2015. The purpose of the survey was to establish the graduate's socio-economic background (SEB) at entry, and their post-graduation employability status and experiences.

The face-to-face semi-structured interviews took place between April 2015 and January 2016. The interview was an opportunity to explore in more detail, the post-graduation employability experience of the graduate. It was decided to extend the pool of interviewees beyond recent graduates, to investigate more fully the impact of degree completion on employability. Interviews were recorded and transcribed to facilitate in-depth analysis. While every effort was made to replicate as closely as possible, the overall graduate population when selecting candidates for interview, some anomalies did arise. Graduates resident in Ireland and Dublin are over-represented as they proved easier to recruit. Those who attained a first-class honours degree also proved more willing to be interviewed.

Quantitative data was analysed descriptively using SPSS, qualitative data was analysed thematically (Brawn & Clarke 2006). This involved initial transcription of all interviews and close reading of all responses. The next stage of the process was organised in two phases. The first phase involved the analysis of individual accounts. The second phase was concerned with more general descriptions of themes across all accounts. Themes that emerged included:

- Credential Capital: Officially smart
- Identity: Who do I think I am?

When reporting qualitative data, in order to preserve the anonymity of participants their age is categorized as follows: 18-39 = Young (Y), 40-59= Middle aged (M), and 60+ = Old (O). Interview data is identifiable by the use of pseudonyms.

### *Limitations*

The qualitative data in this study is self-reported by the graduates. Additionally, as with all case studies, the results are bound to one particular institution. Finally, the approach is interpretative and is characterised by this feature. Nevertheless, how graduates interpret their experiences is revealing and some interesting findings emerge.

## **Findings**

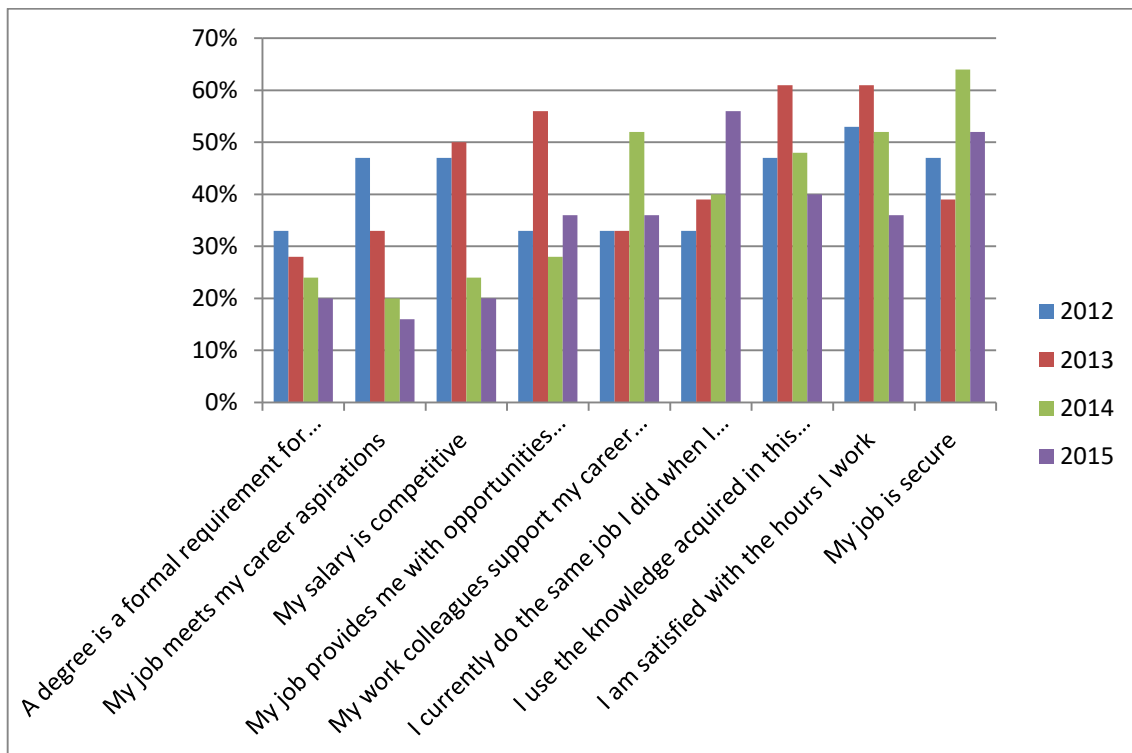
### *Transitioning to Graduate Level Employment: Officially Smart*

The survey sought to establish the extent to which graduates were in graduate level employment where they 'are required to use the knowledge and skills they had developed as undergraduates' (Elias and Purcell 2013,



p. 14), or where a degree was an entry requirement for the job they held (Figure 1). Forty-nine per cent of graduate respondents indicated that they were in graduate level employment, to the extent that they use the knowledge acquired in the degree in their current job. This is most true for those who graduated in 2013 (61%) and least true for those who graduated in 2015 (40%).

In relation to whether graduates still do the same job they did when they started the degree, overall 43% of respondents' state that they do. However, when we break this down on a yearly basis we see that it is much more likely to be true for those who graduated most recently (56%) compared to those who graduated in 2012 (33%).



**Figure 1: Percentage of graduates by year of graduation who reported that, thinking about their current job, they strongly agree or agree with the given statement.**

Moving into a new job does not necessarily mean moving into graduate level employment. By the same token staying in the same job does not mean graduates are not in graduate jobs. Some graduates may have already been in graduate level positions and the degree simply formalised that situation (Woodfield 2011); this might be why their job has not changed. This is evidenced in the following comments:

I was working in an environment where younger staff with degrees were joining the organisation and were part of a team I managed. I quickly realised that they were not any smarter than me... also my son completed his degree in 2005 and I thought if he can do it so can I. (Female M)

It validated my position if you know what I mean in that I'm now officially smart enough to have a degree and an engineering role (Brendan M)



The lowest level of agreement (25%) comes with the statement in relation to whether a degree is a formal requirement for the job graduates currently do. Once again this statement is most true for those who graduated in 2012 (33%) and least true for those who graduated in 2015 (20%) even though 40% of those who graduated most recently (2015) indicate that they use the skills and knowledge gained in their degree in their everyday work.

Sometimes this can be explained by the fact that graduates may be in graduate jobs (where they are required to use the knowledge and skills gained in their degree), which are not recognized as such by employers (Woodfield 2011).

Graduates were asked to rank the importance of various factors in relation to their employability. Eighty-one per cent of graduate respondents (n=79) perceived that their work experience was of key importance in terms of their ability to get a job or get promoted. It was equally important to all age groups with the exception of the 60-69. For this group age was a more important factor in relation to employability.

A majority of graduate respondents (65%) thought that having the credential, i.e. the degree, was important. For some graduates, while the degree did not result in a job change, it allowed them to remain relevant in their existing employment, sometimes facilitating them to retain that employment in a period of serious economic recession:

Pretty much our whole department was made redundant two and a half years ago, of 65 people only 10 of us are left. ...the skills that I learned studying, putting together essays and stuff, sure has helped me in an indirect way (Peter Y)

The level of the degree (i.e. level 8) and the subject studied were ranked as important to 59% and 58% of respondents respectively. These factors were regarded as more important to employability than the classification of the award and the institution attended. However, the subject studied is identified as being of primary importance to some graduates, who acknowledge that the subject(s) studied was instrumental in career change and attainment of graduate level employment:

I completely changed profession...the course was a necessary factor in this change (male M)

In general graduates did not feel that their employability was impacted negatively by their age. However, older graduates were more likely to think that age mattered with 50% of those over 60 ranking it as important while no-one in the 18-29 age group did.

The indications are that transitioning into graduate level employment is not something which happens immediately after graduation. Graduates likely needed time to position themselves to avail of promotional opportunities or may have needed further post-graduate study. Importantly however, the evidence, from this case at least, is that distance graduates do transition into graduate level employment, albeit slowly.





## Social Class and Employability: Work Matters

The socio-economic background of graduates in this study has already been outlined in detail in previous publications (Delaney 2015; Delaney & Farren 2016) and will therefore not be discussed in great detail here. Suffice to say that graduates primarily came from a working class background, which impacted their ability to study full-time on completion of compulsory education. Seventy-one per cent (n=122) stated that wanting or needing to be available for work, was the reason they chose to study by distance education. Work matters to these graduates.

Social class was not thought by survey respondents to be an important factor in relation to employability, with just 10% of respondents regarding it as important. This is interesting given that the primary reason graduates did not complete a degree when they were younger, related to social class. They think a degree will enhance their employability. Yet the intersectionality between social class and HE attainment does not appear to resonate. While the impact of societal structures appears clear in their accounts, it does not appear in their discourse.

Of the seventeen graduates interviewed, sixteen (94%) were in graduate level employment. The survey findings indicated that graduates did not think age had a major impact on employability. Individual experiences, however, told a different story, and highlight the intersectionality between age, social class and employability.

Una is 39 years old when she graduates in 2015, working as an IT trainer, and has tried to move into project management. She has come up against barriers:

It (the interview) was the most demoralising experience... because he was saying to me 'you're too old to be a graduate' and at the same time I don't have enough experience to be a project manager. I left quite disheartened. I felt where do I sit in the market? What should I be doing? My experience isn't transferring over at all (Una Y).

Una is an older graduate for reasons related to her social class. She relates the difficulties she has experienced in changing jobs to age alone.

Social class also comes through in Mary's (M) employability account. On completion of her degree Mary went on to do a Masters and subsequently a PhD. She now works as a lecturer in an Irish university. However, in this role she has been unsuccessful in securing a permanent post, despite applying numerous times. This situation deprives her of certain privileges, for example in relation to leave entitlement, pensions, and research opportunities, all of which are only available to permanent staff. At first she felt the unsuccessful outcome of her job applications was fair, thinking she was less suitable and/or less experienced than those who attained the post. However, Mary slowly came to realise she was as good as the other candidates and began to question, albeit internally, why she was not getting the permanent position. Initially, Mary relates the problem to age:



I sincerely believe...there is an ageist agenda. That's unspoken but if you look at appointments the profile of appointed candidates is quite young, it's very young.

As our conversation progresses Mary reflects that the discrimination might also relate to mode of study:

...appointments that are made in (named university) are made to young people who came through the normal system, ...through Oxford and Cambridge...the normal way, as opposed to non-traditional students and that's not bitterness but it is an observation. (Mary M).

Mary is successful in terms of transitioning into graduate level employment but nevertheless sees that within the field in which she is working, discrimination exists against those who have been educated through the non-traditional route. There is little evidence throughout the study that graduates identify the intersectionality between age, mode of study and social class. They tend to relate their experiences to ones of individual agency, as opposed to connecting them to societal structures.

### **Who Do I Think I Am?**

When we examine how the graduates' progress in the field of graduate level employment and develop a graduate identity it is evident that it is by no means a straight forward process.

On completion of her BA, Margaret (Y) immediately applied for a position on a Higher Diploma in Education to become a teacher. She outlines how she suffered several 'crises of confidence' during this period, sometimes saying to herself:

I don't know what I'm doing studying. Here I am at 40 years old; I don't know what I was thinking. Nobody is going to want a 40 year-old (new) teacher. What makes you think you can do this? Who do you think you are? (Margaret Y)

Margaret goes on to secure employment in a secondary school. The Principal in the school has given her the unpopular task of organising the timetable. Margaret comments:

It's horrible work. But the reason I got that is I'm a secretary, I'm used to the admin. And she (the principal) knows that. She sees your past and she pulls it in.

A striking example of Margaret's unresolved graduate identity is evident when she says she is a secretary. She continues to see herself as a secretary, a job she held for twenty years, even though she has been a teacher for several years. She identifies that she suffers from 'imposter syndrome'. Unless she begins to see herself as a teacher, she will likely impact her career progression.

Ali (M) too finds it difficult to see herself in her new role as a Psychologist. She relates an incident at a training course she attended as a participant:



We were asked to introduce ourselves, it went around the room, I was about the third person. Afterwards a lady my own age came over to me and said ‘oh thank God you’re not a psychologist; most of the people doing this seem to be psychologists’. And I kind of went (coughs) ‘Well actually I am’. And she said ‘Oh you never said’. So I actually couldn’t say the words ‘I am a psychologist’. I couldn’t actually get those words out: ‘I am a psychologist’. And I went away and I said ‘what’s that about?’

Ali, who was employed as a Psychologist for a number of years at the time this incident occurred, connects this inability to see herself as a Psychologist to the fact that she had remained with the same employer while transitioning from administrator to professional.

### **Conclusion**

The evidence from this case suggests that part-time distance graduates successfully transition into graduate level employment. Many totally changed career, while others were promoted in their pre-participation employment. A number identified that the degree allowed them to remain employed in what was a period of severe economic recession in Ireland.

Graduates, in particular those who completely changed career, often struggled to identify with their new role and related suffering from ‘imposter syndrome’. Although they were outwardly successful in the transition they often continued, in some cases for many years, to internally identify with the role they previously held. This may inhibit their progression within that career. The evidence from this case is that transitioning to graduate employment, and developing a graduate identity, can be a slow process of negotiation.

Indications are that graduates do not perceive of themselves as having been disadvantaged by inequalities in the field of HE. On the contrary they feel lucky to have had the opportunities they did, given their socio-economic background.

While it can be difficult to make up for early experiences of educational disadvantage, the graduates in this study appear to have benefited by their completion of a part-time university degree as mature adults. Resulting from their studies, distance graduates regularly attain graduate level employment and social mobility. Even for those who appear to be standing still, the degree facilitated them to remain employed in a period of economic recession. However, social structures, in particular social class, are evident in their accounts. Social class has determined when and how they complete university study. Their later entry to the graduate labour market has impacted the time they have to leverage economic capital from their degree. This is both an individual and a societal loss. ‘It is not ability that is unevenly distributed in our society. It is opportunity’ (The Panel on Fair Access to the Professions 2009, p.7)

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## Concepts and Techniques of the Cinema in the Human Training in Health to Face Syphilis

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### Abstract

Human training in health has been deficient in the different health care spaces. In Brazil, this is evidenced by the increase in cases of preventable adverse events, as well as by the increase in epidemics, such as congenital syphilis and other diseases. Such cases demonstrate failures in care. The severe epidemic of syphilis, decreed by the Brazilian Federal Government, challenges educational professionals to generate ideas on how best to address this issue. In order to address the significant knowledge and skill gaps in this area, innovative and engaging teaching practices are needed that provide concept and technique training to the health care professionals. Thus, this study combines the concepts of pedagogy, neuroscience and cinema in the construction of technology-mediated courses aimed at healthcare professionals.

### Introduction

According to the Epidemiological Bulletin 2018, the Ministry of Health (MS), syphilis has grown in alarming proportions in Brazil, and is considered by the government authorities as a national epidemic. In 2017, this bulletin points out 119,800 reported cases of acquired syphilis, 49,013 cases of syphilis in pregnant women, 24,666 cases of congenital syphilis and 206 deaths from congenital syphilis. In the period from 2010 to 2017, the cases of this aggravation went from "2 cases per 100 thousand inhabitants" in 2010 to 58.1 cases per 100 thousand inhabitants in 2017. Congenital syphilis cases increased 3.6-fold and syphilis in pregnant women 4, 9 times.

The audit recommendations made by the Brazilian Court of Audit (TCU), when evaluating the national policy to combat syphilis, evidenced the need for improvement in the processes and actions of communication and education directed at health professionals, the population in general and groups. These actions are being developed in the Syphilis Rapid Response Project, which brings to the education professionals involved the challenge of thinking about training that is sufficiently innovative and effective to promote behavioral changes for all learners involved in the training process. Because it is a geographically large country, the use of technological mediation was defined, within the scope of the project, as the main strategy to be used in the training process.

Training, whether by health professionals or the general population, needs not only to "inform" about syphilis with specific contents for each public, but also to sensitize them about the severity of the epidemic and to mobilize them for effective behavioral change in their scope of daily performance, whether professional or



personal. This "rapid response", involving behavioral aspects, is not a trivial challenge and therefore requires considerable innovative factor in the formative process, since, the way this training has been carried out in the last years was not enough able to avoid the propagation of the epidemic.

The aforementioned challenge highlighted the need to overcome knowledge frontiers in the area of education, building an innovative teaching methodology capable of providing comprehensive training for health professionals and other stakeholders. In this sense, the fundamental bet is on the role of feelings and emotions as essential factors in learning and decision making, a thought defended by the neuroscientist Antonio Damasio. Among the areas investigated are neuroscience, cinema, communication and cognitive psychology. In this article, the fundamental conceptual bases of this methodology will be presented, based on neuroscience studies, and how some concepts of cinema will be used in the construction of new pedagogical strategies.

### **Innovation in Human Training to Facilitate Syphilis**

In Brazil, we are experiencing an epidemic of syphilis (a sexually transmitted infection) that has worried and motivated the Ministry of Health (MS) to develop strategic actions focused exclusively on this aggravation. These actions were demanded from inspection of the Audit Court of the Union (TCU). Driven by the increase in the number of cases of the disease, as of 2010, said court conducted an operational audit on the control of syphilis in Brazil.

According to the Epidemiological Bulletin: Syphilis - Ministry of Health / 2016, this audit pointed to the following problems: a) in epidemiological surveillance, there were failures in monitoring the performance of health services in syphilis control; b) Not effective primary prevention strategies (avoid sexual transmission of syphilis); c) Absence of intersectoral partnerships or diversification of measures that would target campaigns to different publics (adolescents, sex workers, population without internet access); d) resistance of the health professional to perform rapid testing of syphilis in pregnant women and to administer penicillin, if necessary, in primary care; e) late diagnosis in pregnant women; f) shortages of penicillin in the national market.

This diagnosis has generated a set of recommendations that range from actions related to the evaluation of health services regarding the diagnosis and treatment of syphilis, through the development of new and diversified syphilis prevention campaigns and / or strategies, awareness of health professionals in order to demystify misconceptions about the administration of penicillin, improve the diagnostic work of syphilis in pregnant women, and strengthen measures related to the treatment of partners of pregnant women with syphilis.

The response to this need to confront and control this syphilis epidemic was based on the elaboration and implementation by the Ministry of Health of the Syphilis Rapid Response Project, which operates in 100 priority municipalities, which account for approximately 65 % of syphilis cases in the country, according to the 2018 / MS Epidemiological Bulletin. Among the actions of the project is the development of educational resources, mediated by technology, and that effectively meet the training needs of health professionals, the general population (with different emphases according to the public) and managers in the area of Cheers.



The great challenge is to think of innovative pedagogical strategies that can have a more significant impact on learners and that generate effective changes in behavior and practices. A rapid response to the fight against syphilis requires behavioral changes of all involved, namely, health professionals, managers and population. In this sense, some fundamental questions are raised. They are: why is not scientific information often enough to influence the actions and decision-making of individuals? Why, in many cases, does the professional of health care disregard the knowledge obtained in their professional training? What new element can be brought into a training process in order to contribute to changes in practice? How, in everyday life, whether at work or in personal life, do individuals make decisions? What is the influence of rational knowledge (conceptual and logical) obtained in formal education in the decision-making process?

In search of answers to these questions, we go beyond the frontiers of knowledge in the area of pedagogy, whose conceptual repertoire does not seem to account for the aforementioned training needs, especially when we are talking about training using technological mediation. This requires different conceptual models for the construction of innovative pedagogical strategies, since the elements of the human, for example, emotion, feelings, affective relation, and that are fundamental for an effective learning, need to appear strongly in the middle of technology.

### **Outside the Borders of Pedagogical Knowledge**

#### *An Encounter with the Thinking of Neuroscientist António Damásio*

The search for an expansion of concepts that allow the construction of innovative and possibly more effective pedagogical solutions has led us to neuroscience, especially the neuroscientist and thinker António Damásio.

In his work "The error of Descartes", Damásio (2012) presents arguments based on the systematic analysis of clinical cases, neuropsychological analysis of patients and on anatomo-physiological studies, in favor of the fundamental importance of emotions in learning and subsequent decision making. Damásio (2012) defends the so-called "somatic marker hypothesis".

According to Damásio (2012), the ultimate purpose of reasoning is to make decisions about something. The decision process, whatever it may be, implies having possible alternatives of choice (or course of action) and their consequences. Damásio (2012) shows that there are different levels of complexity in human decision making, depending on the nature of the decision situation and, in all of them, there are neurobiological processes behind. In this study we will highlight one that is strongly influenced by the educational process, namely, decision situations that have as characteristic the derivation of logical consequences from premises. They are subdivided into:

- a) Situation of decision regarding the resolution of a mathematical problem or the construction of an aircraft;
- b) Situation of decision that involves the social and personal environment, besides uncertainty and complexity (ex: the exit of a job, who to vote for, where to invest money).

According to Damásio (2012), in this case, decisions are made based on previous knowledge and experiences of the individual and are permeated by factors related to emotions and feelings. Therefore, decisions are not





made on the basis of a "pure reason", but based on what he calls "somatic markers". That is, in the decision-making process, the individual first makes a prior selection of action options under the influence of somatic markers, which do not always act in a conscious way, and can act in the veiled decisions.

Such markers are "a special case of the use of feelings generated from secondary emotions. These emotions and feelings have been linked by learning to anticipated future results of certain scenarios "(DAMASIO, 2012, p.163).

In the process of reasoning the mind is replete with images constructed from the lived experiences that enter and leave our consciousness. Somatic markers result from the integration of sensations of the external world (specific categories of stimuli) with information (sensations) of the body (specific categories of somatic states). They are created during the process of education and socialization.

According to Damásio (2012), in the process of decision making that involves personal and social aspects, we create scenarios of possible decision / action alternatives and consequences as well. If this whole process were to be conducted by the so-called "pure reason," we would take so much time, making precise calculations of pros and cons, that we would eventually lose time. Thus, in these cases, decisions are made quickly under the influence of somatic markers. Therefore, they are not purely rational and involve prior experiences that have led the individual to associate certain contingencies, which relate to the situation in question, to positive or negative body states. On the contingencies Damásio (2012, p.169) states the following.

[...] in your own life, encounters with a certain kind of sympathetic but authoritarian person may have been followed by a situation in which you felt diminished or, on the contrary, powerful; by being impelled into a leading role, this may have revealed its best qualities, or the worst; the country stays can make him melancholy, whereas the ocean may have made him an incurable romantic. Your neighbor on the side may have gone through exactly the opposite experience, or at least different. It is here that the notion of contingency applies: it is something only his that relates to his experience, something relating to events that vary from individual to individual.

Thus, Antônio Damásio (2012) brings new elements to think about the relevance of the mobilization of emotions and feelings in the teaching and learning process, in order to create somatic markers and experiences that can guide decision making in similar contingent situations. In addition, according to Damásio (2013), recent experiences about the learning process have demonstrated how the presence of certain levels of emotion in learning contribute to the recall of new facts.

### **A Meeting with Cinema Concepts and Techniques**

At the moment, one question that arises is: how can we insert these components (emotion and feelings) in the educational process, especially in the construction of self-instructional courses, mediated by technology, in the health area and for coping with syphilis?

Our experience in the construction of these educational resources has evidenced the relevance in considering some fundamental elements in this creative process. Are they:

- a) active learning, placing the learner in decision-making situations;
- b) proposition of learning situations based on the adaptation of case studies or reflections on problem situations considering not only the information, the logical reasoning and the clinical reasoning, but also mobilizing the emotions and feelings of the apprentices, in order to contribute to the creation of markers -somatic that lead the professional to consider formal learning in the decision-making process in daily work situations;
- c) use of the audiovisual media and different forms of communication as a pedagogical strategy.

According to Bates (2015), the communicational aspect of the teaching and learning process has never been seriously explored in education, even in specific areas such as didactics. The author states that there are various communication strategies such as: character use, plotting, photo composition, audio effects, cuts and editions used in movies, etc. Bates (2015) further argues that media can be used to influence our understanding and / or interpretation of meaning, that is, how the learner will derive meaning from a given information. We can thus affirm that different medias have different pedagogical functions and will have differentiated educational effects attending, each, to specific formative needs. To Bates' understanding (2015), we also add that a specific area of knowledge, using the combination of these two elements, namely media and communication strategies, has a strong potential in contributing to the pedagogical strategies, besides communicating and mobilize feelings and emotions in learners. This area is the cinema.

### **Screenings and Narratives of the Cinema: What Can We Learn with these Concepts?**

The Narrative Structure is characterized by a sequence of facts, which allows us to understand a story that is being presented, either in a simple or complex way. Telling stories is something that we humans have always done, often without realizing it. Many stories contemplate vivid facts, and others depict situations that are in our imaginary. The very act of a medical care predisposes the fact that the patient will tell a story about his current illness, permeated by reports of signs and symptoms, as well as the explanation about the routine of his daily life, habits, situations, facts of his past and family background. This story told by the patient feeds part of the process called "anamnesis", fundamental for the diagnosis. According to Campos (2007), the narrative is the product of the perception, interpretation, selection and organization of some elements of a story.

Cinema, by its own characteristics of reproduction of stories in the form of sound and image, predisposes the conception of narratives, both audio and visual. Through the audiovisual narrative, the most varied cinematographic techniques, such as the soundtrack, photography, closes, and sound design, among others, are used in an orchestrated way, to tell the story, and to arouse feelings and emotions in the interlocutor. The narrative tells us how to tell the story. However, before the construction of the entire narrative process, it is necessary to know what to tell, and it is in this phase that precedes the narrative that the script is developed, the guide that will be developed from six structuring points: the idea, the conflict, the characters, the dramatic action, the dramatic time and the dramatic unity (COMPARATO, 2016).

The structuring points of a script can easily be transposed into a clinical case construction model or problem situation presented in audiovisual format using film techniques in its development process. In the health



area, the problem situation always portrays a reality, and can be used as a trigger for the teaching-learning process, and through this process, it must promote the development of the necessary skills to face real situations that have relation with the development of the professional practice and the behaviors and actions derived from this practice that enable health care to individuals and communities. A problem to be worked in audiovisual format can be portrayed through an enigma, a structured or unstructured situation and should promote in the student a critical-reflexive thinking, leading not only to its resolution, but much more important, facilitating the process of understanding through the cognitive and epistemological challenge, and also fostering the acquisition of competences related to intuition, communication, systemic thinking, accountability, and autonomy in solving problems.

In the perspective of the use of theories and techniques of cinema, the script becomes the essential guide so that reality can be transposed to the problem situation. According to the playwright and theorist, Comparato (2016, p.27), the script "is the written form of any audiovisual project". The writer is much closer to the director than to the writer. Comparato (2016, p.28) states about the script:

[...] With glances and silences, movements and immobility, with incredibly complex sets of images and sounds that can have a thousand relations between them, which can be sharp or ambiguous, violent to some and gentle to others. They can impress the intelligence or reach the unconscious, [...] make invisible things appear.

Therefore, a well-designed and attractive script brings the possibility of provoking in the student the emotions and feelings necessary for the promotion of the acquisition of the knowledge, skills and attitudes necessary for his daily practice.

According to Comparato (2016), a script is made up of different elements. They are: idea, conflict, characters, dramatic action, dramatic time, dramatic unity. The idea is a fact and an event that awakens in the author the need to write, as, for example, the idea of writing about an epidemic of syphilis. Still according to Comparato, ideas can sometimes be subtle and difficult to reach, but they must be obligatorily to become the basis, the basis of the script. Another element, and that precedes the emergence and establishment of the idea, is conflict. From the conflict the story begins to be created, being its starting point, the story line, that condenses the tenor of the story (COMPARATO, 2016). For example, we can from the idea of the syphilis epidemic imagine an essential conflict that is the increase in the number of pregnant and newborns infected with syphilis. The story line that condenses this conflict can be represented as follows: "a woman tried for many years to get pregnant, and when she finally got it, she discovered at the time of delivery that she was infected with syphilis, and also her son, who with syphilis congenital, was at risk of death. " The story line opens the door to questions raised by the conflict, be it internal, external or extra-personal.

Another constituent element of the script is the character. There are several techniques for tracing the profile of the characters and the protagonist. It is time to think about who will live the conflict, what their function, their personal history, their physical characteristics, as well as a script of anamnesis, everything that relates to the character is preponderant in the unfolding of the narrative. Comparato (2016) defines this phase as the time to locate the story in time and space, and states that the development of the character in all its nuances, occurs through the elaboration of the argument or synopsis. It is the character who will live this story in a certain time and space.



The dramatic action is another element of the script, which is nothing more than the way the matrix conflict is going to be lived by the characters, that is, in what way this story will be told. It is the moment of creation of the structure, where the plot of the story is going to be decomposed into well-organized sequential scenes of time, space, and action. This structure is also called the *escaleta*, it is the skeleton of the script, characterized by the fragmentation of the script in scenes, where they are contained. Here the rhythm and order of the story will be defined. As in dramatic action, in a problem situation, order of facts and rhythm, and presentation of the context must be well structured, to enable the learner to begin the process of clinical reasoning.

Following, we still have the dramatic time, which is set for each dramatic action within each scene. It can, for example, be slow, fast, agile, etc. In other words, it's how long each scene will last, and that's what will make sense of the dramatic function. In this phase will be inserted the dialogues, the personality pattern of each character, the emotions that will permeate the scenes and the problematic that surrounds them. At last the dramatic Unity or the scenes. Comparato (2016) states that it is the moment in which the production team appropriates the final script and the screenplay is seen by the camera's look.

The construction of a problem situation for human health formation can be made on the basis of this theoretical construction of cinema and, especially, about the routing, fashion to ally elements of didactics and conceptions of dramatic construction, the latter being fundamental in the configuration of a history (problem situation) that mobilizes strongly, in the student, emotions, feelings and reflections. According to Comparato (2016, p.16),

The dramaturgy is playful because it has as attraction the limits of the soul of man, his affections, anger, passions, etc. and this in every moment marked by a conflict.

Thus, cinema has much to contribute to the construction of a pedagogical model based not only on scientific rationality, but also on intuition, emotion and feelings, these elements, as human as the logical rationality and that necessarily need to be considered in the process of teaching and learning to try to ensure a formation that is closer to the way the human mind actually operates, according to Damásio (2012).

### **Final Considerations**

In Brazil, the current challenges of human health formation to confront syphilis have generated the need to seek new concepts and perspectives of the process of human formation in health. In a training that uses technological mediation, the proposition of innovative formats becomes even more necessary. In this context, the use of audiovisual resources is increasingly gaining space due to its enormous explanatory, argumentative and creative potential in the process of presenting ideas from moving images and sounds.

On the other hand, neuroscience reveals the importance of feelings and emotions in the learning process. Given the need to create learning situations that take these elements into account, in order to achieve greater transformations in actions and professional practice, the authors of this article sought theoretical support for the development of an innovative methodological proposal and more efficient.

The cinematographic narrative can be much more than a moment of acquisition of knowledge, configuring itself as a lively, thought-provoking and strong experience in meaning, contributing to that the learners of



the health area not only amplify concepts, but incorporate, critically, the knowledge built in the formative process in their professional realities. In addition, the mobilization of feelings and emotions may enable the internalization of values and ideas that do not fit within definitions, nor can they be fully understood through the reading of a text, thus enabling creation and innovation.

It is an innovative discussion that still requires more detailed investigations, as well as situational studies to evaluate the effectiveness of the propositions presented here. This study had an initial critical reflection about the theme, as well as a starting point for new reflections and investigations focused on essential aspects of the discussion and proposition.

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## Identification of Key Enablers for e-Learning Delivery Modes in Undergraduate Programmes, using a Literature Analysis Methodology

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### Abstract

Higher Education Institutions (HEI) need to respond to the fast paced social, economic, and student demographic changes to ensure their survival and to enrich the learning experience of their undergraduate students. Flexible learning delivery modes such as e-learning are establishing themselves in the Higher Education (HE) sector. The need for this study rests with the extensive volume of e-learning delivery mode related literature and the absence of a summary in the form of key enablers. Therefore, the overall aim of this study is to identify key enablers for e-learning delivery modes in undergraduate programmes, using a literature analysis methodology. The objectives included: to clarify the definition and positioning of e-learning delivery modes, to conduct a comprehensive analysis of e-learning delivery mode literature, and to identify e-learning delivery mode key enablers in undergraduate programmes. The scope of the study was confined to the use of e-learning delivery modes in undergraduate programmes. The results of the study reveal a plethora of terms being used in the literature, some of which are used interchangeably and from different viewpoints, leading to confusion and contradictions. In response to this finding, a graphical representation was developed to illustrate the positioning of e-learning delivery modes using the metrics of degree of flexibility versus degree of technology mediation. Several themes emerge from a detailed analysis of the literature, namely: stakeholders, stages and pillars. While each has a critical role in e-learning delivery modes, they are not dealt with in their totality, nor is the interaction across all three perspectives considered. In order to address these concerns, a cubic key enablers framework is proposed with stakeholders, stages and pillars assigned to each axis. Further detailed analysis and testing are required to further the research carried out here.

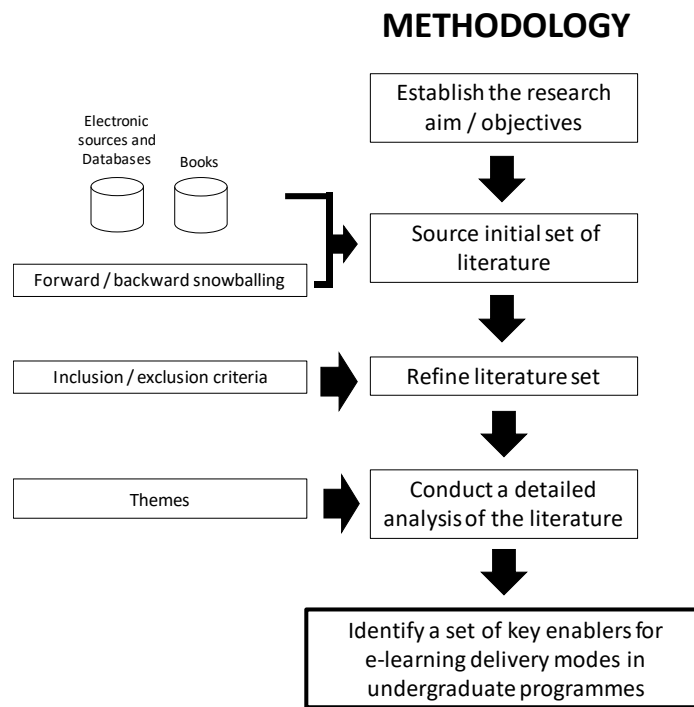
**Key Words:** E-Learning Delivery Modes, Key Enablers, Undergraduate Programme, Literature Analysis.

### Introduction

The environment within which Higher Education Institutions (HEI) are operating is constantly changing for many reasons, including economic, cultural and technical ones. Chris Hunt, Chairperson of the Irish National Strategy for Education 2030 (Department of Education and Skills, 2011, p.10), cites changing student demographics as influencing how Higher Education (HE) needs to respond. This has led to an increased demand for flexible learning delivery modes enabled by technological and pedagogical developments. The 2016/17 student numbers issued by the Higher Education Authority (2018, p.6) cite 3% of all enrolled students access their programmes using online or distance learning modes. Globally, e-learning is expected



to have a cumulative average growth rate of 7.07% by 2023 (Research and Markets, 2018, p.1). The literature in this area addresses aspects of flexible learning delivery mode types, pedagogy, curriculum design, Teaching and Learning (T&L), assessment, and technology. A summative review to tie all these aspects together would benefit stakeholders currently engaging in or transitioning to an e-learning delivery mode. A literature analysis research methodology (figure 1) is used to meet the aim and objectives outlined.



**Figure 5: Literature Analysis Methodology**

An initial set of literature (print books and electronic sources), limited to the previous 10 years, is sourced primarily from the fields of education and Information Communication and Technology (ICT) using advanced keyword searches such as ‘e-learning’, ‘online learning’, ‘blended learning’, ‘virtual learning’, ‘digital learning’, ‘distance learning’, ‘higher education’, ‘enablers’, ‘drivers’, and ‘critical success factors’. Snowballing is used to identify further literature via the reference list and citations of individual articles (Wohlin, 2014, p.2). The initial set of literature includes articles from journals with a high SCImago Journal Ranking (SJR indicator), and with a high h-index. Policy documents are also sourced from National and European educational organisation including the HEA, National Forum for T&L, and the European Union. Refinement of the initial set of literature is through a process of elimination using inclusion and exclusion criteria. Only those articles with specific links to the objectives of the research are included, whilst articles related to post-graduate, second level, and distance learning are excluded. This full and complete representation of literature in the area undergoes detailed analysis using a thematic analysis approach, due to the qualitative nature of the material. E-learning themes applied include the following: stakeholders, stages, and pillars. The analysis results are used to identify a set of key enablers for e-learning delivery modes in undergraduate programmes.

The organisation of the paper firstly considers whether there is consensus in the literature in relation to definitions of e-learning delivery modes; secondly, a comprehensive literature review of factors influencing e-learning delivery modes is presented; and thirdly, key enablers for e-learning delivery modes for



undergraduate programmes are summarised based on the literary findings. Finally, conclusions are drawn from the research, and recommendations for future research outlined.

### **Definition of E-Learning Delivery Modes**

Delivery modes is a term used across the education spectrum to describe how course content and instruction is delivered to the learner to enable them to grasp the prescribed information/skills. In simple terms it is the what, when, where and how of T&L. Even a cursory review of literature reveals a plethora of terms used to describe learning delivery modes, including face to face, hybrid, online, e-learning, classroom, blended, flipped classroom and work-based learning (Panigrahi et al., 2018; McCarthy et al., 2019; Garrison, 2011; Philips et al., 2012; Friesen, 2009). However, whilst a large variety of terms can be found in the literature, some are used interchangeably and from different viewpoints, which leads to confusion and contradictions. In order to define these delivery modes suitable for undergraduate programmes in HEI, two comparison dimensions are proposed. Firstly, the degree of flexibility where the learner has control over time, place, and/or their path of learning; and secondly the degree of technology mediation needed for T&L to take place. These criteria are used to categorise the various types of learning delivery modes found in literature (see figure 2). The author suggests that at a high level these modes may be split into the traditional approach and e-learning modes, with e-learning further divided into mixed approaches and fully online approaches.

The traditional approach to the delivery of T&L commonly uses terms include classroom based, face-to-face and 'brick-and-mortar' (Panigrahi et al., 2018, p.1; Hu & Hui 2012, p.782; McCarthy et al., 2019, p.26, Sener, 2015). The key characteristic of this approach is place-based learning, where both the educator and learner are in the same location at the same time, with low flexibility and low technology mediation involved. The technological advances that stemmed from the World Wide Web in the 1990s transformed programme delivery and led to the term e-learning being coined by Elliott Maise in 1999, which is the term the author found was most prevalent in the literature reviewed (Sangrà et al., 2012, p.146).

E-learning has its origins and pedagogical foundations in distance learning, but it is the opportunities ICT has offered that make it such an important and expansive learning delivery mode. Pinpointing a single definition for e-learning in the literature proved to be a futile exercise. Authors such as Sangrà et al. (2012, p.145, p.153) and Stein et al. (2011, p. 148) attest to this describing it as a concept that is constantly evolving in part due to learning needs changing all the time. In the author's opinion, Sangrà et al. (2012, p.148) and Philips et al. (2012, p.4) correctly summarise the various definitions in literature as being driven from a variety of foci including technology, delivery system orientation, communication orientation, and an education paradigm orientation. Often the term is used by researchers without any explanation of the context within which they are using it and their understanding of the term. A reoccurring theme in the literature is the importance of the educational aspect rather than the technological aspect of e-learning (Phillips et al. 2012, p.3; Garrison, 2011, p.2; and Sangrà, 2012, p.154). Garrison (2011, p.4) expands on this concept citing 'the 'e' in e-learning stands for more than electronic; it can also stand for extending and enhancing the learning experience'. In terms of this study, the author asserts caution to ensure the technological aspects of e-learning enhance the learning rather than becoming the focus. Philips et al. (2012, p.4) are of the opinion the term e-learning is used as a 'one size fits all'.

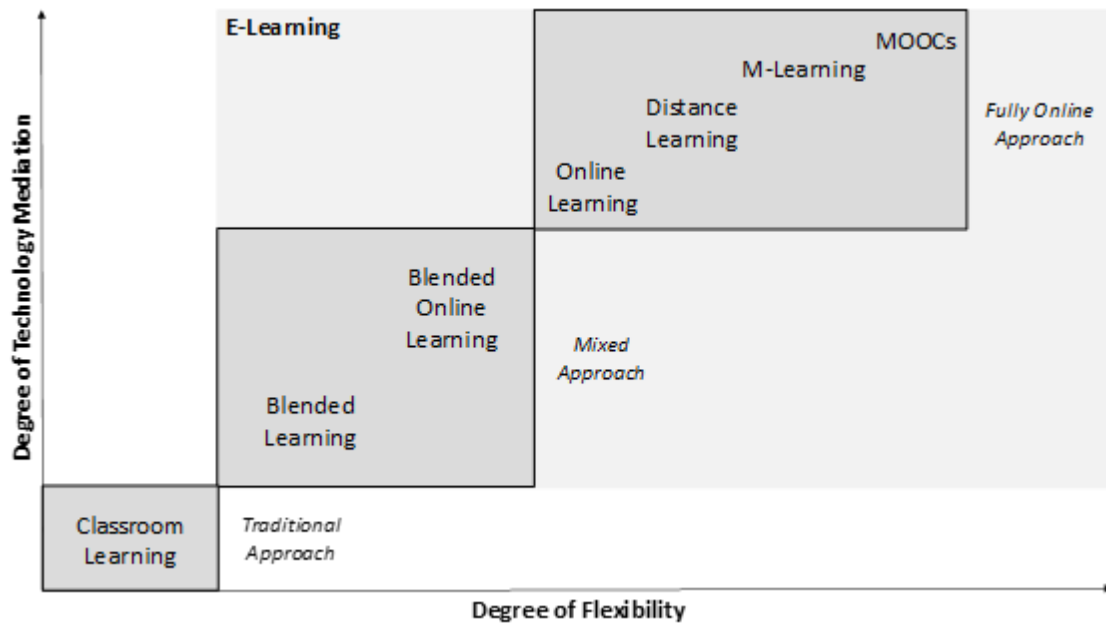




This point is echoed by Friesen (2009, p.4) when he talks about the term becoming ‘shorthand’ for the use of technology in education regardless of purpose and agenda. Therefore, the author will adopt the definition of e-learning put forward by Sandrá et al. (2012, p.152) who cite a ‘e-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning’. For this study, the term e-learning will be used to represent all learning delivery modes using technology under the headings of mixed approaches and fully online approaches.

Under the heading of mixed approaches, blended learning is a term used extensively in the literature with a large degree of consensus (Panigrahi et al., 2018, p.1; Garrison, 2011, p.75; Charbonneau-Gowdy, P., 2018, p.56). McCarthy et al. (2019, p.26) use the term ‘hybrid’ in place of blended. Here classroom-based learning is combined with an online Learning Management System (LMS) where learning is a combination of face-to-face and asynchronous Internet based learning. The benefits of face-to-face contact are combined with online learning material and methods of communication (Richardson et al., 2014, p.33). According to Garrison (2011, p.2) blended learning, rather than online learning, is the most common form of e-learning found in HEI. A variation on blended learning proposed by Richardson et al. (2014, p.34) and Garrison (2011, p.77) is blended online learning. LMS and synchronous online learning via web conferencing is used to enhance this delivery option. This mode helps overcome the undermining factor of blended learning where ‘my time, my pace’ is compromised due to the classroom-based element.

In terms of flexibility, online learning represents the next level. Online learning is the delivery of course content via Internet-enabled learning technologies, with the learner having no physical presence on campus and all content delivered asynchronously (Kjaergaard, A., & Thomsen, T. U., 2016, p. 3; Panigrahi, et al., 2018, p.1). This is often termed as ‘fully online’ or ‘wholly online’ in the literature (Bach, et al., 2007, p.34; Garrison, 2011, p.81; Charbonneau-Gowdy, P., 2018, p.56). The successful application of online learning applied as per the above definitions is very challenging to achieve. Retention and engagement issues are highlighted in the literature (Hollands & Tirthali, 2015, p.11; Panigrahi, et al., 2018, p.1; Richardson et al., 2014 p.18 & p.73). The absence of face-to-face contact with the lecturer and fellow learners can lead to the learners feeling very isolated and, ultimately, not completing the programme of study. The author observed the use of the term online learning in the literature, but the approach applied was a blended learning one. Examples of researchers identifying online learning as their chosen delivery mode but then combining it with face-to-face elements include Panigrahi, et al., (2018, p.1), and Wiesenbergs and Stacey (2005, p.389). Apart from online and distance learning, the other two types of e-learning delivery modes in this category are M-learning and Massive Open Online Courses (MOOCs). M or Mobile learning is the use of mobile technology to support the learning process (Talbot, 2003, p.34). Mobile technology advances flexibility and has a technical functionality which is more advanced than that of online/distance learning delivery modes. MOOCs are another variation on fully online programme offerings (Hollands & Tirthali, 2015, p.1). Their target market and basis in Open Education Resources (OER) sets them apart from undergraduate programmes but their delivery modules are like those of online learning. In terms of degree of flexibility and technology mediation, these three delivery modes are grouped under the heading, ‘fully online approach’. All the definitions discussed in this section may be represented in a graphical form as illustrated in figure 2 below:



**Figure 6: Degree of Flexibility versus Degree of Technology Mediation of Learning Delivery Modes**

Clearly, understanding the types and definitions of e-learning delivery modes is important to be able to present an analysis of related literature.

### **Analysis of E-Learning Delivery Mode Literature**

As indicated previously, the thematic analysis of the literature will cover stakeholders, stages, and pillars. Firstly, three main stakeholders can be identified, namely: the learner, the educator and the Institute. Typically, literature focuses on the educator and devotes large sections of research to their perspective, experiences, and requirements. Richardson et al. (2014, p.84) argue that it is incumbent on the educator to provide an interactive and engaging environment for the learner that promotes making connections and collaborating with peers and the course content. Despite all the literature available, if an educator is new to this form of delivery it can be very daunting. This ties in with the finding that although the use of e-learning is becoming more prevalent in higher education its growth is cited as being slower than expected by Stein et al. (2011, p.46). The slow growth is attributed to the lack of professional development among educators in terms of support, encouragement, knowledge, skills and abilities to integrate e-learning into their teaching (Stein et al., 2011, p.46).

The impact of e-learning from the learner's perspective is poorly represented in the literature. A study conducted by (Alhabeeb & Rowley, 2018) provided some insight, with the authors suggesting to 'consider the perspectives of all stakeholders and user groups and not to assume that the 'success' for one group implies 'successes' for another group'. All too often the design, delivery and assessment of an e-learning module is a fait accompli with little or no learner input. Given that modern education demands a learner focus and to be led by the learner, it is paramount the learner has a say (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2018). User-perceived satisfaction is critical for learners undertaking e-learning, with system quality, instructor attitude towards online learning, and learner-perceived interaction among the key considerations (Wilmar et al., 2018).



The Institute as stakeholder has a role to play in e-learning. All too often the Institute may not have an active role apart from administrative requirements for learner registration, quality assurance and award approval. Whether that is a conscious or unconscious decision is hard to decipher. Richardson et al. (2014, p.35) prioritise integrated online instruction platforms, training and technical support as institute requirements. The need for institute support is confirmed by Ghilay (2017, p.111) who cites the lack of training and support for lecturers as translating into resistance to convert from classroom learning modes to e-learning modes. Noble's famous 'Digital Diploma Mills' (1998) paints a very cynical picture of the Institute's motives behind e-learning. He cites commercialisation, education as a commodity, administrative control, manipulations of learners, and capturing the educator's knowledge and then throwing them on the scrapheap as the future of e-learning. In the author's opinion this has not been the case, and that it has been shown there is a place for both classroom and e-learning delivery modes.

Analysis of the second theme identifies three stages, namely: curriculum development, delivery, and assessment (Ghilay, 2017; Wilmar et al., 2018; National Forum for the Enhancement of Teaching and Learning in Higher Education, 2018; Wiesenberg and Stacey, 2005). The National Forum for the Enhancement of Teaching and Learning in Higher Education (2018) details curriculum development for e-learning as including universal design, digital literacy skills for both educators and learners. Wiesenberg and Stacey (2005) suggest curriculum development should encompass spending time pre-delivery to adequately plan, including several different educator roles to cater for various situations unique to the learning mode, adopting a 'blended' approach for building a community of learning, using asynchronous communication to encourage critical reflection and analysis and lastly employing instructional approaches and techniques that engage and empower learners to take responsibility for the learning process.

In terms of program delivery, four suggestions are put forward by Wiesenberg & Stacey (2005), namely: a developmental/apprenticeship and experiential approach to online course delivery, a safe 'community of learning' online, as well as building learners' online communication skills, a well-organised online presence to encourage learners to emulate the behaviour and lastly a variety of teaching aids that are inclusive of the diversity of learners. Given that e-learning is so heavily dependent on technology, its inclusion at the delivery stage is critical. While Patel (2014, p3) advises that 'dependency on technology without regard to pedagogy may result in a flawed learning perspective', he also warns against the trend to 'technologise' learning to make it attractive to those tech savvy or to meet the needs of distance learners. Challenges associated with e-learning delivery from an educator's perspective include securing assessments and learner privacy, controlling learner cheating, and accommodating learners with special needs' keyboard skills (Richardson et al., 2014, p. 137).

The final stage is assessment. Here the use of online media offers huge potential for a variety of e-assessment types. Successful online learning needs to embrace the potential whilst ensuring engagement, proper management, appropriate and timely feedback and academic rigour in terms of meeting programme learning outcomes (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2018). According to Wilmar et al. (2018), 'if e-learning systems provide a variety of ways for learning assessment, and if learners interact with each other, it will lead to an increase of satisfaction'.



Pillars of an e-learning delivery mode represent the third and final theme that emerged from the analysis of the literature. These may be further broken down into engagement, communities of learning, digital wellbeing, support mechanism, and data/content protection. Engagement centres around the learner demonstrating an interest in the course they are undertaking, actively participating with the learner group and interacting with the learning material and activities. The author agrees with Hu and Hui (2012) when they state that technology-mediated learning does not have to be inferior to face-to-face learning (Hu and Hui, 2012, p.778). If a learner displays poor engagement, the delivery mode is irrelevant. Richardson et al. (2014, p.84) emphasise the importance of providing an orientation, during which the learner can become familiar with the online environment and the expectation for them to engage in course content. Other aids include a developmental/apprenticeship and experiential approach to online course delivery to engage learners in the learning process, and the importance of feedback (Wiesenberg & Stacey, 2005; Panigrahi et al. 2018).

Communities of learning are particularly important for e-learning delivery in the absence of face-to-face contact and where asynchronous learning takes place. As highlighted by Richardson et al. (2014, p.73), there is a perception that online learning is not engaging and collaborative. With the right planning, appropriate pedagogies, approaches and tools, e-learning can be as collaborative as classroom-based delivery modes. A model developed and applied by Wilmar et al. (2018) found use and user satisfaction during online learning are interdependent and can lead to an individual performing better. Online learning platforms should provide technological features to enable a collaborative environment, which will link learners and, therefore, improve use and learner's satisfaction (Wilmar et al. 2018).

The third pillar is digital wellbeing. This addresses ethical, safety, professionalism and well-being considerations around the use of online technology. These areas are addressed by the National Forum for the Enhancement of Teaching and Learning in Higher Education (2018). Training is required for all stakeholders to ensure content is of an ethical nature and that engagements are cognisant of the confidential nature of the learner's identity and their assessment results. Use of online technologies brings issues of safety and mental health wellbeing into perspective, which need to be addressed.

Support mechanisms repeatedly appear in the literature and represent the fourth pillar. Support crosses all the process stages and each of the stakeholders has a part to play. It is important to note it goes beyond training and technological support, to include administrative support, policy, professional and pedagogical competences (Stein et al. 2011; Redecker & Punie, 2017, p.8). Educators need institutional support to overcome the current resistance to convert to e-learning delivery modes (Ghilay, 2017, p.111). Patel (2014, p.11) also talks about technology as a barrier to learning unless support is provided. Learning Management Systems represent a shift toward learner-led learning rather than teacher-led learning (Talbot, 2003, p.34).

The final pillar put forward by the author is data/content protection. The National Forum for the Enhancement of Teaching and Learning in Higher Education (2018) cites the need to manage the storage and archiving activities both inside the Institute and with other external systems linked to the Institute. Due to the nature of online delivery, Intellectual Property Rights (IPR) and copyright issues surrounding digital media are identified which also need to be considered (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2018). This refers to what is created and used by lecturers but also to the

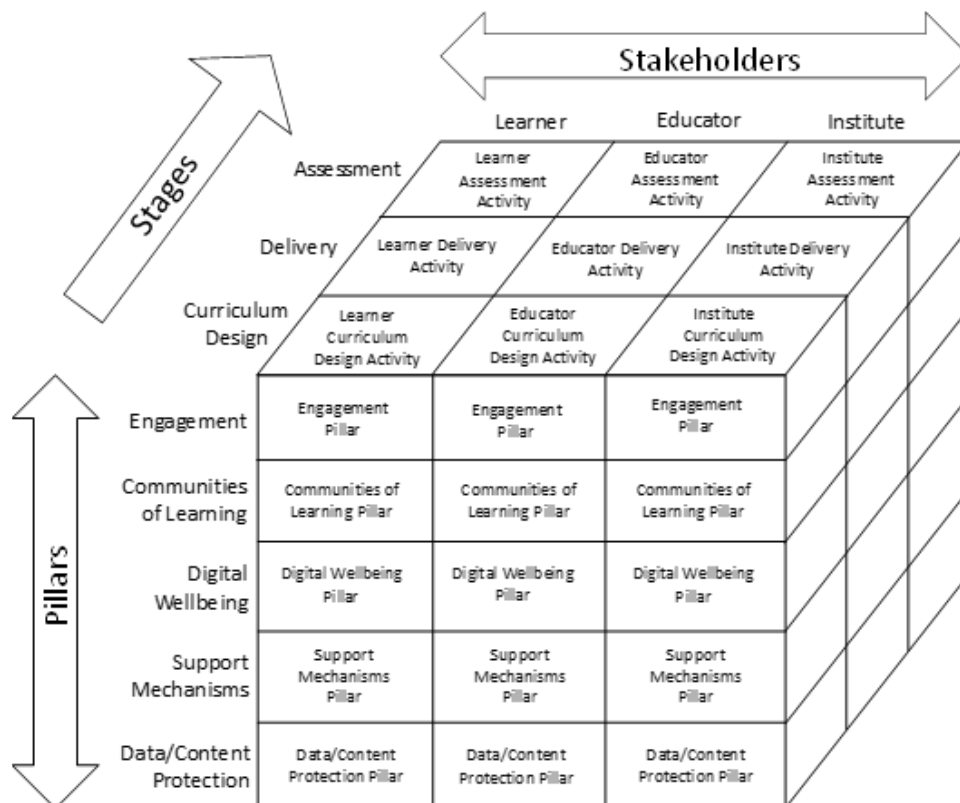


artefacts created by learners. Data/content protection has become an increasingly important enabler with the updates to European General Data Protection Regulations (GDPR) legislation in 2018 (Greengard, 2018, p.16).

When the literature presented in this section is considered in terms of the overall aim of this study, no consensus emerges. Resistance to migrate to e-learning on the part of both educators and learners may be attributed to the disjointed nature of e-learning delivery mode literature. While there is validity to the points being made under the headings of stakeholders, stages and pillars, a simplistic view is taken in a lot of cases. A multi-faceted approach is required that enables the impact of these key enablers on each other to be evaluated simultaneously. In order to be of value, the above findings need to be summarised in some meaningful way.

### Key Enablers of E-learning Delivery Modes in Undergraduate Programmes

Based on the analysis of the literature a great deal of valuable information, suggestions and recommendations in relation to e-learning have been revealed. However, it is difficult to see how each piece fits in the overall picture that is e-learning delivery modes. Therefore, a framework based on the findings of the literature is suggested as illustrated in figure 3 below:



**Figure 7: Key Enablers for E-Learning Delivery Modes**

Along each axis is a different perspective, which when combined must be considered in their totality. The first perspective pertains to the three stakeholders, namely; learner, educator, and the Institute. Secondly, the three stages of curriculum design, delivery and assessment are represented on another axis. And lastly, five pillars are identified as distilled from literature, namely: engagement, communities of learning, digital



wellbeing, support mechanism, and data/content protection. For example, the ‘learner’s’ input to the ‘curriculum design’ activity must be included in the context of the ‘engagement’ key enabler.

## Conclusion

The overall aim and objectives of the study have been achieved. A plethora of e-learning delivery mode terms were found to be used in the literature, some of which are used interchangeably and from different viewpoints, leading to confusion and contradictions. In response to this finding, a graphical representation was developed to illustrate the positioning of e-learning delivery modes using the metrics of degree of flexibility versus degree of technology mediation. The three themes of stakeholders, stages and pillars were analysed in the literature. While each has a critical role in e-learning, they were found not to be dealt with in their totality, nor was the interaction across all three perspectives considered. In order to address these concerns a cubic key enablers framework is proposed, with stakeholders, stages and pillars assigned to each axis.

It is the author’s assertion that there is a greater chance of an e-learning delivery mode being successful when the key stakeholder’s perspective is considered in the context of the relevant stages of implementation when the pillars identified from literature are adhered to. Given the short time frame of this study, only a preliminary review was possible to identify and provide a rationale for the key enablers. Further detailed analysis and testing are required to further the research carried out here. There are gaps in the literature in terms of some of the positions in the proposed framework that need to be researched. The framework needs to be tested under real conditions. Further expansion of the framework may include adding industry as a stakeholder, where work-based learning via industry placement takes place. Other expansions may also emerge following further research. The identified key enablers for e-learning delivery modes in undergraduate programmes represent a contribution to that may be built upon.



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## Te Whakapaipai, Dílárúchán: Towards Decolonisation via the Digital Self-Directed Study of Indigenous Languages

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### Abstract

In this paper I reflect on the praxis of being a self-directed (Knowles, 1975) second language learner in two Indigenous languages - one as a settler (Māori) and one as a diasporic community member (Irish). Using action research methods (McNiff, Lomax and Whitehead, 1996; Greenwood and Levin, 2000) I examine my experience as a non-traditional student managing different modalities of self-regulated learning praxis. In learning Indigenous languages - where I live and where I am from - I endeavour to read the world differently by reading the decolonised word (Freire, 1970, 1985).

**Keywords:** Decolonisation, Language Learning, Self-Regulated Learning, Action Research, Aotearoa, Eire

Tēnā koutou katoa  
Ko Slieve Aughty te māunga  
Ko Lough Derg te roto  
Ko Galway tōku iwi a ko Gibbons tōku hapū.  
Ko Tiernascragh te papa kainga.  
Ko Patrick rāua ko Patricia ōku mātua.  
Ko John Patrick tōku ingoa.

Greetings to you all  
The mountain I affiliate to is Slieve Aughty  
The lake that I affiliate to is Lough Derg  
My tribe is Galway and my clan is Gibbons  
The village I affiliate to is Tiernascragh  
My parents are Patrick and Patricia  
My name is John Patrick

### Introduction

Above is the translated English version of my pepeha, a form of ritual introduction in Aotearoa (New Zealand) Māori culture. Pepeha positions a person in relation to their connectedness to both family and place, including nearby waters (lake, river, or sea) and mountain. For some, this orientation towards place as much as people might seem unusual: as a member of the Irish diaspora, this was instantly logical to me. In fact, when I have shared my pepeha with an Irish audience I have never needed to explain the importance of connectedness to people and place. Mine is an adapted pepeha, however. As a feminist, I have chosen to position my pepeha in relation to my paternal grandmother rather than my paternal grandfather. I have interpreted tribal affiliation as her county in Ireland. Thus, there is a purposive and strategic mixing of the traditional, interpretive, personal and political in my pepeha.

Aotearoa is the most recent of a series of settler societies in which I have lived. I was born in the traditional territory of the Leni-Lenape (New York USA). I have spent a plurality of my adult life in the traditional territory of the Squamish (Sḵw̓x̓wú7mesh) and Musqueam (xʷm̓əθkʷəy̓əm) in Senakw (Vancouver Canada). I now live



in the rohe (territory) of Ngāti Whātua in Tāmaki Makaurau (Auckland). Since my time in Senakw I have endeavoured to align my teaching practice towards reconciliation with my Indigenous hosts. Much of this work has been framed around a decolonised (te whakapaipai in Māori) model (Smith, 1999).

Aotearoa is the first place I have lived where the Indigenous language is persistently reflected in mainstream and popular culture. We eat kai (food), spend time with whānau (family), and greet one another with kia ora (hello). The quotidian ubiquity of te reo Māori is deceptive, however: few non-Māori speak Māori at a conversational level. I aspire to do so. Learning Māori is an obvious way for me to move beyond valuing decolonisation as a principle towards becoming a more active agent of decolonisation in Aotearoa. And yet...my focus on decolonization within the Aotearoa context revealed something else: a lack of consideration of my need to decolonise (dílárúchán in Irish) as a child of the Irish diaspora.

### Literature Review

There is a limited range of literatures that looks at Indigenous language learning specifically as an aspect of decolonisation. With regards to te reo Māori, Rātima and Papesch (2013) report on case study of one Māori woman's experiences becoming a fluent te reo Māori speaker as an adult. Te Huia (2015) examine the interplay between Māori identity, racism, colonisation and the efforts of Māori adult learner in learning the language. He reports both intrinsic (sense of confidence; improved self-concept) and extrinsic (substantive access to participation in cultural and social spaces where te reo Māori is the quotidian language) benefits of learning Māori for Māori.

There is a somewhat broader literature that examines the Irish language learning as it relates to decolonisation. Dillon (2016) points out that "colonisation in Ireland and in many other countries has gone much deeper than political rule" (p. 100): he cites the hegemony of the English language in twenty-first century Ireland as one manifestation of this. Similarly, Murray (2005) argues that, while Ireland has disengaged politically from the United Kingdom, "there are many reasons to believe that much of what has resulted from centuries of domination lives on in our shared ideologies of progress and development today" (p. 18), including the predominance of English. The current status of the Irish language in Ireland is perhaps the most glaring example of this: in the most recent census, just under 40 per cent of the population of (the Republic of) Ireland were able to speak what is the official first language of the state (Census of Ireland, 2018), despite a schooling system with compulsory Irish language study at both primary and secondary school.

Cahill (2007) highlights several times in Irish history, where the Irish language was suppressed under British occupation, including the 1695 Act to Restrain Foreign Education, which banned schooling in Irish and led to the growth of illegal hedge schools "where Irish youth were taught in all subjects, including [Irish] and often Latin, Hebrew and Greek," and the advent of "national schools" in the 1830s, which forbade both the teaching and speaking of Irish at school (pp. 118-119). Cahill also points out that, despite the establishment of the Republic of Ireland, the use of Irish on the island of Ireland remains deeply contested. Schools teaching via the medium of Irish did not re-emerge in Northern Ireland until 1971. A 1949 Northern Ireland statute prohibited bilingual English/Irish street signs until the 1990s (p. 122). More recently the Democratic Unionist Party has blocked the establishment of an Irish Language Act in Northern Ireland. Thus, Irish is the only Indigenous language of the UK without any statutory protections where it is spoken.



## On Decolonisation

Among postcolonial theorists, Edward Said has produced a body of work that looks at the colonial enterprise across the realms of politics, culture and social relations, arguing in *Orientalism* that “ideas, cultures and histories cannot seriously be understood or studied without their force, or more precisely their configurations of power, also being studied” (1979, p. 5). Said also wrote about the experience of exile and marginalisation as both actual and metaphoric experiences, since “the intellectual in exile derives from the social and political history of dislocation and migration” (Said, 2005b, p. 373). As a child of the Irish diaspora, this resonates with me - and my aspirations to learn te reo Māori and Irish. My Nana (grandmother) was a fluent Irish speaker, who did not give the language to any of her children.

Said has specifically written about Ireland and postcolonialism. He notes that “more than any other of its colonies, Britain’s Ireland was subjected to innumerable metamorphoses through repeated settling projects and, in culmination, its virtual incorporation in 1801 through the Act of Union” (2005, p. 299). He goes on to say:

It is an amazing thing that the problem of Irish liberation not only has continued longer than other comparable struggles but is so often not regarded as being an imperial or nationalist issue; instead it is comprehended as an aberration within the British dominions, yet the facts conclusively reveal otherwise. Since Spenser’s 1596 tract on Ireland, a whole tradition of British and European thought has considered the Irish to be a separate and inferior race, usually unregenerately barbarian, often delinquent and primitive. (Said, 2005a, p. 310).

Similar arguments have been made about the Irish language--and Māori and their language. This is a common strategy of occupation and colonisation. Thus, I have found much pleasure in beginning to learn these delinquent, barbaric and primitive languages.

## Method

This is an action research project, centred on my praxis as a self-directed additional language learner. According to McNiff, Lomax and Whitehead (1996) action researchers “are intent on describing, interpreting and explaining events (enquiry) while they seek to change them (action) for In the context of this study events relate to (directed or self-regulated) learning activities, the action is to acquire language proficiency (however rudimentary), and the purpose was decolonisation. the better (purpose)” (p. 13).

Greenwood and Levin (2000) define action research as “research in which the validity and value of research results are tested through collaborative insider-professional researcher knowledge-generation and application processes in projects of social change that aim to increase fairness, wellness, and self-determination” (p. 94). For this study both definitions have currency. I am seeking to improve my practice as both a learner and university lecturer through a range of self-regulated learning strategies I often proffer to my students. I am also trying to foment social change: as a settler learning the Indigenous language where I live by learning my Indigenous language of where we are from.



As part of my studies - and as a part of this action research project - I keep an [online diary](#) “blog”, where I capture a timeline of my activities and to chart my progress (McNiff, Lomax and Whitehead, 1996, pp. 87-88). As a sociologist my inclination is to use this blog as field notes - as I would during ethnographic research - though this diary process is less ritualised or systematic than a fieldwork diary: I write when inspired to do so, or to capture something that might be useful later. There are anecdotes, thoughts, reflections, meaning-making, and analyses of what I do and what I learn. These are written by me for me: as a result, I do not make great effort to unpack these for anyone else in the diary itself.

In addition to my blog, additional data sources include the learning materials themselves, particularly those that required me to interact with content via learning activities

- Workbooks in each te Wānanga o Aotearoa He Papa Reo course kete (basket)
- Lessons and assessments in the Duolingo Irish curriculum
- Lessons and activities in a series of massive, open, online Irish language courses (MOOCs) offered by Dublin City University through the FutureLearn consortium
- Lessons and activities in Gaelige gan stro (Level One), a self-directed Irish language curriculum

Across these components I use self-reflection, dialogue and conversation, and narrative and story, in a cyclical way (McNiff, Lomax and Whitehead, 1996, pp. 21-22) to reflect on and in my learning experience.

My research question for this action research project is: to what extent do any (or all) self-regulated learning activities contribute to my learning of te reo Māori and Irish?

### **Diacrits and Dilemmas**

Having previously learnt French as an adult, diacrits are something I am comfortable using rather than view French vowels as separate from diacrits I instead see multiple of versions of vowels when they include diacrits. Thus e, é, and è are each distinct vowels, rather than versions of e when I speak, read or write French.

Both Māori and Irish use diacrits to change the sound of vowels. Māori’s macrons are relatively simple: a macron changes the vowel to a long sound; there are also a few vowel combinations to learn. In Irish the fada works similarly, but the vowel combinations in Irish orthography are much more complex. As a result, working with Māori language written materials has been more straightforward than those in Irish. Despite being a language spoken by relatively few persons, there are many more Irish language learning tools available than Māori. In all other respects, learning Irish in a self-directed manner is more accessible. Trying to balance my efforts across both languages when one offers fewer avenues of study was my first dilemma.

### **Te reo Māori**

The self-directed materials from Wānanga are comprehensive and well designed as a curriculum. However, the onus is on me to organise the various materials to structure my learning: the multimedia materials are on a memory stick; there is a workbook; and, an assessment book. These all sequence together, but I must



manage the sequencing. Having an online course site that aggregated all these would make managing things easier and present a potential space for interacting with other learners. Instead at times my struggle with process rather than with language learning directly was another dilemma. I enrolled in Wānanga as part of a cohort at my university. While there has been some organisation of social activities for our cohort, these are based at a different campus of our university and often other work-related responsibilities preclude my participation.

### **As Gaelige**

Duolingo offers a range of languages via a platform that includes smart phone and tablet apps, as well as browser-based access. Several months after first using Duolingo to study Irish I discovered that the browser version offered both lessons and assessments, rather than assessments alone on my phone. Further, in paying to use DuolingoPlus I can work entirely at my own pace, rather than worry about accruing daily points to continue. Thus, on any day where I had five free minutes, I can complete a lesson. I can also elect to cover one topic through four levels or move through the entire curriculum staying at one level. This too has adapted well to my self-regulated learning.

Dublin City University's Future Learn suite of Irish language MOOCs are aligned with the Common European Framework for Languages: completing the first four courses (Irish101, 102, 103, 104) maps to level A1 on the framework...if one completes every learning activity. As this is not my first MOOC experience, I have engaged as a quasi-lurker, having completed nearly all assessments and consuming nearly all the materials, but not engaging consistently in the comment-based discussion opportunities in the courses. This ability to construct my participation based on my own inclination and requirements is well-suited to self-regulated learning. Persistently having found the orthography of Irish vexatious, however, remains intimidating.

Initially I also started working through the first of the Gaelige gan stro (O Donaill, 2011) book series. Alas, I quickly became time poor and put this aside: I intend to restart the book later this year. A dilemma here was my tendency to take on too many differentiated learning strategies concurrently.

When learning French, I found using multiple modes of self-regulated learning worked well for me—and it has for learning Irish too. I have struggled to find additional learning resources for Māori. As a result, I have dedicated more time to Irish. But social media have offered me additional modalities to support learning both these languages.

### **Social Media**

In addition to my own blog, I discovered many people using Irish in social media. I follow the [Motherfocloir podcast](#), which is about “words, Irish, Irish words, and words from Ireland” (Ó Séaghdha, 2019). Ó Séaghdha has also written two books about Irish (2017, 2018), which I have read. These resources given context to Irish more than contribute to language acquisition directly.

There is an associated Twitter account for Motherfocloir, which is curated each week by a range of guests. One of these curators subsequently created a DuolingoPlus classroom for followers of the podcast. As a



result, we get homework to complete in addition to our own self-paced learning through the curriculum. This classroom also has a Facebook community, which fosters further interaction between learners as well. What began as listening to a podcast has resulted in a substantive online community of practice in which I participate, albeit at times on a peripheral basis (Lave and Wenger, 1991).

The FutureLearn Irish MOOCs also have a social media presence. Students are encouraged to use a corresponding hashtag for each course (e.g. #FLIrish101). And there is an affiliated Fáiite ar Líne [Facebook community](#). I have been a lurker in both. I have also found following Māori language media on YouTube - including Māori Television, Te Reo Television, and TVNZ's Te Karere Māori language news bulletin - has supplemented the somewhat less prominent presence of te reo Māori on social media such as Twitter.

## Conclusion

Greenwood and Levin (2000) argue that “action researchers do not make claims to context-free knowledge, nor are they interested in achieving such knowledge” (p. 96). This study, which is ongoing as I continue my journey as a te reo Māori and Irish learner, largely validates this stance.

The greater options for Irish language study mean my time has been more focused on Irish over te reo Māori to a ratio of around three-to-one; ease of access also means I seem to be progressing more quickly as Gaelige (in Irish).

These endeavours are about acquiring Indigenous language in-context. However, the cumulative impact of more persons decolonising through learning Indigenous languages—whether the learners are Indigenous or not—is an outcome not constrained by any individual’s particular context. We are learning to new ways to “read the world by reading the word” (Freire, 1985), in different languages and their accompanying epistemologies.

Murray cautions that “if we are only prepared to look at post-colonial theory along its linear and temporal axis, we will have missed the dual relationship, and co-existence, of the coloniser and the colonised ‘other’” (Murray, 2005, p. 22). Thus, I try to be mindful of my positionality as a settler in Aotearoa. Ease of access alone cannot drive my opportunities to learn te reo Māori. I must seek out additional modalities for learning te reo Māori: ease of access is not a legitimate barrier.

I began this essay with my pepeha, in te reo Māori and English. Here it is again, this time as Gaelige:

Tēnā koutou katoa

Ko Slieve Aughty te māunga

Ko Loch Deirgeirt te roto

Ko Gaillimh tōku iwi a ko Mac Giobúin tōku hapū.

Ko Tiernascragh te papa kainga.

Ko Pádraic rāua ko Pádraigín ōku mātua.

Ko Seán Pádraic tōku ingoa.

Go raibh maith agat go léir

Is é Eachtaí mo sliabh

Is é Deirgeirt mo loch

Is é Gaillimh mo mhuintir agus is é Mac Giobúin mo theaghlach.

Is í Tiernascragh an tír dhúchais.

Is iad Pádraic agus Pádraigín mo thuismitheoirí.

Is mise Seán Pádraic.

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## Future Skills and the Future of Higher Education

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### Abstract

The report, Future Skills – Future learning, Future Higher Education focuses on empirically determining the future skill demands for higher education. Research on future skills is currently a hot topic in management and organizational research. Global networked organizations and steadily accelerating product cycles bring into question the model of qualification for future jobs. According to the “Future of Jobs Report” (WEF 2018), released in 2018, the majority of employers expect that by 2022, the skills required to perform most jobs will have shifted significantly: “While these skill shifts are likely to play out differently across different industries and regions, globally, our respondents expect average skills stability—the proportion of core skills required to perform a job that will remain the same—to be about 58%, meaning an average shift of 42% in required workforce skills over the 2018–2022 period”. Can graduates really be prepared for the future through knowledge acquisition? Do we already have adequate concepts for competence development in higher education? Or is something new and something radical needed?

**Keywords:** Future Skills, Higher Education, Learning, Competence, Delphi Survey, Education Research

### Introduction to the Field of Future Skill Research

Research on future skills is the current hot topic of the day in management and organizational research. In times of global networked organizations, and steadily accelerating product cycles, the model of qualification for future jobs seems in question. The vast majority of employers surveyed for the “Future of Jobs Report” of the World Economic Forum (WEF 2018), released in 2018, expects that in short term, by 2022, the skills required to perform most jobs will have shifted significantly: “While these skill shifts are likely to play out differently across different industries and regions, globally, our respondents expect average skills stability—the proportion of core skills required to perform a job that will remain the same—to be about 58%, meaning an average shift of 42% in required workforce skills over the 2018–2022 period”. Can graduates really be prepared for the future through knowledge acquisition? Are we already having adequate concepts for competence development in higher education? Or is something new, something radical needed? Research on future skills becomes more prominent, either compiling lists of skills for broad purposes of how to live and work in 2030 (OECD, 2018) or analysing job field related qualifications (Deming, 2017). However, the time is ripe to go a step further and conduct in-depth research.



What plays out in the future depends on decisions taken today, which can critically narrow the room for manoeuvre over time. That is why it is important to factoring the long term into decision-making in higher education today. Starting point for research on future skills is an analysis of factors, which influence our lives, the way we work and live, learn and develop. On the one hand, we cannot predict what the future will look like, whereas, on the other hand we notice that changes are underway and leave us with a changed environment demanding different behaviour, and adaptation to more complex situations in our lives and work contexts. An analysis of such changing factors is available in a multitude of volumes, in many forms, shapes and perspectives. The nature of such descriptions, studies and analyses is – as they are dealing with the future – naturally carrying a certain degree of vagueness, while being as precise as possible in order to capture aspects, which can be taken as factors of influence for the future: future ways of living, future ways of work, future ways of learning, etc. (e.g. OECD 2019, 2018, 2017a, 2017b). Analysing the currently existing writings dealing with the question of which skills and abilities will be important for the future work life, at least two converging primary factors crystallize:

- Ever faster technological advancements and their penetration and infusion of all spheres of our lives, work and societies, leading to an excess of information and options. This can be compared to the point in time, when Gutenberg invented the printing machine for books, and for which our society is only starting to develop ways of coping with it.
- Increased global cooperation, exchange, and communication, which moves from being an option to being a necessary ingredient of every process of society, work and individual life.

Resulting from that, a number of connected changes can be observed, which we believe to be secondary effects, building on the foundations of the two prior ones:

- Resulting from the tectonic shifts in the structure of work and its development, a new demand for (higher) education study and learning pathways and qualification structures including certification and credentialing schemes will be needed. Educational institutions need to understand these forces in order to develop a changed vision of future education to inform their strategies.
- Fostered through these changes an ever-larger demand for higher educational attainment is induced evoking industrialized societies to turn into learning/ educational societies in which life risks primarily can be mitigated through education.
- And lastly, a changing nature of the very essence of what learning (in school) and studying (in higher education) is aiming at can be observed, leading to a new 'lead-orientation' for concepts like knowledge – shifting from static knowing to knowing & reflection in action in complex and open situations.

It is important to note that no cause-effect model can be applied to these developments. In order to find reference models which are capable of capturing the intertwined and networked nature of these developments with factors mutually influencing each other, we turned to eco-systems theory and cybernetics. The dynamic nature of these approaches able to deal with and describe system dependencies provides grounds for theoretical description of reality. The eco-systemic approach is based on the assumption that changes and developments in one system are causing effects in a connected system. Building on this approach, combining it with an education science point of view, as well as with a sociological perspective,



our research is rooted in the assumption that there are ongoing changes within the structure, nature, and profile of the abilities and skills. Individuals will need these skills for their professional lives in order to cope with the demands and requirements of their respective work contexts and tasks. In our research we found, that these changing skill requirements can be described and analysed.

Notably, policy and especially research, pays increasing attention to analysing in-depth changes and trends for the future world of work and for future job markets (OECD 2018a, 2018b, WEF 2018, Playfoot & Hall 2009). However, most approaches fall short of two perspectives, which we call the “iceberg phenomenon” and the “future education gap”:

The first blind spot is the iceberg phenomenon: The iceberg phenomenon of future skill research refers to the fact that future skill research is often focusing on technological change (World Economic Forum 2018, Hirsch-Kreinsen 2016, CEDEFOP 2012, Deloitte 2018, PwC 2018, McKinsey & Company 2018, Balliester & Adam 2018), which is only one side of the coin. Our research shows that this is just the tip of the iceberg. Only very few studies try to elicit changes, which go along with it and which lie underneath the surface of the iceberg: dealing with future work concepts, the tectonic shifts throughout an entire business or public organizations, the way collaboration is organized, and the impact it has on organization culture, new leadership concepts, more decentralized, smaller units, and a need to organize shared creativity and shared cognition in a global setting.

The second blind spot (future education gap) is the future skills education concepts gap, which refers to a lack of research with regards to the demand and shape of future higher education concepts, which meet the need for future skills. It is still unknown how higher education institutions can organize their academic programs in a way that they specifically are sensitive to supporting the development of future skills for their future graduates. Although many promising attempts and pilot trials are underway, there is no overarching forum for discussing possible future higher education and its institutions.

Both issues, the iceberg phenomenon of future skill research and the future education gap are predominant issues in future skill research today. In order to overcome this shortfall and to be able to research the articulation, extent, nature and contexts of such future skills – and not limited to digital skills but future skills with a broader scope, we designed a threefold long-term research project, starting in 2015, called “Future skills – future learning and future higher education”. The research focus is on identifying future skills in a broad and holistic sense, incorporating digital skills but going beyond them, and determining which changes are caused in work environments leading to these new skill demands. Moreover, we asked how higher education institutions would have to reorganize their academic programs in order to support development of such future skills for future graduates.

There are complex feedback loops between new technologies, job creation, education organizations’ attempts to prepare individuals for present and future jobs, and their skill development. New technologies can drive business growth, job creation, and demand for specialist skills, but they can also displace entire roles when certain tasks become obsolete or automated. Well-developed links between higher education institutions and labour markets in order to share and exchange information about these often short-term developments, do not exist at large scale. Skill gaps—both, among workers and among the leadership of organizations—can speed up the trends towards automation in some cases but can also pose barriers to the adoption of new technologies and therefore impede business growth.



Part 1 of the research initiative is about identification of innovative and future, advanced organisations. We identified organizations, which we call for the purpose of this research study ‘future organizations’ due to their advanced thinking on learning and competence development. In part 2 of the research, we analysed the nature of these competence concepts and the competence demands of these organisations on a deep level through in-depth interviews and were able to model a set of sixteen competence profiles which we refer to as ‘future skills’. Each competence profile contains an array of a number sub-competences. The data led us to be able to identify a three-dimensional competence frame around the 16 competence profiles, so that they can be categorized according the three future skill dimensions. In order to validate our approach and findings, and to determine the impact the demand of future skills has on higher education, we designed – in part 3 – the presented Delphi study on the basis of our findings, drawing on the assessments and opinions of almost 50 experts from all over the world.

The Delphi study involves experts into reasoning and evaluation of statements and scenarios about future higher education. The experts were asked to engage into reflection and evaluation within three areas, which were identified as important for future higher education: (1) drivers of change shaping future higher education, (2) scenarios of future higher education, and (3) future skills. For each of the areas we were interested in the degree of relevance of the respective issues, as well as in the experts’ opinion about when they would gain relevance.

### **Methodological Design and Research Context of the Delphi Study**

Since 2015, we have been conducting research to shed some light on the future of skill demand. We focus our efforts on identifying what we (and others) refer to as future skills, as well as how we can support their development. As has been demonstrated by other studies, too, research in this area is of vital importance as future graduates need to adapt to an increasingly changing and complexity-gaining environment that demands agility and innovativeness. To address this complex, intertwined field systematically, we pose three questions within three different, but interrelated areas:

- Future skills: Which skills are necessary for future employees? Which skills are/ will be necessary to shape the future and society in a sustainable way?
- Future learning concepts: How can organizations and firms support the development of future skills (learning and management approaches)?
- Future higher education: How can we design higher education concepts such that they support the development of future skills?

We approach these questions from an education theoretical point of view, combining it with a socioecological perspective on competences. Before conducting the Delphi on which we will elaborate in more detail here, we want to provide a brief overview on two past projects that we carried out in advance of the current research effort.

We started the first project in June 2015. In this first step, we identified and analysed competence concepts in more than 120 German organizations. Through an expert screening and analysis, we were able to identify main dimensions of action competence within the overall concepts submitted by the participating organizations. According to the expert’s opinion, about 20 organizations proved to have very advanced, developed, and elaborated conceptions and documented approaches for competence development with



their employees and advanced learning architectures. Within these documents, experts also found evidence of skill and competence descriptions, which are seen as important and essential for individuals' and organizations' performances in future markets and activities.

The research team chose 17 organizations from this group of advanced organizations to conduct further research into finding dimensions and structures of future skills from the perspectives of advanced organizations. To gain further insights into the specific skill set, organizational approaches to promote them as well as for the purpose of identifying drivers leading to the changed skill demand, we interviewed 17 representatives from such advanced organizations. These 17 interviews were conducted with eleven organizations from the set of the advanced organizations identified beforehand. The interviews resulted in more than 700 minutes of interview material addressing the above questions. Based on the material, two researchers coded all interviews independently using the inductive coding technique (Thomas, 2006) and the software MAX QDA (VERBI Software, 2017). After coding, passages lacking unanimity were discussed among the researchers to gain inter-operator reliability in coding.

As a result, we have obtained

- a) a set of future skills,
- b) insights into dimensions of change in organizations through digital and networked global collaboration processes,
- c) and have specified a number of scenarios of future higher education.

The international Delphi study we are reporting on here is based on these results. Having gained insights into future skills, cultural and organizational changes, as well as organizations' reactions to these new demands, the Delphi's main intention was fourfold:

1. To gain insights into the main drivers of change and factors resulting from these drivers,
2. To capture the likelihood for different scenarios about the organization of higher education in the future, about
3. Important skills for future graduates, and
4. Learning design and study experiences of future higher education.

In round one of the Delphi, we engaged the experts into clarifying concepts and asking for the importance of each concept presented (see Delphi Questionnaire at [nextskills.org](http://nextskills.org)).

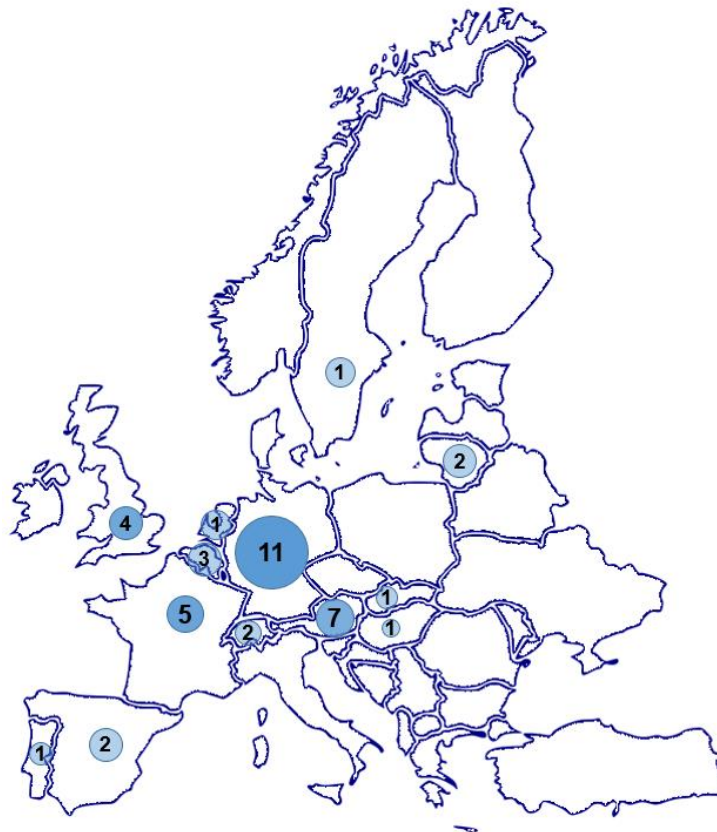
In round two of the Delphi, experts were asked about their estimations on potential time of adoption of the aforementioned topics (see Delphi Questionnaire at [nextskills.org](http://nextskills.org)).

We invited 53 international experts from different organizations and institutions. They worked within higher education institutions, as researchers in the field of pedagogy, networks concerned with learning and skill formation topics, the digitalization of higher education or within NGOs. It was important to us, to consider the perspectives of both, representatives from higher education institutions as well as from consultants and practitioners from the economy. Further, we paid close attention to the fact that within the two sub-samples, people occupying different positions were included in order to capture the plurality of opinions on the topics surrounding the future of learning, skills and higher education. Almost 50 international experts participated



in round 1, representing 17 different countries (Australia, Austria, Belgium, Canada, France, Germany, China, Italy, Lithuania, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). Although the sample predominantly represents European views, some experts also came from North America, Asia and Oceania, with Europe representing 89% of the overall respondents.

As illustrated by Figure 1, most of the European respondents came from Germany (27%), followed by Austria (17%), and France (12%). Gender-wise, the sample consisted of 30 male and 16 female respondents in the first round, as compared to 14 female and 26 male participants in round 2, leading to a slightly lower overall participation in the second round (-17%). The round two sample consisted of participants from 14 different countries with the majority of participants still coming from Europe. This allowed bridging geographical boundaries, thus considering the expertise of an international sample, which suggests that the results obtained in the survey extend beyond national boundaries and reveal general trends within higher education that might also be relevant especially to other European countries or maybe even globally.



**Figure 8: Residence of the European Delphi participants**

To reduce response bias, participants remained anonymous to each other during the phase of data collection. Only after completion of both rounds, we asked the respondents for permission to name them as part of our international expert board, thereby acknowledging their participation in our publication (see table A in the Annex for those who gave their permission).

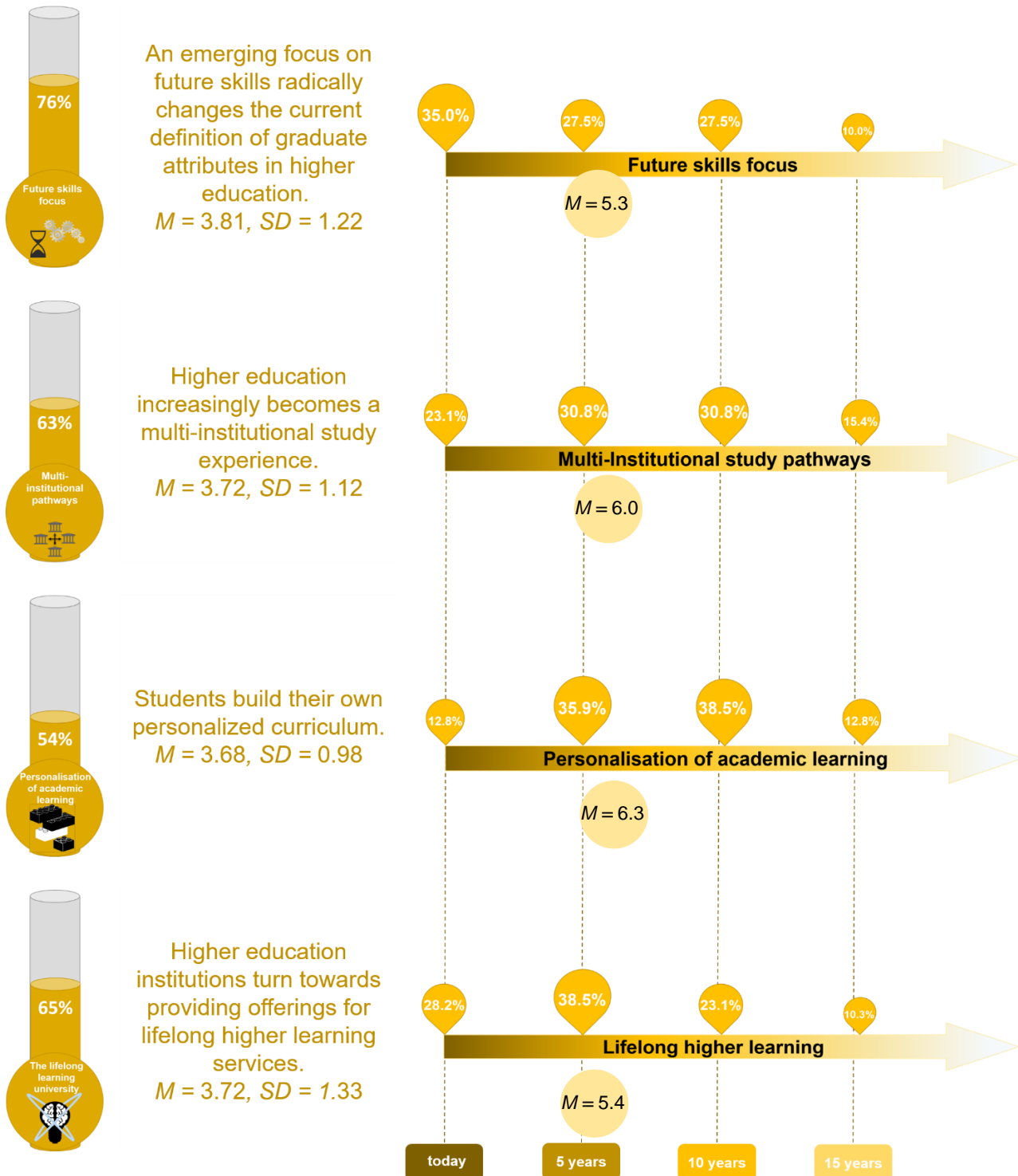


Figure 9: Overview on agreement levels and adoption times of the four pillars of change in future higher education  
 (N<sub>Round1</sub> = 46; N<sub>Round2</sub> = 39)



### A Three-Dimensional Model for Future Skills

The analysis resulted in a reconstruction of factors which are underlying future skills and reveals insights into the form and importance of learning in today's and future professional work environments of advanced "future" organizations, as well as a reconstruction of those specific individual abilities and skills which will be necessary to deal with challenges in professional future work environments. We found that the inherent structure of future skills could be classified according to its inherent inner structure into three dimensions: subject – object – and environment. The three dimensions allow to allocate skills according to their relation to subject – object – world. All three dimensions are interrelated. We are introducing this threefold distinction (Figure. 3) because any kind of ability or action can either be an expression to shape

- a. an individual's relation to itself in past present or future (time dimension)
- b. an individual's relation to a certain thing or object (object dimension)
- c. an individual's relation to somebody else or a group in the world (social dimension)

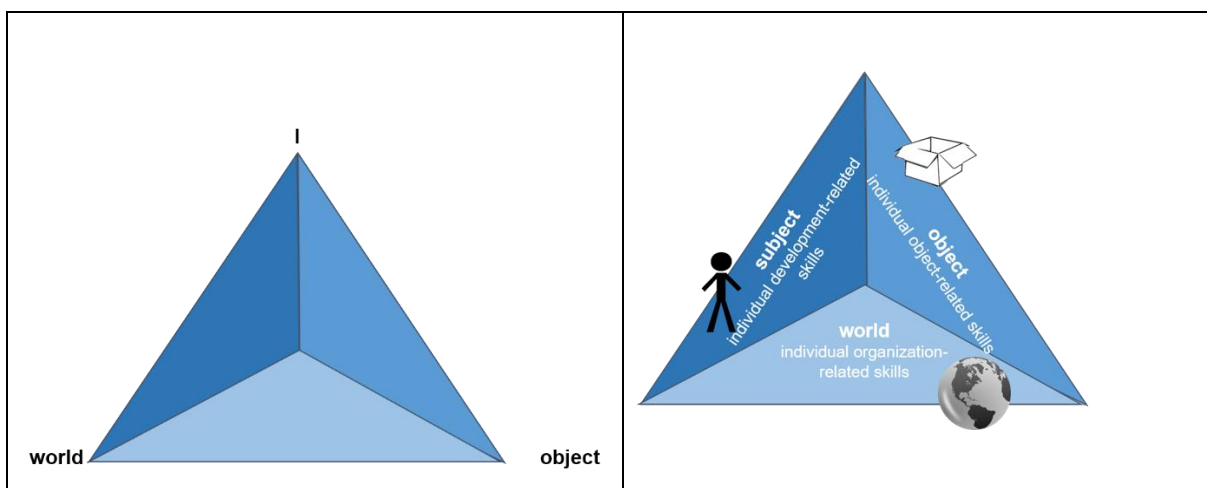


Figure 10. The threefold future skills model

This threefold distinction goes back to Meder (2007, also Roth 1971) which are presenting a foundational, constitutive structure for education as a threefold relation.

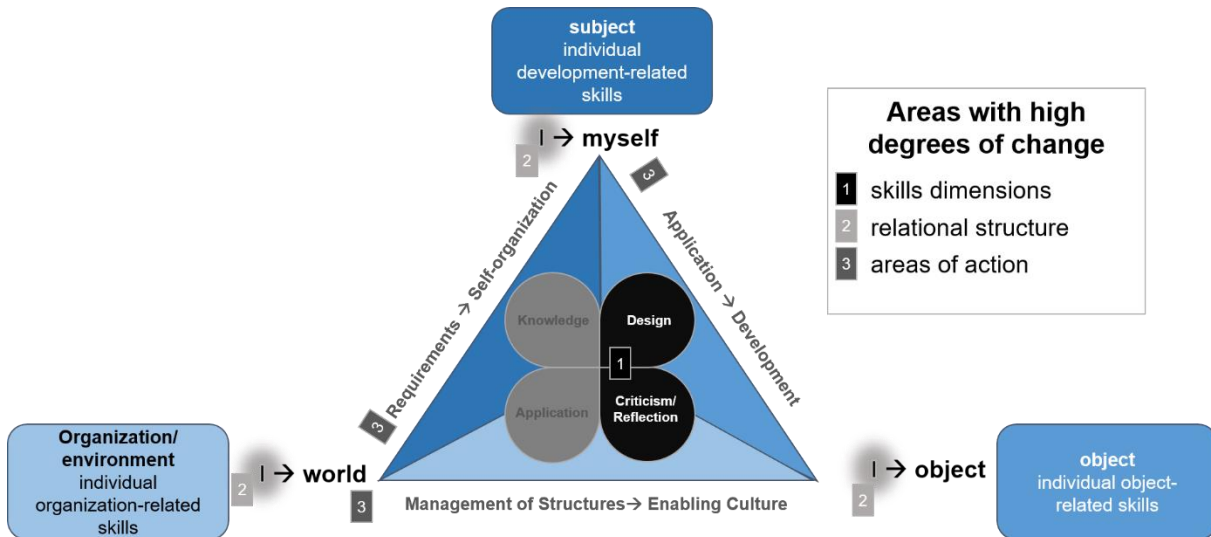
It thus allows to differentiate skills which are related to individual perception, individual reflection and development of awareness (subject related) and skills which are related to things which can be experienced (objects), and thirdly related to the social world (world). The three dimensions allow to describe more precisely which we refer to future skills instead of just calling them skills. In all of the three dimensions, shifts are going on. The interview data reveal a clear change in nature of what is demanded in the future in comparison to the past and in parts the present.

- 1. Subject related individual skills: Whereas in the past individuals could rely on following requirements, the future will demand more self-organization instead.





2. Object related individual skills: Whereas in the past individuals could rely on applying knowledge, methods and tools, the future will demand original creative development of new knowledge, methods and tools.
3. World/ organizational related skills: Whereas in the past organisations were organized and management according to clear structures, the future will demand fluid, enabling, agile cultures.



**Figure 11: Linking the Structural Education Model and the Skills Model as conceptual framework for the Future Skills Model**

The figure shows that shifts take place in all three dimensions (third area of change). In addition, data reveal shifts in different fields as well by emphasizing the greater importance of individually responsibility for their own development, competence management and autonomous navigation through an ever faster changing environment. Whereas in the past external structures were the scaffold which provided guidance to individuals, external scaffolding will be less perceivable in the future. Thus, individuals will have a greater role to be navigators themselves (second area of change – relational structure). And, finally, the skills dimensions which will be important in the future are also changing. Although the term skill is referring to a compound of elements (e.g. knowledge, skills, attitudes), the data emphasize certain elements with more importance of the future and certain elements which will be providing basic foundation but will not be sufficient for the future. The figure shows that knowledge and application of knowledge will be such foundational elements which will however, in the future not be sufficient for successful performance. More importance was given to the two elements “design” and criticism/ reflection” for future performance.

All three dimensions interact with each other and are not sole expressions of isolated skill domains. Subjective aspects influence outlook on objective aspects as well as social aspects impact subjective and objective aspects. The presented future skill model is thus going beyond a static model of listing a set of defined skills. It is secondly going far beyond digital or technical skills which will no doubt be important but represent just one ingredient. Their values lie in the personal development of dispositions to act self-organized in the respectively described domain.



## Future Skill Profiles

The term “future skills” is defined as the ‘ability to act successful on a complex problem in a future unknown context of action’. It refers to an individuals’ disposition to act in a self-organized way, visible to the outside as performance. As described above the future skills model divides future skills into three interrelated dimensions and is capable of describing the wide array of future skills in a clearly structure and well described set of dimensions (Figure. 2):

1. The first Future Skill dimension is the subjective dimension of futures skills profiles. It is relating to an individuals’ subjective, personal abilities to learn, adapt and develop in order to improve their opportunities to productively participate in the workforce of tomorrow, actively shape the future working environment and involve themselves into forming societies to cope with future challenges. It contains seven future skill profiles.
2. The second Future Skill Dimension is relating to an individual’s ability to act self-organized in relation to an object, a task or a certain subject matter related issue. It is emphasizing a new approach which is rooted into the current understanding of knowledge but is suggestion to take knowledge several steps up the ladder, connect it to motivation, values and purpose and impregnate it with the disposition to act self-organized in the knowledge domain in question. It is not just a quest for more knowledge but for dealing with knowledge in a different way which is resulting into professionalism and not into knowledge expertise.
3. The third Future Skill Dimension is relating to an individual’s ability to act self-organized in relation to its social environment, the society and organizational environment. It is emphasizing the individual’s dual role as the curator of its social portfolio of membership in several organizational spheres and at the same time having the role of rethinking organizational spaces and creating organizational structures anew to make it future proof. It contains an array of five skill profiles.

Within the three dimensions, sixteen skill profiles have been defined. A skill profile is an array containing further subskills. A full report and description can be accessed at [www.nextskills.org](http://www.nextskills.org).

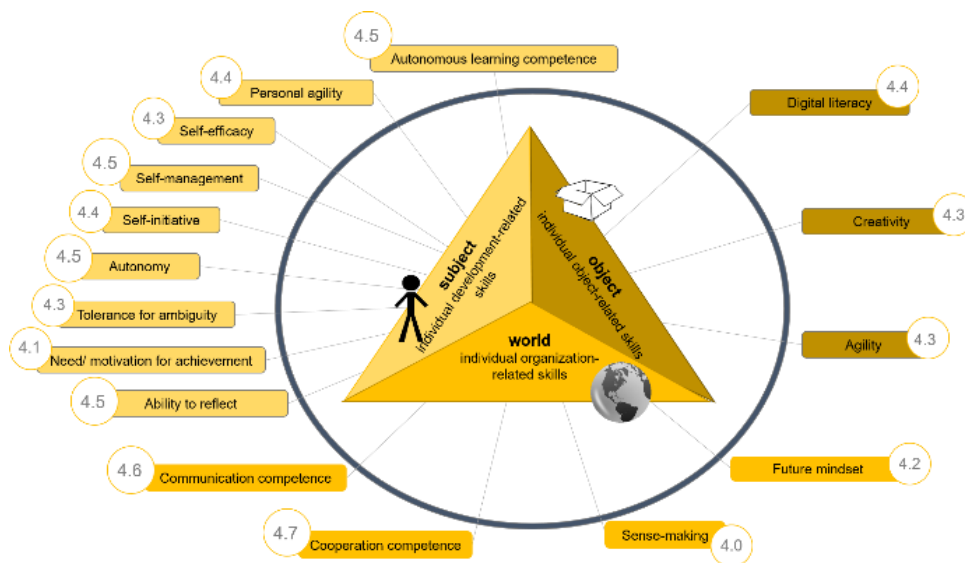


Figure 12: Future skills



## Future Learning

The Delphi resulted into hallmark indications on the shift from academic education and teaching to active learning of choice and autonomy. Higher education institutions in the future will provide a learning experience which is fundamentally different than the model of today. Timeframe for the time of adoption vary but for many aspects a close or mid-term timeframe has been estimated through the Delphi experts. The dimensions of future learning in higher education will comprise (1) structural aspects, i.e. academic learning as an episodic process between biographical phases professional and private episodes throughout life, learning as institutional patchwork instead of the current widest-spread one-institution-model of today, supported through more elaborated credit transfer structures, micro-qualifications and micro-credentials, as well as aspect of (2) pedagogical design of academic learning, i.e. changing practices of assessment, also peer-validation, learning communities, focus on future skills with knowledge playing an enabling role in interactive socio-constructive learning environments). In general experts estimate structure changes to become relevant much later than changes related to academic learning design.

## Drivers of Change in Higher Education

Four key drivers in the higher education market can be described. Each driver has a radical change potential for higher education institutions and together they mutually influence each other and span the room in which higher education likely will develop.

There are 2 content and curriculum related drivers (i.e. (1) personalized higher education and (2) future skill focus) and 2 organization-structure related drivers (i.e. (1) multi-institutional study pathways, (2) Lifelong Higher Learning)

The profile, shape and nature of higher education in the future will be most probably a certain pattern of configuration along the impact each of the four key drivers, called “pillars of change” has, and will influence the development of higher education strategies.

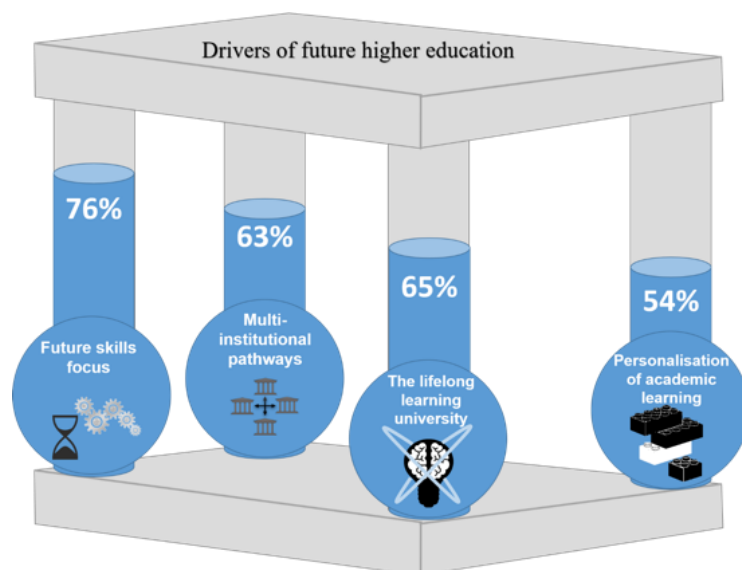


Figure 13: Drivers of change in Higher Education



1. An emerging focus on future skills radically changes the current definition of graduate attributes in higher education:

The focus on a “next mode” of studying (focus on future skills: autonomous learning, self-organization, applying and reflecting knowledge, creativity and innovation, etc.) gradually replaces a reduced/ narrow focus on academic and valid knowledge acquisition as a means to provide correct answers for known questions based on a curriculum which is focused on defined skills for fixed professions.

2. Higher education increasingly becomes a multi-institutional study experience:

The provision of higher education increasingly moves from a ‘one-institution’ model to a ‘multi-institution’ model in which higher education is provided through alliances of several institutions.

3. Students build their own personalized curriculum:

The elements of choice in academic programs enlarge. The curriculum of academic programs moves from a fully predefined and ‘up-front’ given structure to a more flexible, personalized and participatory model in which students actively cooperate with professors/ teachers/ advisors in curriculum building of higher education programs.

4. Higher education institutions turn towards providing offerings for lifelong higher learning services:

The current model of higher education, to prepare students (up front) for a future profession, is equally complimented with higher lifelong learning offerings.

#### **Four Scenarios for Future HE**

The Delphi survey made a point to view future higher education from a students’ perspective and envisioned future learning experiences. Four scenarios for future higher education can be described as gravitation centres of organizational development: (1) the future skill university scenario, (2) the networked multi-institutional study scenario, (3) the My-University scenario, (4) the lifelong higher learning scenario.

Three out of four scenarios score with a time of adoption of more than 10 years from today with the majority experts. Only the lifelong higher learning scenario scored for a time for adoption within the next 5 years with the majority of experts.

##### *The ‘Future Skill’ University Scenario*

The ‘future skill’ scenario suggests that higher education institutions would leave the current model that focusses on knowledge acquisition. Instead, new profiles would be developed that emphasize graduates’ future skill development. In this scenario, HE would mainly be organized around one key objective: to enable the development of graduates’ future skills, i.e. complex problem solving, dealing with uncertainty or developing a sense of responsibility, etc. This would not replace but go beyond the current emphasis of knowledge acquisition and studying based on defined curricula for fixed professions.



### *The Networked University Scenario:*

This scenario views higher education as a networked study experience. It will not be down to a single institution providing a student with a certain program, but that this role would be split among multiple institutions. This means that ‘digital import’ and ‘digital export’ of parts of the curriculum would play a significant role. The standard HE study structure and experience would shift from a “one-institution” model to a “multi-institutional” model.

### *The “My-University” Scenario:*

This scenario describes HEIs as spaces where the elements of choices enlarge, and students can build their own curricula based on their personal interests. The curriculum of academic programs in this scenario would move from a fully predefined and ‘up-front’ given structure to a more flexible, personalized and participatory model in which students actively cooperate with professors/ teachers/ advisors in curriculum building of HE programs.

### *The Lifelong Higher Learning Scenario:*

In this scenario, seamless lifelong higher learning would be as important as initial higher education. Learners in the workplace would be the main type of student, choosing their portfolio of modules according to their personal skill needs and competence demands with high autonomy throughout their lifetime. Institutions thus would offer micro-credentials, which students assemble individually based on their own interests. Recognition of prior study achievements and practical experience would enable permeable shifting between different providers, which offer to bundle prior learning experience into larger certifications.

## **Acknowledgements**

I would like to thank Sarah Kellermann for her assistance in research and publication of the findings. In addition, I would like to acknowledge the contribution of all experts who have participated in the Delphi Survey. All reports can be accessed in full length at the projects web site [www.nextskills.org](http://www.nextskills.org) as open access publications.

### Delphi Questionnaire Round 1:

Round 1 asked participants to assess the relevance of scenarios and statements about future skills, studying and learning and higher education in the future.

To access Annex B, please follow the link:

[https://nextskills.files.wordpress.com/2019/03/2019-03-Future-Skills-Delphi-Annex\\_B.pdf](https://nextskills.files.wordpress.com/2019/03/2019-03-Future-Skills-Delphi-Annex_B.pdf)

### Delphi Questionnaire Round 2:

Round 2 asked participants to evaluate the speed of adoption of scenarios and statements about future skills, studying and learning and higher education in the future, which had been presented in the first round, and were reformulated according to participants’ qualitative remarks afterwards.



To access Annex C, please follow the link:

[https://nextskills.files.wordpress.com/2019/03/2019-03-Future-Skills-Delphi-Annex\\_C.pdf](https://nextskills.files.wordpress.com/2019/03/2019-03-Future-Skills-Delphi-Annex_C.pdf)

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## Utilising a Meta-Data Standard for Digital Credentials and Recognition of Open Learning

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### Abstract

The MicroHE project presents a meta-data standard for digital credentials and micro-credentials. Based on the ESCO metadata schema (European Skills, Competences, Qualifications & Occupations), the MicroHE meta-data standard adds specific Higher Education and micro-credential extensions. The MicroHE team is currently developing a credentials clearinghouse and a learning passport. The aim is to showcase how a secure digital, blockchain-enabled credentialing solution could look like and function, creating a reference for further developments and standardizations. (For the full meta-data standard definitions, please consult <https://github.com/MicroCredentials/MicroHE>). In order to make an informed and consistent decision on recognizing open learning as ECTS credits towards a degree programme, Higher Education Institutions (HEIs) need sufficient information about the credential. Online education providers, either on their own systems or on portals such as iversity, edX, Coursera, Udacity, FUN, MiriadaX or XuetangX, provide in-demand skills to the labour market. To contribute their offerings in the higher education sector as equal to accredited courses or modules, they need to know which information they should provide and which formal requirements exist regarding workload, learning outcomes, assessment, ID verification, EQF level, quality of learning etc. Virtual mobility is subjected to lack of trust and transparency, making it difficult to transfer credits from online and other non-traditional short learning programmes. A harmonised European approach to recognizing open education credentials will boost virtual student mobility, empowering students to adapt their learning portfolio to changing labour market demands and technological trends. We envisage students becoming digital pioneers and entrepreneurs of their studies, as they work on challenging projects and seek out learning resources online or from specialist sources. The World Economic Forum cites an estimate by Scott McLeod and Karl Fisch postulating that “65% of children entering primary school today will ultimately end up working in completely new job types that don’t yet exist” (World Economic Forum, 2016, p. 3). We envisage HEIs adapting their curricula and their degrees so that they can accompany and coach students on their open learning journey.

**Keywords:** Data Standard, Digital Credential, ESCO, Micro-Credential, Open learning, Recognition





## Introduction

There is no European approach to recognising open education modules. EU recognition instruments such as the European Credit Transfer and Accumulation System (ECTS), the Diploma Supplement and the European Qualifications Framework (EQF) support the award of qualifications in the areas of formal learning (Table 1). They are supported by recognition procedures for non-formal and informal learning. The recognition and transfer of individual credits through ECTS was created for an era of physical mobility, and is optimised accordingly. Little guidance exists on how to document open education experiences for the purposes of credit transfer. Open online learning (OOL) is referred to as different forms of open distance learning with access to open or distance courses (Cole, Shelley, & Swartz, 2014, pp. 111–131). In line with the terminology usage in current literature on the subject, we suggest to use the term ‘micro-credential’ for the certificate of learning and the term ‘short learning programme’ for the course and learning experience itself.

EU standards for qualifications	
European Qualifications Framework gives an indication as to the level of various qualifications	Not for non-formal education or open learning or micro-credentials
European Diploma Supplement provides a standardized template to give additional information about a degree	Only for degrees
European Credit Transfer System allows for individual learning units to be described in terms of knowledge, skills, responsibility and autonomy	Only for Higher Education
European Skill, Competences, Qualifications and Occupations database provides a multi-lingual standard terminology	Not used by the tools above

**Table 1: EU Standards for Qualifications (MicroHE project, Ildiko Mazar)**

This paper explores scenarios to make open and online learning comparable and recognisable within higher education. This is challenging (Table 2). While formal recognition according to the Lisbon Recognition Convention (LRC) is about recognising credits from accredited study programmes offered by different higher education institutions, open learning extends far beyond the realm of higher education. It includes different formats and providers in a wide range from formal to non-formal and even informal learning.



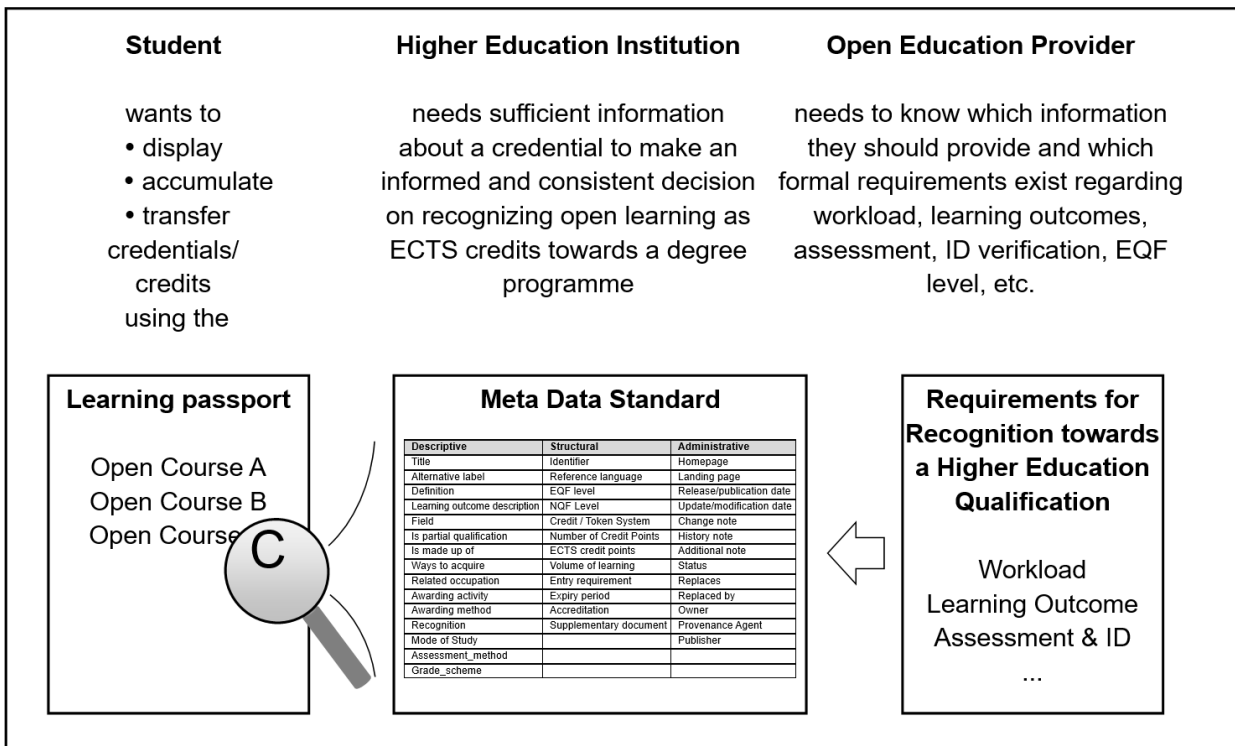
Physical Mobility: transfer credits	Virtual Mobility: transfer credits
Between higher education institutions (HEIs).	From online and other non-traditional short learning programmes.  Which might be offered not only by HEIs, but also by other education and training sectors.
From accredited study programmes.	Which are typically not higher education accredited.
With credits described in ECTS.	Which are often not described in ECTS, instead use alternative systems of credentials.
With controlled assessment environments.	Where identity verification processes and assessments are more complex and challenging than in face-to-face settings.
With learning agreement from home HEI.	Without formal statement from home HEI about the perception of externally acquired learning.
With module description that provides information about workload, learning outcome and assessment conditions.	Which lack transparency regarding academic content and learning methodologies.
→ Trust and Transparency	→ Lack of Trust and Transparency

**Table 2: Challenges of Virtual Mobility (MicroHE project, Jochen Ehrenreich)**

## Basic concepts

### *Meta-Data Standard*

To achieve the credibility and accountability needed for formal recognition of open learning within the European higher education systems, the project MicroHE is creating a standard format for describing open education and virtual mobility experiences according to the standards and guidelines of the European Higher Education Area (EHEA). The proposed meta-data standard is independent of the underlying technology. The Learning Passport based on this data standard should not only ensure accountable and verifiable documentation of open learning, but also facilitate the potentially automated translation of open learning credentials (also called micro-credentials) into ECTS credits with a formal value for higher education. The Learning Passport thus provides higher education institutions with sufficient information so that they can make an informed and consistent decision on whether to recognize such a micro-credential as ECTS credit towards a specific degree programme. The Learning Passport could also pave the way for the transition from paper-based to digital credentials in the European higher education area.



**Figure 1: Basic concept of the Meta-Data Standard (MicroHE project, Jochen Ehrenreich)**

ESCO Metadata Schema as the Basis for the Microhe Meta-Data Standard European Skills, Competences, Qualifications and Occupations or ESCO is the multilingual classification of skills, competencies, qualifications and occupations that identifies and categorizes all of those which are relevant for the EU labour market and education and training in 25 European languages. The system provides occupational profiles showing the relationships between occupations, skills, competences and qualifications. (ESCO, 2013, p. 2).

The introduction of standard terminology for occupations, skills, competences and qualifications can help education and training systems and the labour market to better identify and manage the availability of required skills, competences and qualifications. Jobseekers can use ESCO to describe their skills, competences and qualifications when developing their CV, which can then go through various automated or machine matching processes. Besides, they can also compare their skills, competences and qualifications against job vacancies using ESCO terminology, to identify the skills they are lacking (ESCO, 2013, p. 4).

As “ESCO has been developed in an open IT format and is available for use free of charge by everyone and can be accessed [through an online] portal”, [...] “ESCO can be used by developers as a building block for different types of applications that provide services such as auto complete, suggestion systems, job search algorithms and job matching algorithms.” (ESCO, 2017).

*MicroHE Meta-Data Standard*

Figure 2 illustrates the internal logic of the MicroHE meta-data standard. It is an extension to the ESCO Metadata Schema. The MicroHE meta-data standard facilitates the automatic exchange of micro-credentials. It provides all the necessary information to make an informed recognition or validation decision. For the full MicroHE meta-data standard definitions, please consult <https://github.com/MicroCredentials/MicroHE>.

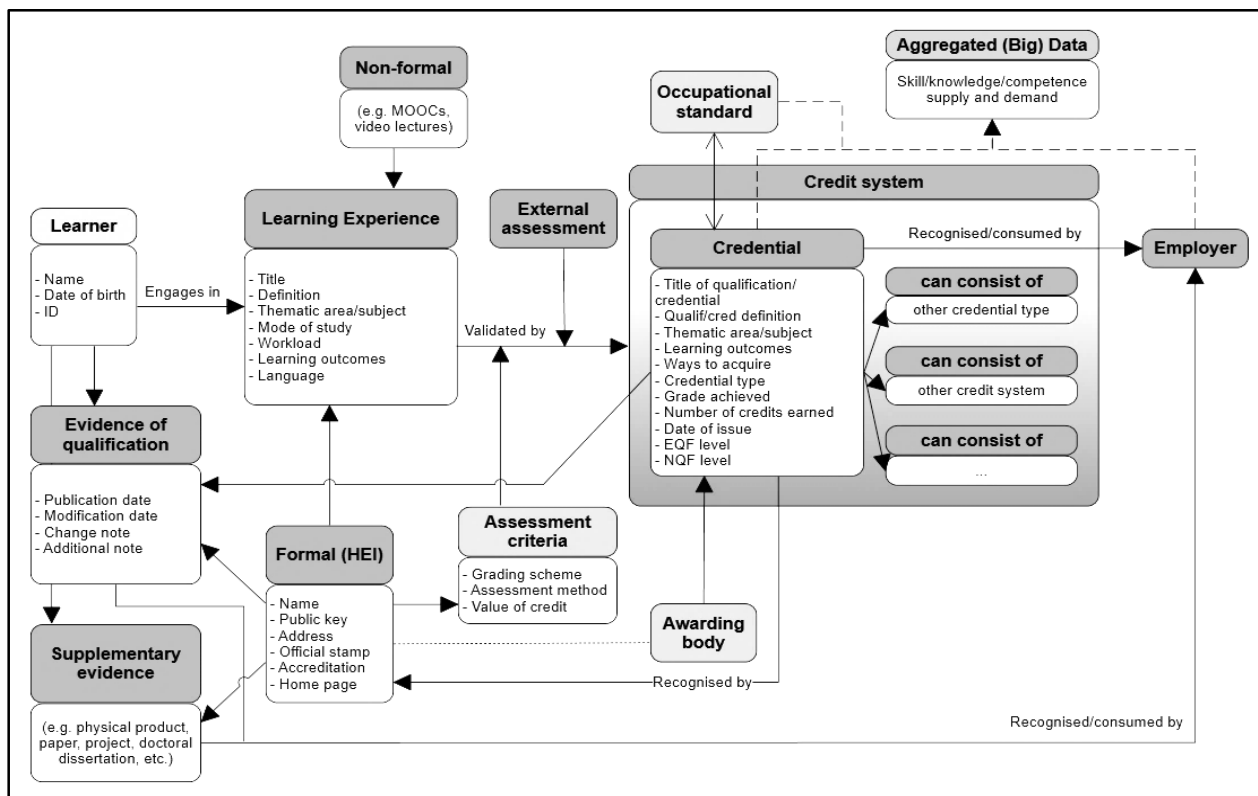


Figure 2: Ontology of the Meta-Data Standard (MicroHE project, Ildiko Mazar)

## Learning Passport

Many initiatives around the world are developing and proposing digital credentialing solutions, often using blockchain technology for verifiable transactions. Well-known examples are Open Badges and Blockcerts, illustrating the wide range of possible applications from badges for participation to micro-credentials and even full academic degrees. Identifying a single best solution is not easy. Most likely, a number of open-source, interoperable technologies will emerge, and these standards and technologies will evolve through the support of a community.

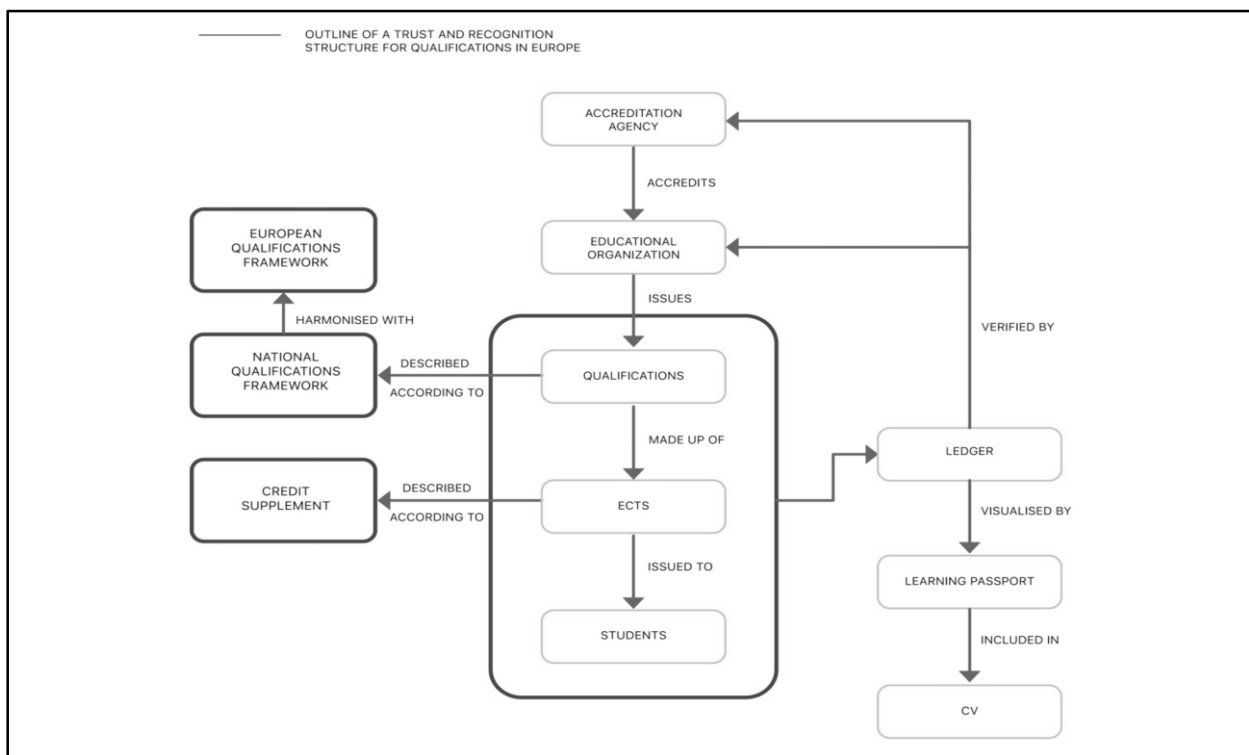
The Learning Passport will allow students to store credentials from different education providers all in one place and selectively share them with educational institutions and employers. It could pave the way for the transition from paper-based to digital credentials in the European Higher Education Area. We envisage that a digital credentialing solution would include the following components:

- a secure digital Learning Passport where students and lifelong learners can collect credentials from various formal and non-formal (possibly also informal) learning experiences,
- a way for students to share such credentials, for example in CVs, online portfolios etc.,
- an international consortium of educational institutions jointly operating the digital credentialing solution and taking responsibility for governance and evolution of the Learning Passport, as well as for admission of new full and associate members,
- digital certificates/credentials issued to a student by members of the consortium,

- a way to ensure that only consortium members, i.e., accredited institutions, can issue such digital credentials,
- a way to authenticate the certificate and ensure its validity,
- a way to verify the learning outcomes (described in ECTS) documented by the credential, as well as its link to the EQF, automatically.

### Credentials Clearinghouse

We at the MicroHE project aim to create a system for issuing, verifying and sharing micro-credentials in terms of ECTS, which we call Credentials Clearinghouse. Digital credentials must have a secure mechanism for verification, therefore a publicly accessible record is indispensable. We propose for this purpose to employ a distributed ledger based on blockchain technology, as outlined in Figure 3.



**Figure 3: Blockchain in Education (Grech & Camilleri, 2017)**

The Learning Passport is aligned with a solution that utilizes a combination of a public blockchain and a private blockchain run by a consortium of participating educational institutions. There are different consortium blockchains, one for each specific token type. So there is one for ECTS qualifications, one for ECVET qualifications, and there are other blockchains for other different qualification types. These blockchains are collectively maintained by the consortium of educational institutions that issue credentials on them. To ensure integrity, hashes of each block on these consortium chains are in turn stored on a public blockchain involving proof-of-work. Credentials will be stored on the consortium blockchain in anonymous form using a Universal Unique Identifier.

Qualification data (like for example versioned and time-stamped module descriptions) are stored off-chain in a qualification database. Evidence linked to a credential is stored off-chain in an evidence database. This



could be project work a student has created as part of an assessment in open learning, like a video, a website or a computer program. To prevent tampering and falsification, hashes of the off-chain data are stored on the consortium blockchain (Figure 4). The Learning Passport can be interpreted as the view of an individual on all the qualifications and credentials associated with that specific person, i.e., the individual’s wallet. Likewise, the database that an institution maintains about all the credentials it has issued is that institution’s wallet.

In this Learning Passport community, each educational institution who is a consortium member “maintains his or her own copy of the information and all members must validate any updates collectively. The information could represent transactions, contracts, assets, identities, or practically anything else that can be described in digital form. Entries are permanent, transparent, and searchable, which makes it possible for community members to view transaction histories in their entirety. Each update is a new “block” added to the end of a “chain.” A protocol manages how new edits or entries are initiated, validated, recorded, and distributed. With blockchain, cryptology replaces third-party intermediaries as the keeper of trust, with all blockchain participants running complex algorithms to certify the integrity of the whole.” (Grech & Camilleri, 2017, p. 16).

Education providers will issue digital credentials using their institutional wallet. There will also be a paper representation of the digital credential containing a link to the digital form.

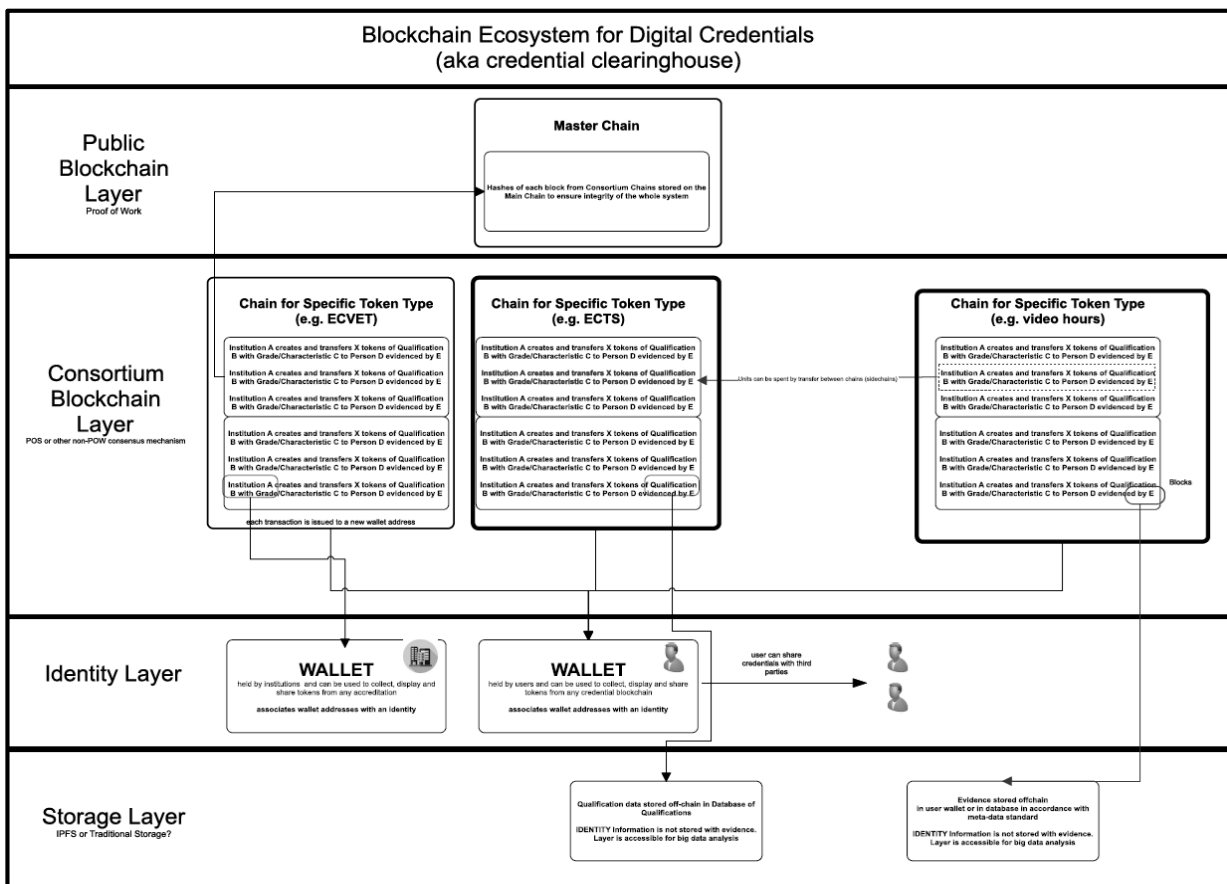


Figure 4: Blockchain Ecosystem for Digital Credentials (Source: MicroHE project, Anthony Camilleri)



Developing and maintaining applications is not within the scope of the MicroHE project. Therefore, we welcome outside collaboration. To provide front-end and back-end integration and applications, we collaborate with the Blockchain experts from Oxcert. Oxcert uses non-fungible tokens on the Ethereum blockchain according to the ERC721 standard. For a start, we envisage the following applications and functionalities:

- Learning Passport as a web service and as an application
- Social Media and Career Network integration
- New Europass integration
- Verification services

### Digital Credentials

In the context of education and training, a credential is a certificate issued by a responsible institution that attests and verifies that a person has achieved specific learning outcomes and acquired specific skills and competences. The learning experience can involve online- or face-to-face-learning, or both. Credentials can be paper-based or digital, and they can be degrees, certificates, badges, diplomas, licenses, and industry certifications, among others, testifying attained skills and competences (Connecting Credentials [Lumina Foundation], 2016; Ganzglass, 2014; SUNY, 2018).

The switch from paper-based to digital credentials offers advantages to learners and employees, to educational institutions and to potential employers. Open education demands digital credentials (ICDE, 2019). A system of universally recognized and stackable micro-credentials for smaller units of learning below degree level (both online and offline) enhances student mobility and employability and enables truly flexible learning paths. It has the potential to take life-long learning to a new level. Stackable credentials are referred to as a “transferable currency’ that can help people progress in our multi-layered education, training, and credentialing system” without having to duplicate certain courses as their needs and learning pathways change (Ganzglass, 2014).

The advantages of digital credentials and the Learning Passport for learners are:

- all credentials are conveniently stored online in one place
- the credentials are securely stored for a long time
- the learner “owns” his or her credentials
- the credential incorporates the verification of the identity of both earner and issuer
- the credential is verifiable
- there is a permanent link to the credential and the supporting evidence, even after the program or course has been completed, changed or discontinued
- the credentials may contain links to evidence of tasks performed or of assessment results
- a digital credential can document achievements from formal education, non-formal learning, lifelong learning, apprenticeships and short programs
- even small or diverse bits of learning may get visible and documented (and possibly credited)
- the credential’s content (meta-data) is searchable

- a credential may be linked to an online identity
- digital credentials can be made available to employers and HEIs when applying for work or for a study programme, in full or selectively
- possibility to create multiple flexible collections of credentials to (a) communicate distinct sets of skills and competences and/or to (b) identify skill/knowledge gaps when pursuing degrees or specific employment
- potential to utilise the digital certification ecosystem to present existing evidence of prior learning to earn corresponding credential
- increased possibilities for physical and virtual student mobility

The advantages of digital credentials and the Learning Passport for educational institutions are:

- option to access additional information about the credential and the acquired knowledge, skills and competences
- easier admission processes
- easier recognition processes
- consistent recognition decisions due to transparent documentation
- potential to consult data on skill/knowledge/competence demand by labour market
- the credential's content (meta-data) is searchable
- version control: time-stamped history of module descriptions and their evolution over time
- quick issuing of credentials (once the protocol is in place and administrators are trained)
- inexpensive issuing of credentials
- quick and inexpensive replacement of lost credential
- safe and secure credentials that are harder to temper with than traditional credentials
- option to withdraw credentials in case of errors or misuse
- option to track how and to which extent the digital credentials are being consulted
- most of the data is already available in the IT system
- can be linked to the IT system and to administrative processes
- standardized data format
- verified transactions via blockchain are a logical next step
- enables unbundling of credentials (e.g., for modules instead of degrees)
- enables stackability
- new forms of study and new business models are possible
- new potential students or customer groups can be reached

The advantages of digital credentials and the Learning Passport for employers are:

- simple and quick verification of digital credentials
- link to evidences of tasks performed and/or the results of assessments
- potential to consult data on HE skill/knowledge/competence supply and trends
- option to access additional information about the credential and the acquired knowledge, skills and competences





- encourages lifelong learning
- opportunity to document in-service / continuing professional development training in compatible credential format
- transparent solution
- the credential's content (meta-data) is searchable

Adapted from (Riksen & Kerver, 2016).

## Unbundling

Unbundling means that products and services that were being offered or sold together are now being offered in parts. In Higher Education, all modules of a study programme leading to a degree were traditionally organized and offered by the same institution. Upon successful completion that institution awarded the degree. Open learning recognition could potentially lead to unbundling in higher education. As an example of how higher education institutions can embrace the trend towards unbundling in higher education, consider the “curiosity-driven education” approach of the Code University in Berlin, Germany. Students work on challenging projects, seek out learning resources online, define the competencies and skills to be acquired through a learning agreement with their professors, and are accompanied by university lecturers in their personal development and learning processes. They become digital pioneers and entrepreneurs of their studies. They develop the self-confidence to accept unknown challenges and develop new competencies (Code University of Applied Sciences, 2019).

## Recognition

### *Standards and Guidelines for Recognition*

We envisage an automated system of credential recognition as a long-term goal. In order to ensure such recognition, it is not only necessary to provide suitable (innovative) procedures but also to fulfil the standards that are required for formal recognition by the relevant authorities, mainly HEIs. The Learning Passport will thus be designed in alignment with the standards and guidelines of the European Higher Education Area. The major reference for the project thus are the European Standards and Guidelines (ESG, 2015), the European Area of Recognition Manual (Nuffic, 2012; The EAR HEI and STREAM projects, 2016) and the ECTS Users' Guide of the European Commission (European Union, 2015). Additionally, the national and European qualification frameworks (NQF and EQF) play a major role for the taxonomies behind the credential, linked to other initiatives such as ESCO. As part of the PARADIGMS project the Dutch NARIC Nuffic recently published a policy paper called *Oops a MOOC* focussing on the evaluation of MOOCs that suggests several criteria for the assessment of a MOOC certificate which could be applied to the context of micro-credentials in general (PARADIGMS, 2018).



Quality Criteria of Credentials	OpenCred	Oops a MOOC	EAR Manual	
The credential should provide information on...				
C1 Identification of Credential & Institution	Informative certificates / badges acknowledging learning	2. Verification of the certificate [Authenticity]		Transparency
C2 Identification of the Learner	Identity Verification of the Learner	7. Identification of the participant [Identification]		
C3 Learning Outcomes		4. Learning outcomes	5. Learning Outcomes	
C4 Workload of Learning		5. Workload (volume)	2. Workload	
C5 Level of Learning		3. Level of the study programme [Level]	1. Level of a Qualification	
C6 Quality of Learning	Quality Assurance	1. Quality of the study programme [Quality]	3. Quality	
C7 Assessment of LOs / Rules to earn	Supervised assessment Award of Credits	6. The way study results are tested [Testing]		
	Partnership & Collaboration		4. Profile	
The medium should be ...				
M1 Distinct			(Substantial and non-substantial differences)	Trust
M2 Authentic	(Informative certificates / badges acknowledging learning)	(2. Verification of the certificate [Authenticity])	(Authenticity)	
M3 Accessible				
M4 Exchangeable			(Credits, grades, credit accumulation and credit transfer)	
M5 Portable			(Purpose of Recognition)	

**Table 3: Quality Criteria of Credentials (Source: MicroHE project, citing (PARADIGMS, 2018; The EAR HEI and STREAM projects, 2016; Witthaus et al., 2016))**



There are several possible use cases for credential recognition, among them:

- Learning agreement
- Stackability
- Curricula that integrate prior or open learning
- Recognizing (micro-) credentials towards a Higher Education degree

#### *Learning Agreement*

Ideally, the decision about recognizing an open learning credential will be made before the student takes that course, and the student and the institution sign a corresponding learning agreement.

#### *Stackability*

Institutions may choose to define learning pathways (or curriculums) through which they define beforehand that some specific courses combined will be awarded with a summative credential or degree. Stackable credentials may be accumulated over time to build individual's qualifications allowing him to move along career pathway allowing to optimize credential attainment (Ganzglass, 2014).

#### *Curricula That Integrate Prior or Open Learning*

Higher education institutions might also decide to accept certain pre-qualifications as equivalent to some (usually entry-level) modules of their curriculum. The Massachusetts Institute of Technology (MIT) has signed agreements with over a dozen universities from around the world. They recognize MIT's edX online credential "MicroMasters in Supply Chain Management" as equivalent to between 20 and 42 ECTS credits of their own curriculum. Some Bachelor's curricula in midwifery or physiotherapy in Germany recognize a vocational education in that field as equivalent to the first two or three semesters of the curriculum.

#### *Recognizing (Micro-) Credentials Towards a Higher Education Degree*

For a higher education institution to recognize open learning credentials as credit towards an HE degree, a responsible person has to make an informed decision by evaluating the information and evidence about the learning that the credential attests and comparing it to the learning outcomes of the module that it will be credited to (graded or non-graded). The initial decision about recognizing a certain credential as ECTS credit towards a specific module must always be done by a responsible person or committee. It cannot be automated.

Automation can only kick in for all subsequent recognition requests about that course, i.e., to ensure consistency once a recognition decision has been taken about a specific credential. Recent studies have tried to provide guidance on the recognition of online learning (Kiron Open Higher Education, 2017; Rampelt, Niedermeier, Röwert, Wallor, & Berthold, 2018; Witthaus et al., 2016) and of foreign degrees (The EAR HEI and STREAM projects, 2016).



## Conclusion

A meta-data standard is an important element in the emerging ecosystem for digital credentials and recognition of open learning. Following the start of the MicroHE project, the European Commission announced the preparation of an update of the Europass, which will include a framework for digitally signed credentials. The MicroHE project has engaged closely with the DG Employment on this matter. This has resulted in Europass adopting a number of key decisions based on research done by MicroHE.

The MicroHE project is developing and field-testing the Credentials Clearinghouse using innovative technology on the blockchain. The aim is not to have a perfect solution by the end the project, but to showcase how a digital blockchain-enabled credentialing solution could look like in the future and to discover the potential pitfalls of such a system. In particular, the project is launching a set of APIs which allow for credentials to be created as non-fungible tokens using the Ethereum network. This is the first application of this technology globally for credentials. By creating APIs, other institutions are then free to use this technology platform to develop other solutions.

## Acknowledgements

This paper would not have been possible without the contributions of the other members of the MicroHE consortium. Especially, we would like to acknowledge the contributions by Anthony Camilleri in Sections 2 and 4 (Basic Concepts and Conclusion) and Florian Rampelt in Section 3 (Recognition). The MicroHE project has been funded with support from the European Commission. This paper reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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## A Juggling Act: Exploring Student Narratives of Learning Online

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### Abstract

This paper reports on a qualitative case study set in Dublin City University which explored student experiences of studying online. The project adopted a case study approach, following twenty-four online students over one academic year. The setting for the study was an undergraduate sociology module on the BA (Hons) in Humanities, an online programme delivered through DCU Connected at Dublin City University (DCU). Following an open and distance learning philosophy, DCU Connected aims to afford educational opportunities to adult students. The research question for the study was: How do online students construct their narratives about learning online? Data was collected from participant generated learning portfolios and semi structured interviews. Two instruments were developed: a learning portfolio instrument and an interview schedule. Participants were interviewed with their learning portfolios, which were used as stimulus during the interviews. A circular model of data collection and analysis was followed and data analysis was an ongoing and iterative process. The analysis followed a data-led thematic analysis approach based on Braun & Clarke's (2006) six phases and comprised of several cycles of coding, theme generation, refining and reviewing themes. Through this analysis process five themes were constructed with reference to the research questions, literature and theoretical framework. The findings were constructed into five themes: motivation, peer community, module supports, studying while balancing life commitments and my approach to learning. Findings indicate being a successful online student was impacted by the challenge of life-load issues such as balancing competing demands of family, work and illness. In addition, the findings suggest that the learning portfolio gave online students a personal space to evaluate their own learning, to process their thoughts and experiences and to document their lives and learning in an authentic and meaningful way. Online students' learning portfolio gave a unique window into their learning experiences where they documented the development of their highly personal approaches to studying. Another important finding was that participants placed a high value on the peer communities they formed.

**Keywords:** Online Students; Online Learning; Student Voice; Qualitative Research



## Introduction

This case study set out to explore online student experiences of studying online. Online education is the fastest growing areas of education worldwide because it provides access to educational opportunities in a flexible manner to students from diverse backgrounds and geographical regions who often can't access higher education by other means (Delaney & Fox, 2013). Typically online students in an Irish context tend to be older and from lower socio-economic backgrounds and some are educated and upskilling, many are second chance learners or have delayed participation (Delaney & Brown 2018, Brunton, Brown, Costello, Farrell, 2018). Online learning is more affordable as students can earn as they learn and travel costs are reduced. However, online students are more vulnerable to attrition, therefore it is crucial that the needs of online students are understood and addressed in order to facilitate their success in higher education.

## Successful Studying Online

Online learning degrees have lower rates of retention and graduation than full time campus based undergraduate courses (Woodley & Simpson, 2014 ) There are a number of factors reported in the literature which affect online learning student experiences and retention, which are: time management skills, the ability to balance work, family with study, autonomy, community, sense of belonging, motivation, course design, and support structures at institutional, programme and teacher levels (Blackmon & Major, 2012; Brown, Hughes, Keppell, Hard, Smith, 2015; Buck, 2016; Holder, 2007; Zembylas, Theodorou, Pavlakis, 2008).

Students with more developed time management skills are more likely to continue on an online course (Holder, 2007). This involves establishing a sustainable study routine which can adapt and account for problems (Brown et. al. 2015). In addition to time management, strong organisational skills and the ability to keep on task are key to being a successful online learner (Buck, 2016). However, many online students struggle to follow a regular study schedule due to the challenges of balancing work, family and study (Brown et. al., 2015; Blackmon & Major, 2012; Buck, 2016; Zembylas et.al. 2008). Trying to fulfil multiple roles and juggle professional, family, social life, and study can cause online students to feel considerable stress (Brown et. al., 2015; Kahu et al, 2014; Zembylas et. al. 2008).

Being an online student involves greater autonomy than traditional campus based higher education (Comer, Lenaghan, Sengupta 2015). Online students have to be able to work independently and there is an increased need for self-regulation and self-discipline to meet the course requirements (Thompson, Miller, Franz, 2013). This greater need for autonomy can cause frustration, confusion and discomfort in some online learners (O'Shea, Stone, Delahunty 2015).

Feeling that they belong to a community of learners has a significant impact on the learning experiences of online students (Buck, 2016; O'Shea, Stone, Delahunty, 2015). The two factors that can support the development of a sense of community and belonging in students are establishing social presence and high levels of interaction in the course (Buck, 2016; Veletsianos, 2012). Developing social presence in the course gives students a greater sense of connection to each other, the teacher and the course (Veletsianos, 2012). Interaction and social presence can be promoted through course design which promotes active communication between students and instructors using asynchronous discussion forums and synchronous





online classes (Buck, 2016). Community can also be fostered through informal student interaction such as social media, study groups, and email (O’Shea, Stone, Delahunty, 2015). In a study conducted by Andrews & Tynan (2012) informal student networks were most beneficial for participants in terms of sense of community. Informal student networks can enable online students to form positive social relationships and close ties with fellow students (Zembylas et.al., 2008). The emphasis in the literature on building community is in response to the feelings of isolation often experienced by online students (Bolliger & Shepherd, 2010). Fostering a strong sense of community among students in online courses and establishing social presence can decrease students’ feelings of isolation and disconnection (Phirangee & Malec, 2017).

### **Study Habits of Online Students**

Although they are studying online, the study habits of online students follow traditional study activities such as reading, note taking and writing assignments and are similar to campus based students (Cakiroglu, 2014). There are a number of key study habits which contribute to successful study online; organisation, taking responsibility of learning, creating a positive study environment, time management and effective note taking, reading and assignment writing strategies (Andrews & Tynan, 2012; Brown et. al. 2015; Buck, 2016). Creating a positive study environment with a dedicated and quiet study space is an important organisational aspect for online students (Buck, 2016; Cakiroglu, 2014). A further organisational aspect is the necessity to plan and structure their study around their other responsibilities effectively, this can result in unusual study patterns which are highly individual such as studying late at night or early in the morning (Andrews & Tynan, 2012; Buck, 2016).

One major point of difference from campus based study, is that much of online students learning takes place outside of the teacher’s view as they typically have on demand access to the learning resources of the course (Watkins, Corry, Dardick, Stella, 2015). In spite of this difference, there are some empirical studies which investigated the study habits of online students. In a study of new online students in Australia, Brown et al. (2015) identified three study approaches in the cohort: active-strategic, active-deep and passive-surface. Active-strategic online students were task oriented, thorough, effective at managing and planning for study and spent a lot of time working on assignments. Active-deep students were motivated by self-development and passive-surface students lacked independence, had unrealistic expectations of higher education in addition to no previous experiences of university (Brown et al. 2015).

Effective note taking is an important self-regulatory skill which is one of the most common activities in a face to face class, but is equally important for online students (Watkins et. al., 2015; Cakiroglu, 2014;). However, Watkins et. al. (2015) found that online students were less likely to take notes if they had not been prompted unlike in face to face classes where students spontaneously take notes. For some students learning how to use the technology that is necessary to learn effectively online is a struggle (Brown et. al. 2015; O’Shea et. al., 2015). Other students are comfortable in the online environment and are increasingly using online resources such as videos, open educational resources, and wikis to aid their comprehension of course content (Henderson, Selwyn, Finger, Aston, 2015). In a study of student perceptions of digital technology in Australian universities, Henderson et. al. (2015, p.1567) found that students found the most useful and supportive aspects of digital technology were the “watching and re-watching video lectures, and preferring to look at diagrams, animations and images as opposed to engaging with the written or spoken word”.



In summary the literature identifies a dearth of research on the experience of online students in Irish higher education.

## Methodology

A qualitative case study grounded in the constructivist paradigm was designed with the aim of exploring online student experiences of studying online. This research was part of a larger qualitative case study that explored the experiences of online students at DCU (Farrell & Seery, 2019). This study was framed by the following research question:

*How do Online Students Construct Their Narratives About Learning Online?*

The setting for the study was an undergraduate sociology module on the BA (Hons) in Humanities, an online programme delivered through DCU Connected at Dublin City University. The study followed twenty-four online students over one academic year studying for a humanities degree with DCU Connected at Dublin City University (DCU).

Purposive sampling was used to select participants for the case study, twenty-four online students consented to take part in the study. Data was collected from participant generated learning portfolios and semi structured interviews. Two instruments were developed: a learning portfolio instrument and an interview schedule. Participants were interviewed with their learning portfolios, which were used as stimulus during the interviews. A circular model of data collection and analysis was followed and data analysis was an ongoing and iterative process. The analysis followed a data-led thematic analysis approach based on Braun & Clarke's (2006) six phases and comprised of several cycles of coding, theme generation, refining and reviewing themes. After a number of iterations of reviewing and refining, a thematic diagram was created and each theme was defined and named. Themes constructed through the analytical process are discussed in the findings below.

## Findings

Five themes were constructed during the analytical process, they were as follows: peer community, module supports, studying while balancing life commitments, confidence and my approach to learning, see figure 1 below.

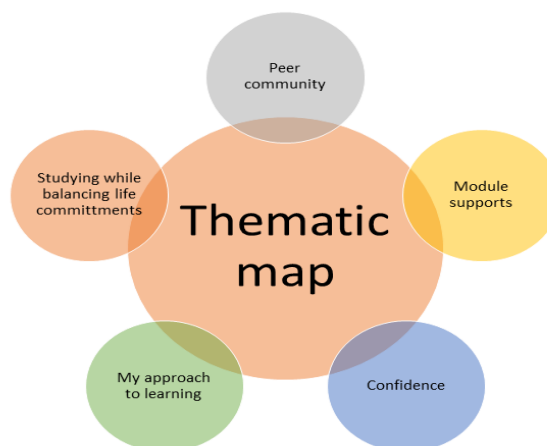


Figure 1. Thematic Map



### *Peer Community*

Participants placed a high value on the peer communities they formed over the course of the academic year. Three types of formal and informal peer communities were formed. The official institutional community which interacted on the Loop discussion fora, the student generated and student led class community which interacted on WhatsApp, and smaller cohorts of student generated study groups which interacted on WhatsApp and Facebook.

These peer communities were perceived by participants to be an essential source of support, reassurance, encouragement and human connection.

I: Ok that's interesting. And then evidence 2 is your WhatsApp group.

P19: I need those women, that's my cohort. We are in contact most days supporting one another. Like when I was feeling down and I was thinking I do not want to do this course anymore it's too much, they were like you're great and you're smart. I read your post, your post is really insightful. If I don't understand a concept we can discuss it. If WhatsApp isn't sufficient we can ring each other.

I: So your study group is really important.

P19: It's not a study group. My sister when she did her they give you a cohort you do all your classes together. You do all your study groups together, projects together. There's something about that approach that makes you feel like you're part of a supportive group.

I: You're in something greater than yourself?

P19: Yeah (P19 Interview 1)

This means that for participant 19, the peer support group was an integral part of their approach to learning in the module.

### *Module Supports*

Participants placed a high value on the support offered by their modules tutors both in synchronous online sessions and asynchronous discussion forums. Attending and participating in tutorials was described by participants as fundamental to their learning, socialization and progression in the module. Tutorials provided them with reassurance, interaction with peers and clarification of difficult concepts and theories.

“However, since then I have completed the postings for Assignment two and have attended another online tutorial. The tutorial covered the codes, conventions, theories and perspectives of Social Order. As I had been studying these subjects in the unit notes, it was very useful to have a structured discussion on them. When our tutor gives real life examples of the application of these, it makes everything easier to understand and remember. I thought that tutorial was



particularly useful, as there was good interaction among the group. We were in the middle of our postings for assignment 2 at that time. X (Tutor name) gave us useful pointers for the assignment, among which was to try to focus our examples on Irish society.” (P8, eportfolio entry 4)

The importance and centrality of the support provided by the module tutors was very clearly articulated in participant narratives. Although the mode of study of online distance learning is largely self-directed, the reassuring and supporting role of the tutor still remains very significant to the learning experience of participants in terms of clarification of concepts and assignments, encouragement, guidance on reading and approaches to study.

“One of my main difficulties in gathering my work for the first assignment, was my block on getting over what the definition of power is in sociology. When we had our first face to face tutorial with X (tutor name) it made more sense and I was actually surprised at how much power was evident in everyday life, in our relationships with people and in our interactions with pretty much everyone.” (P5, eportfolio entry 1)

#### *Studying While Balancing Life Commitments*

The most challenging aspect of being an online student is studying while balancing work, family and caring responsibilities, this is very clearly articulated in the participant narratives. Balancing competing demands while finding sufficient time to study, and write assignments, put participants under severe pressure. As the students are already time poor, issues such as illness had a domino effect on participants’ ability to keep on track with their studies. One or two unexpected problems in their personal lives can cause students to fall badly behind with their study and assignment work, thus impacting their learning experience

“For the first time since taking up third level education again, I found it very difficult to juggle my work demands, assignment demands and minor ill health. However, the first three assignments were all due in November rather than December this year and the first sociology assignment, as well as the first psychology assignments, coincided with annual parent teacher meetings. As a primary school teacher, my job is my priority and I had prepared for the clash of assignment and meeting dates. What I couldn't prepare for was getting sick at the same time. It is fair to say that I felt very overwhelmed with everything happening all at once.” (P7, eportfolio entry 2)

The issue of time management is very strongly articulated by participants in their narratives, the pressure of finding sufficient study time, the stress and worry they felt about falling behind, was a persistent difficulty faced by participants throughout the academic year.

“I’m beginning to worry that I won’t have time for a more in depth look at everything in this section, before having to move on to Crime and Deviance in advance of Assignment 2. It all comes down to time management, which I remember was an issue at this time last year. With all the extra pressures of Christmas from a work and family point of view the study can get squeezed. I may have to do less(no?) housework to facilitate my learning this month. This idea



has not been negotiated with my partner and may have to be revised! Perhaps a self-imposed ban on TV for the month is a more acceptable strategy. However, all work and no play!” (P20, eportfolio entry 2)

### *Confidence*

Many participants expressed feelings of self-doubt, fear, apprehension, uncertainty and lacked confidence about own academic abilities and approaches to studying.

“I am very happy to see that over the past few months my reading skills have vastly improved. Before I started my journey of third level education, my reading skills were below average at the best of time, I had a lack of confidence in myself and I could not abstract information from a text on the best of days.” (P15, eportfolio entry 3)

Some participants grew in confidence as the module progressed. Getting good assignment results and positive feedback validated their perceived abilities, and enabled them to overcome their feelings of uncertainty.

“Previously, I was unaware that self-doubt affected new writing challenges such as the SOC3A A1 article review. However, I was aware of a drive to learn and demonstrate knowledge of sociology to myself. I believe the grades validated my ability and I was no longer distracted or made anxious by self-doubt. Therefore, I have discovered growth in my confidence impacted my study habits and did not uncover contrary study habits.” (P19, eportfolio entry 3)

### *My Approach to Learning*

In their narratives, participants described their highly personal approaches to learning, this provides a detailed insight into their study techniques, when, where and how they learned. As the majority of study was self-directed, participants had to develop individual techniques to aid their understanding of the sociological content, theory and concepts. These techniques were varied, and innovative, and were heavily orientated towards online resources such as YouTube videos, online lectures, podcasts, glossaries, online articles, and watching recordings of previous online tutorials.

“I find if I cannot grasp a piece of information through one format, i.e. reading a text, sometimes watching a YouTube video regarding the topic can really help me comprehend the material better.” (P2, eportfolio entry 3)

The challenge of fitting study time into their busy lives was described by participants when detailing when they studied. At the weekend, every evening, in the morning when the kids were at school, early morning before work, on days off, between shifts. Finding time to study was a recurring challenge for participants, which required developing creative strategies to try and carve out study time in their already busy lives.

“My learning process is still haphazard and I struggle to block off sufficient time to study. I have dealt with this to some extent by spending longer hours in my office in work to catch up on my



modules. The downside of this is I am available to work colleagues even though I am technically finished work and situations often arise that require my attention.” (P3, eportfolio entry 3)

In addition, participants reported studying in a wide range of places. They studied at home, in the library, on their phone while commuting to work, in cafes, in work, and sitting on the side of football pitch. In their eportfolio entries, many participants included images of their study spaces, for example participant 18 evidenced his study space in the image in figure 2 below, which he described as “the view from the window of my attic office” (P18, eportfolio entry 5)



Figure 2: The view from my attic office.

## Discussion

The findings from this study indicate that being a successful online student was impacted by the challenge of lifeload issues such as balancing competing demands of family, work and illness. This is consistent with previous research on the lifeload challenges experienced by online students (Brown et al., 2015; Kahu et al., 2014; Zembylas et al., 2008). Further, the findings suggest that the learning portfolio gave online students a personal space to evaluate their own learning, to process their thoughts and experiences and to document their lives and learning in an authentic and meaningful way. Online students’ learning portfolios gave a unique window into their learning experiences where they documented the development of their highly personal approaches to studying. This finding supports Penny Light et al. (2011, p.8) theory that learning enables students to represent their own learning by providing a “window into the lived and experienced curricula”. However, there is only one empirical study carried out by Shepherd & Bolliger (2014) which has touched on the documenting of the lived experiences of online distance learners. Shepherd & Bolliger’s (2014) study of online graduates’ students found that learning with eportfolios personalised the experience for students and increased feelings of connectedness. However, no studies have examined learning portfolios as a window into the lived experiences of online students, which is an original finding of this study.

Another important finding was that participants placed a high value on the peer communities they formed. This finding is consistent with previous research on peer interaction in online courses carried out by O’Shea, Stone, Delahunty (2015) and Andrews & Tynan (2012). In addition, the value of informal student networks for online students has been evidenced by Zembylas et al. (2008).



## Conclusions

The purpose of this study was to explore how online students construct their narratives about learning online in the Irish higher education. The findings of this study indicate that being a successful online student was impacted by the challenge of lifeload issues. Although this study is a small in-depth qualitative study, its findings provide insights into how online degree programmes can support online students to achieve successful and fulfilling learning experiences.

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## Paving the Way to Online Teaching: Introduction to an eTutoring Course

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### Abstract

This paper discusses feedback gathered from 168 participants of the Introduction to eTutoring online course jointly developed by the International Centre for Innovation and Workplace Learning (ICIWL) at Dublin City University (DCU), the Professional Development Service for Teachers (PDST) Technology in Education (TIE) and the Inspectorate at the Department of Education and Skills (DES). Five modules were developed to equip participants with the skills and knowledge to become effective eTutors. On completion of the course, participants were asked complete an online questionnaire to evaluate the course. Open-ended questions were used to collect data in relation to participants' experiences during the course. Participants reported on the most positive aspect of the course, as well as what could be improved for future learners. A notable finding from the data highlights participants satisfaction with the practical aspects of the course, interactivity, and the structure of the course. Disparities in feedback were received from participants from external CPD providers who were accessing the course content on the PDST TIE platform, and the course e-tivities on their own providers' platforms, as this proved to be inconvenient for some.

**Keywords:** eTutoring, Interactive Online Course, Blended learning, Evaluation

### Introduction

The Introduction to eTutoring course was designed as a joint collaboration between ICIWL, PDST TIE and the Inspectorate of the Department of Education and Skills (DES). The course was intended for PDST TIE eTutors, as part of a blended learning programme, and also to be provided on behalf of the DES to all external providers of online summer courses for primary teachers.

In the Summer Course Providers booklet issued annually to all summer course providers for primary teachers, the DES describes the role of the eTutor as follows:

- To lead learning and guide participants in their achievement of the course learning outcomes
- To promote the engagement of learners
- To stimulate, monitor and guide discussion in online forums in a timely manner
- To lead and facilitate learning in synchronous sessions, where provided
- To provide opportunities for participants to reflect on their own practice and prepare for implementing course content in their own classrooms



- To monitor participants' learning and completion of assignments
- To provide timely feedback to participants on completed assignments, including feedback to guide participants on the resubmission of assignments, which have not satisfactorily demonstrated the attainment of the learning outcomes
- To play a role in ensuring the valid participation of those enrolled on the course

#### [Providers Booklet for Summer Courses](#)

[https://ecdromcondra.ie/images/Summer\\_Courses\\_2019/Summer\\_Course\\_Providers\\_2019\\_FINAL.pdf](https://ecdromcondra.ie/images/Summer_Courses_2019/Summer_Course_Providers_2019_FINAL.pdf)

The online course was divided into 5 modules:

Module 1: Introduction to online learning

Module 2: Introduction to eTutoring

Module 3: eTutoring skills

Module 4: Managing online learners

Module 5: An effective eTutor

Each module provides participants with the skills and knowledge to become an effective eTutor, as well as offering participants the opportunity to participate in e-tivities, which have been designed to facilitate active learning and collaboration in an online environment.

In total there were 168 participants on this course. 34 were PDST TiE eTutors, who completed the module content only, having previously completed the e-tivities in an earlier iteration of this course; and 134 eTutors from external providers, who were provided with access to the course content directly by PDST TiE on their platform (TeacherCPD.ie), while the course e-tivities were moderated locally on their own providers' platform.

The 34 PDST TiE eTutors attended a follow on one-day face to face training event which provided them with tailored training specific to the course they would be facilitating as well as hands-on experience within the PDST TiE learning management system.

#### **Background**

The eTutoring course was redesigned in 2016 by ICIWL, PDST TiE and the Inspectorate of the Department of Education and Skills (DES) to cater for a wide range of educational providers. The current course draws on expert research incorporating good practice in e-learning and covers different models of eTutoring and the community of inquiry model.

## Evaluation Approach

The course was evaluated using a mixture of closed- and open-ended questions in the form of an online questionnaire. There were 10 questions: 6 closed questions, and 4 open-ended. The purpose of the questionnaire was to evaluate the course and to provide constructive feedback on how to improve the quality of the course for enhancing participants' learning in the future.

The questionnaire was developed by the PDST TiE. The employment of closed questions resulted in statistics being available, while open-ended questions resulted in more qualitative data in relation to individual participant experiences and insights about the course. In order to analyse the data from the qualitative feedback a coding approach was used. Analysis was carried out using thematic content analysis, which involved examining themes within the data. For example, repeated words or phrases and similarities led to potential themes. Quotations from data collected are used in this report to illustrate key themes from the data.

There were 2 separate cohorts of eTutors - the 34 PDST TiE eTutors who completed the module content only, and the 134 eTutors from external CPD providers, who completed the course on two platforms – therefore the feedback was copied and pasted into two separate excel sheets and analysed separately. The feedback from the participants of the external providers relates in many cases to local challenges regarding learning platforms, moderation and organisation of discussions, which were beyond the scope of the course designers.

## Findings

168 participants enrolled on the course. 126 questionnaire responses were received, which represented an overall 75% response rate.

Responses	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Course learning outcomes/objectives were met.	74 (59%)	47 (37%)	4 (3%)	1 (1%)	0	126
Course was well structured.	82 (65%)	36 (29%)	6 (5%)	2 (2%)	0	126
Modules content was of a high quality.	77 (61%)	44 (35%)	4 (3%)	1 (1%)	0	126
e-tivities were of a high quality.	68 (54%)	37 (29%)	17 (13%)	4 (3%)	0	126
Duration/length of the course was just right.	69 (55%)	41 (33%)	11 (9%)	5 (4%)	0	126
Completing the course will help me to improve my e-tutoring practice in the future.	85 (67%)	30 (24%)	8 (6%)	2 (2%)	1 (1%)	126

**Table 1: Summary of course feedback**



## Quantitative Data

Based on the responses received, 44 were male (35%) and 82 were female (65%). The majority were primary school teachers (111 participants - 88%), while 15 participants (12%) ticked Other as profession. 67 participants (53%) rated overall satisfaction with the course as very high, 43 (34%) as high, 14 (11%) as moderate, and 2 (2%) as low.

118 (94%) participants stated that they would recommend this course to a colleague; 8 (6%) participants stated that they would not recommend the course to a colleague. On the whole the majority of participants ( $\geq 68\%$ ) strongly agreed that the content, structure, e-tivities etc. were conducive to their learning. The summary of course feedback based on content and objectives is given in Table 1

## Qualitative Data

Qualitative data from the questionnaire responses offered a more in-depth and descriptive evaluation in relation to participants' course experience. The data is separated into two parts:

- Group A: 34 PDST TiE eTutors, who completed the module content only (as they had previously completed the e-tivities); and
- Group B: 134 eTutors, who accessed the course content on the PDST TiE platform, and the e-tivities on their own providers' platforms.

### *Group A*

34 completed the questionnaire. Five participants (14%) noted that they had experienced difficulty completing the course: three of these were in relation to broadband/connection issues, one was in relation to using a MAC and having to install Adobe Flash Player, and the other stated that there was an issue with the interaction design, but did not specify the issue.

Two key themes emerged in relation to the most positive aspect of the course: (i) practical content, and (ii) course structure. These themes are summarized and analysed under 'Group A: Most positive aspect of the course' in the following section. The key themes identified in areas that need improvement were: (i) content, and (ii) course duration. These will be discussed in the section under the subheading 'Group A: Areas that need improvement.' The final section of the questionnaire was in relation to 'Any other comments.' The most common theme identified from participants' comments was overall course satisfaction - some quotes will be used in the following section to highlight participants' comments.

### *Group B*

84 out of 134 completed the questionnaire. 18 (22%) reported that they had experienced difficulty completing the course - issues ranged from dissatisfaction with the dual platform approach to general connectivity issues and Adobe Flash Player.

Three key themes emerged in relation to participants' most positive aspect of the course: (i) practical content; (ii) level of interactivity; and (iii) course structure. These themes are summarized and analysed under



‘Group B: Most positive aspect of the course’ in the following section. The key themes identified in areas that need improvement were: (i) dual platform access; (ii) improved content; and (iii) e-tivities organisation. These will be discussed further in the following section under the subheading ‘Group B: Areas that need improvement.’ The final section of the questionnaire related to ‘Any other comments.’ The most common theme identified from participants’ comments was overall course satisfaction - some quotes will be used in the following section to highlight participants’ comments.

## **Discussion**

This section will present and discuss the main themes from the data collected. Quotations from participants’ responses will be used to illustrate key points.

Group A: Most positive aspect of the course

Two key themes emerged from the participants’ responses:

### *(i) Content*

A number of participants noted that the course had a very practical element to it, which in turn benefitted the learner. Participants stated that the inclusion of practical and relevant examples was the most positive aspect of the course:

“Appropriate content - good background of eTutoring position and practical ideas for implementation.”

Specific areas of the course were highlighted to illustrate these practical examples e.g. the animal characters in module 4 and the examples of weaving and summarising in module 3.

Key adjectives used to highlight the course were ‘interesting’, ‘practical’, and ‘relevant.’

A number of participants also mentioned that the videos enhanced their understanding of plagiarism and overall there was a good balance of text, video, and assessment activities.

### *(ii) Course structure*

The structure of the course was also highlighted as the most positive aspect of the course. This included the level of interactivity in the design as one participant noted that the most positive aspect of the course was “having to actively engage with the resource”, which points to satisfaction with the interactive element.

Furthermore, participants stated that it was easy to navigate, well organised, and easy to follow. Some key adjectives used to highlight this were: ‘well-structured’, ‘well presented’, and ‘clear’. For example, one participant noted that the most positive aspect of the course was its “excellent design and structure.”

## **Group A: Areas that need improvement**

Participants also made very relevant and constructive points for improving the course. The main areas of improvement can be grouped under two headings: (i) content, and (ii) course duration.

### *(i) Content*

A number of participants stated that more videos, animations, or audio files could be added to the course, which would then reduce the amount of text on slides. More up-to-date research or quotes could be used to reflect current practice in eTutoring:

“Some of the quoted research is over 10 years old at this stage; maybe some revision to reflect current research on online elearning”

In addition, two participants highlighted aspects of the quiz which could be improved. This includes: (a) giving the user a second chance before revealing the correct answers, and (b) removing feedback after user selects correct responses as this is unnecessary repetition.

### *(ii) Course duration*

The course duration was also mentioned as an area of improvement. Participants felt that the course was quite short and didn't require 5 hours. Suggestions were made to either reduce the course duration or else add more content to stretch it out.

### *Group A: Other comments*

Additional comments by participants showed the overall satisfaction and learning that they obtained from participating in the online course. Examples include:

“Very worthwhile course”

“An excellent course, professional in design and delivery”

“Excellent course, as a refresher for experienced eTutor as well as new to the role.”

There was, however, one participant who stated that part of the course content was not relevant to his/her context: “Course content was not all relevant as I do not design activities for participants.”

Noting that the Group A participants had completed an earlier iteration of this course previously and were just accessing the content as a refresher on this occasion, the data and evidence gathered from Group A would suggest that the eTutoring course remained largely relevant to them and was a success, with positive feedback in relation to course content and design. There are areas of improvement with regards to adding more multimedia resources to reduce the amount of text on slides, as well as updating some quiz features and quotations used within the resource.

### **Group B: Most positive aspect of the course**

Three key themes emerged from the participants' responses:

#### *(i) Practical content*



Similar to Group A, Group B participants also highlighted the course content as the most positive aspect of the course. Feedback included references to the content being relevant, accessible, comprehensive and insightful especially in relation to the section on learning styles, and summarising and weaving: “High quality and highly thought-provoking course content. Excellent section on dealing with different learning styles.”

Participants also noted that the content was effective in equipping them with the skills and knowledge needed for eTutoring, as one participant highlighted:

“Content - exceptionally beneficial equipping us with the necessary skills and confidence to fulfill our role as eTutor.

This level of practicality was highlighted a number of times: “I found the course to be practical, in that it will actually support us in our roles as eTutors.”

In addition, the videos used in the course were also mentioned as being positive and contributing to participants’ learning.

#### *(ii) Level of interactivity*

The level of interactivity highlighted by participants was twofold. Firstly, participants stated that they were engaged by the interactive element of the course itself, which in turn made them think about the content and proved to be beneficial for the user:

“I really enjoyed the interactive aspects of the course, I felt I really had to engage with the course content because of this, and I benefited enormously from it.”

“The matching activities and dragging answers to complete sentences was excellent - it made the participant think more about the content.”

“The level of interaction required to complete the course. I believe it keeps the mind fresh and responsive to learning.”

Secondly some participants highlighted the level of interactivity among the participants themselves as being a positive factor. Participants in Group B contributed to online forum discussions and being able to contribute to these discussions and see others’ comments in the forums was regarded as a positive aspect as one participant noted:

“I really enjoyed the interaction from other participants - sharing, debating and discussing ideas. I also thought the course tasks were very well designed and dispersed nicely throughout the course.”

#### *(iii) Course structure*

The structure and layout of the course was also highlighted by some participants in this group as being the most positive aspect of the course. Key words used to emphasise this aspect included: well-structured, nice visual presentation, clear, concise, and easy to navigate.



## Group B: Areas that need improvement

### *(i) Dual platform access*

Group B participants represent the external providers, who accessed the course content on the PDST TIE platform, whilst having their e-tivities moderated within their own providers' platforms. Quite a number of participants highlighted this as an inconvenience. For example, participants noted that doing the course on one site and then doing reflections and e-tivities on another, which required different login details, was somewhat off-putting and unnecessary.

### *(ii) Improved content*

There were a number of areas of improvement outlined with regards to course content. These areas included:

- **Multimedia:** More multimedia and audio-visual material. It was also pointed out that more audio on slides would be beneficial to learners who prefer to read and listen.
- **Models of eTutoring:** A clearer and improved explanation of the three models of eTutoring, as participants found module 2 very content-heavy.
- **Course refinement:** A level of additional input by the individual providers is necessary to ensure the relevance of the course in general to suit the need of all summer eTutors, as not all the content covered is relevant to summer eTutors who facilitate online summer courses. It is noted that because the course is designed for access by multiple providers, each with different courses, that a level of additional input by the individual providers is necessary to ensure its relevance to its own eTutors.
- **Examples:** It was suggested that more examples be provided to demonstrate how to respond to difficult participants (e.g. argumentative types or those not spending adequate time on the modules)
- **Plagiarism:** A number of participants from the external providers felt that there was too much focus on plagiarism
- **Reading list:** A reading list at the end of each module would be a useful resource for participants.

### *(iii) e-tivities organisation*

The final point emphasised in the feedback was in relation to the organisation of e-tivities, specifically the discussion forums. While it is recognised that different providers may have utilised different formats for the discussion forum activities, from single thread to multiple threads, some participants expressed that there were too many new discussion threads, which resulted in no one topic being discussed in detail.



“I feel that ideally only one thread should exist per forum as there were both individual posts and those collectively posted. One post would make the course more user friendly, in my opinion.”

“I think there were too many 'threads' - course participants were opening new discussion threads which made it difficult to follow the debate. I believe that one single thread for each module is sufficient.”

“The instructions for following one thread on the discussion forums never got off the ground as the presence of an "add new discussion" button proved too tempting to most participants! This made it more difficult to follow a line of discussion.”

These comments relate to the organisation of the e-tivities by external providers of the course. In order to address this issue external providers should look at a more streamlined organisation of the discussion threads to enable more effective participation.

As well as this, in Group B, it was suggested that eTutors be able to access the e-tivities for the course they will be facilitating so that they can provide feedback to the participants. Furthermore, one participant noted that more constructive feedback from those moderating the e-tivities could be given to the participants, rather than just a 'thank you', as it should be more engaging (as is exemplified in module 3) than a one word response.

#### **Group B: Other comments**

The additional comments by participants highlighted the overall satisfaction and learning gained from participating in the online course. Overall a great deal of learning and appreciation was evidenced from their feedback. Examples include:

“I have been tutoring online for many years, but I still learned from this course. Thank you very much.”

“I thoroughly enjoyed the course and I would consider it to be one of the better courses of the many I have completed. Thank you.

“Very insightful, engaging course. Well structured and of huge benefit as eTutor of online course this summer. Thank you”

“The course was very well structured and coherent. As a result, I am fully prepared to take on the role of eTutor and cope with any unexpected eventualities.”

One participant made a valid point about being able to access the course notes over the summer months: “Possibly allow access to the content over the summer months during our facilitation of the course.” Or another point was made that it would be useful to have the option to print out or download the content in PDF form so participants can consolidate in their own time.

## Conclusion

This paper discussed the key ideas that emerged from participants' feedback of the eTutoring course. There are parallels between the two groups in terms of overall satisfaction with the level of knowledge, participation, and skills gained from taking part in the online course. There were areas for improvement, namely in relation to the integration of more multimedia content on slides and simplifying the 3 models of eTutoring or providing a clearer differentiation between the three models. The most notable difference between the two groups was in relation to Group B who highlighted the inconvenience of completing the course on two platforms

## Recommendations

In view of the feedback the following recommendations can be made:

- Add more multimedia content to each module. This can be in the form of videos, animations, podcasts, or a voiceover on some slides so that participants can read and listen to the information or instructions.
- Add more current research. Up-to-date research can reflect the current trends in online learning and eTutoring.
- Give users a second chance to complete the quiz without revealing the correct answers immediately. If they get the answer wrong the first time, then they should be given time to think about and correct their mistake.
- Provide a reading list at the end of each module so that participants can research the topics further if they wish to do so.
- Shorten the stated duration of the course of 5 hours or, alternatively add more content to bring it up to 5 hours duration.
- External providers to provide more streamlined access to moderated e-tivities for their own eTutors, bearing in mind that it may not be possible to provide access to both the content and e-tivities on one platform.
- External providers to ensure course moderators are experienced and skilled eTutors themselves, and that they model the eTutoring practice as described in the eTutoring course. This may require their prior completion of the eTutoring course or its equivalent.
- External providers to organise e-tivities into single discussions to enable more effective dialogue and reflection on course content.



## Online Learning: From Blended Learning to Connected Learning with Content Curation

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### Abstract

Information and digital literacy is still poor in undergraduate students in France and elsewhere, although they are emphasized by UNESCO, OCDE and European Society 2020 as major competencies for workers in the near future. Blended learning combines traditional teaching and self-learning using internet resources, leading to the development of autonomy in trainees. Content curation is still a recent concept with applications in marketing but less in use for teaching and learning in colleges and universities. Content curation tools (Scoop.it preferred because of potential) for blended learning and information literacy training were implemented during 5 years of 400 French (and Chinese in the context of Nancy-Wuhan medical training program) students in two knowledge domains: immunology in medical university, geography in “classes préparatoires littéraires”. Teachers opened and maintained one or more general topics related to the discipline as well as topics focusing on annual examinations programs. Students opened and maintained, during various periods of time (from months to years), topics of their choice in related areas. They were evaluated on the number of posts, regularity of posting, commentaries and tagging, pictures, sharing on social networks and impact of their topic. Content curation allowed teachers to select relevant resources in rapidly evolving topics and share them with students. Using curation, researchers followed scientific knowledge evolution, detected new topics, built interest networks and became thought leaders. Content curation allowed students to (1) acquire and develop information, media and digital literacy learning by practicing focused information research, (2) discover usage of diverse resources (primary documents, secondary information, databases, press releases), (3) develop critical minds about sources and contents. Content curation stimulated reading, analyzing and mastering digital information, helping create scientific watching competencies. Reading, tagging, commenting on information in foreign languages helps students improve reading and writing fluency. Students were able to build information portfolios and create their digital identity which is useful for recruiting interviews. Content curation should be used in teaching in the context of blended learning programs to train students and trainees for multimodal literacy as well as future work capacities, research competencies and life-long learning.

**Keywords:** Content Curation, Immunology, Geography, Blended Learning, Connected Learning, Scoop.it

### Introduction

In education, teaching is the concerted sharing of knowledge and experience, usually organized within a discipline and, more generally, the provision of stimulus to the psychological and intellectual growth of a



person by another person or artifact. Traditional classroom methods focus on teacher centered education. Thanks to technical progress, e-learning is more and more available for initial training, continuous education and professional development. Blended learning is a new way of learning and teaching combining classroom tuition and open online learning using information and resources available on the internet (Garrison et Kanuka, 2004 ; Güzer et Caner, 2014). It integrates digital tools and techniques, materials, activities in faceto face classes and independent studies. In parallel; the amount, diversity and evolutivity of information in numerous disciplines is now impossible to acquire during traditional classes and educators should push to train learners to enlarge their digital literacy in order to become autonomous for their life-long learning. Connected learning has been proposed as a new approach based on social connectivity and inquiry-based learning associating exploration, discovery, driven by real world problems, young people interests and identities (Ito et al, 2013).

UNESCO and OCDE insist on needs in information literacy, including media analysis allowing evaluation, interpretation and use of technical, scientific and societal contents. Objectives of the European Society 2020 are very similar, focusing on multi-competent individuals able think critically, to raise and solve problems, and become lifelong learners (OCDE-OECD, 2018; UNESCO, 2018) (Europa, 2010). This knowledge management approach is becoming crucial because of the so-called infobesity context (Sauvajol-Rialland, 2014), covering information published in journals as well as accessible through the internet via blogs, social networks etc. Paradoxically, information and digital literacy of students end-users is still rather poor, often limited to usage of a few search engines and social networks.

Content curation is still a recent concept although the number of tools have exploded during past years. It covers actions of collection of relevant information through aggregation, selection, editorialization, tagging and sharing (Dale, 2014 ; Deschaine et Sharma, 2015 ; Flintoff, Mellow et Clark, 2014 ; Gadot et Levin, 2012). Pinterest (Hansen, Nowlan et Winter, 2012). Usages are focusing more on marketing applications while teaching and learning developments are still wide open. A few teachers invested themselves in training students in digital curation as a core competency for learning and literacy particularly in higher education (Ungerer, 2016).

We will report on experiences during almost 5 years of content curation in two areas of learning: geography in undergraduate training (literary “hypokhâgne/khagne”), and immunology in medical university at Masters level. We will detail methods used by teachers and learners, contents and audiences, participation of teachers and students, evaluation and assessment, advantages and opportunities, limits and difficulties.

## **Geography**

Geography is a knowledge area where online numeric resources, for example, GIS, cartography, géomatic, increased considerably in the context of spatial dynamics of territories (Healey, Pawson et Solem, 2013).

### *Methods*

« Hypokhâgne » class of 50 students and “khâgne” classes of 40 students benefited of an original pedagogic action aiming to use various content curation tools, web resources and social networks during more than 5 years, i.e. more than 200 students. The teacher built content hubs focused on topics of the official program



offering students selected resources. Students were invited to practice content curation on focused topics during the first year of training. During the second year, individually and collectively, they were stimulated in building content hubs on actuality of topics required by the examination. Various tools were used such as Paper.li, Pearltrees, Pinterest, Scoop.it, Storify and rediffusion on social networks mainly Twitter and LinkedIn.

### *Actions*

The teacher curated on Scoop.it a general geography topic from 2012 to 2018. Géographie : les dernières nouvelles de la toile, (Geography, last news from the web) (Arnal, 2018) gathered more than 1000 posts and attracted more than 33k views in addition to topics curated on Pearltrees, Pinterest, Paper\_li. Every year, he also opened and maintained webpages related to current's year programme for recruitment at Lyons Ecole Normale Supérieure : Frontières et espaces frontaliers dans le monde (Frontiers and border areas in the world), L'afrique australe (Austral africa), la Planète financière : espaces et territoires à l'ère de l'économie globalisée (Financial world : spaces and territories in era of globalized world economy) 2015, Population et inégalités dans le monde (inequaliries between populations in the world), Le Brésil, La Chine : sociétés, territoires, environnements (Brazil, China: societies, territories, environments) with 150 to 450 posts relevant and commented, viewed from 5 to 24 K times.

Students, alone or in pairs, opened topics of their choice, more or less related to subjects covered by training, allowing them to enlarge and deepen their knowledge and interests and sharing their discoveries. Material collected varied from student to student from 50 to hundreds of posts. Audiences of some topics reached thousands of views , up to 15K pour le sujet suivant : La fonte des glaces à l'heure des changements climatiques. Quel impact occasionne le dérèglement climatique sur la fonte des glaces? (Melting of ice in this time of climatic changes. Impact of climate change on ice melting) active between November 2016 and April 2018, gathering 400 posts and a community of around 300 followers (Vignat, 2018).

Some topics were detected by Scoop.it algorithm and gained a Gold badge, such as Identités de l'empire du milieu : La chine vue par la géographie (Identities of the Middle kingdom: China viewed through geography) ; Russie et géographie (Russia and geography) or a Silver badge for Géographie et imaginaire (Geography and fantasy) (200 posts et 7K views) and for Quand l'art s'invite en ville (Art in the city) avec 14K views de 75 posts. Other topics were selected under the theme Geography by Scoop.it, such as Le tourisme des series Comment les lieux de tournages deviennent-ils des destinations touristiques? (Television series and tourism: how filming locations become holiday destinations) (50 posts 3.5 K vues). Many topics collected more than 1000 views : Envolée migratoire (migratory surges), Industrie textile et environnement (Textile industry and environment), Rock et géographie (Rock music and geography), Cercle polaire arctique (Arctic polar circle), Séismes et conséquences (Earthquakes and consequences), Terrorisme islamiste (Islamist terrorism), Ecoquartiers (ecology and neighbourhoods), Les mines d'or dans le monde (Gold mines in the world), Transport aérien (air travel), Question kurde (Kurdish issue), Terre de pèlerinages (Centers of worship and pilgrimages).

Some students pursued their curation activity beyond their initial training program, with some modifying their topic of interest. Objective and subjective assessment of the work of students relied on contents posted (number, relevance of selection to the topic, titles, images, tags, personal comments) and impact (number of views, links on social networks, audience, followers).



## Immunology

Immunology is a transversal biological specialty interested in all medical specialties with a very rapid movement of knowledge, fundamental and applied, useful for pathophysiology, diagnosis and therapies. Teaching and learning become major challenges for initial training and continuous professional development (Debard, Py, Kraehenbuhl et Fuchs, 2005).

### *Methods*

After having maintained during many years, the website of ASSIM which offered already selected pedagogic contents and links to relevant resources in various areas of medical and fundamental immunology (Faure, 2013) the author invested himself into curation, using mainly scoop.it to select, gather and share information and relevant contents, validated covering main areas of immunology.

In the context of 7.309 unit (Methodology of Clinical Research, Surgical and Medical Research) Master students (Medicine, Dental) and students from the French-Chinese training program, around 40 students every year, were incited to invest into scientific watching using curation tools. It was also offered to interns, PhD students, post-docs as well as French, European and international colleagues, particularly in Laboratory medicine section of UEMS.

### *Actions*

The teacher in charge opened and maintained, with about 20 co-curators, 11 topics directly related to fundamental, medical, clinical and biological immunology (Faure, 2018) gathering more than 150K posts. These were Immunology: From Flow Cytometry to Cytomics, Immunology and Biotherapies, Mucosal Immunity, Autoimmunity, Allergy (and clinical Immunology), Hematology, Rheumatology-Rhumatologie, Neuroimmunology, Laboratory Medicine – Biopathology, History of Immunology. Their audience was more than 250K views, by 145K visitors and 2K followers. Three topics were opened on cities partners of the Sino-French training program to help students and teachers stay in touch, prepare their collaborative talks and help students maintain their foreign language fluency. (Nancy, Lorraine (5.6K scoops, 19.5 views, 7.6 K visitors); Wuhan, Hubei (3.8K posts, >14K views, >5K visitors); Kunming-Yunnan ( >1K posts, >2K views, 600 visitors)

Topics opened by master students and Chinese students of the Sino-French training program are diverse, but much less focused than students in Geography. They are related to medical disciplines they are studying (Hematology, Obstetrics, Genetics..) or to wide biology subjects (Science, Nucleus) and sometimes more focused (clinical research and oncology, stem cells and immunology). Medical and biology interns opened topics on Medical biology, allergy and autoimmunity. PhD students and post-docs as well as French, European and American colleagues were interested in joining curation of running topics or opened specific topics according to their research interest (PNH Research Today, Immune-monitoring, type I diabetes, ENT articles). European colleagues from UEMS section preferred act as cocurators of topics focusing on CME/CPD and Laboratory Medicine. Students pursued curation activity during time of the module. Some PhD students, researchers and teachers pursued during months and/or years but most argue that lack of time does not allow to maintain this watching and sharing activity. Bonus points, according to number of posts, relevance of selection and quality of tags and comments are stimulators.



## Discussion

Most students and teachers prefer scoop.it as a curation tool for serious information. Its usage will be mainly discussed. Indeed, web crawling can be parametered, posting with pictures and images is attractive, comments and tagging are easy and sharing on another social networks is convivial. It is possible to post when browsing with an applet and reposting posts from other curators is useful. The internal search engine is a major asset enabling students to find again previously curated information using tags or free text. Thus teachers and students can build web-magazines and content hubs focusing of any kind of topic and share them through their networks and communities. Other tools such as Spotify, Paper.li and Pinterest, focusing more on image curations, were also used mainly by the teacher as well as Pearltrees in Geography to organize and structure curated collected information. However, in the long run, Scoop.it was chosen by most students.

### *Advantages*

The main advantage of content curation for students was summarized somehow provocatively as “apprendre à lire et à écrire” ie learning to read and write (Faure & Arnal, 2018).

Learning how to read: is (1) discover information in its amount, richness and diversity , so-called infobesity nowadays impossible to master by individuals (2) discover diversity of resources (primary documents, secondary or tertiary documents, reviews, grey literature, press releases, web and internet pages, (3) discover tools enabling information access (databases Pubmed, Google Scholar, Scopus, Web of science, dedicated search engines, scientific social networks).

Tagging posts is similar to key words definition, and pushes to analyze major messages of the information. Content curation of sensitive subjects an health-related concerns such as allergies and vaccinations allows students to manage fake news and develop criticism. Sharing results of curation on Twitter, Facebook, LinkedIn, and Google+ social networks allow students to build personal learning networks and facilitate informal contacts in relevant interest domains. Content curation by teachers and students is typical of blended learning and rely on “learning by doing” methods. It offers an initiation to science watching and strategic intelligence which is not usual in classical studies. In master and PhD research, it helps following the major topic, but should help discovering other interest subjects through serendipity. More widely, it might awaken curiosity so much constrained in classical unidirectional training.

Learning how to write in writing summaries and personal comments helps students to be trained in analysis of texts, summary writing, important keywords tagging and message transmitting. In the context of medical French-Chinese training programs, posting and sharing medical and non-medical resources in French help in maintaining fluency levels acquired during initial training and might enlarge vocabulary useful for further medical activities. In collaboration with foreign language teachers content curation favours reading and writing in foreign languages.

### *Limits*

The first problem for teachers and students is the perennity of open access to curation tools. Most, for economic models, have to change their initial free policies to more expensive solutions. The major problem



is the tenacity and persistence of teacher-curators who argue they have limited time to accomplish this task regularly. It might seem surprising in that their mission is to stay informed and to share their knowledge with students, but teachers are still not recognized for this new activity

## Conclusions

### *Content curation*

Content curation allows teachers and lecturers to follow scientific knowledge in rapidly changing areas, offering to their students selected and commented information. Teachers involved in research in universities on top of keeping abreast of information can build interest networks and become though leaders in their area of interest. Through serendipity, they can also detect easily potential new research projects.

Content curation helps students and learners in developing their digital and information literacies (Antonio et Tuffey, 2015 ;Kortelainen, 2016 ; Ungerer, 2016 ). They acquire a culture of information research, and criticism spirit useful in their future personal and professional lives. Cross fertilization of students and teachers allows them to **decompartmentalise** access to knowledge.

Practicing Content Curation stimulates information research and reading not only in the topics covered by training and research programmes, but also in adjacent themes, particularly in case of the societal aspects of a subject. In training based on practicing research, such as Master and PhD studies, students will be able to build content hubs of information searchable months or year later. Reading and analyzing resources in foreign languages helps students' master multilingual information. Commenting on those resources allows them to practice writing and summarizing, competencies required for learning, teaching and professional life.

Students can build portfolios of information received in their training and encountered when surfing the internet, information discovered can be refined according to the objectives of their courses and their interests. It will help students to affirm their digital identity, more so than classical personal social networks, focusing on their interests, which might be very useful for further recruiting interviews in their research and professional life. Indeed, for some students this made a difference in such situations, on their accomplishment using content curation.

### *From Blended Learning to Connected Learning and Beyond*

Blended learning has many alternatives names such as, hybrid, mixed, flipped. It fills the gap between traditional education and virtual classrooms. It helps trainees and future professionals become active and self-learners, without the availability of a facilitator. Exchanges between learners and social networks allows for experience online studying communities so can be useful in future participation in company networks for strategic intelligence.

Information and digital curation indeed allows students to collect, organize, interpret, annotate and share online resources on a topic of interest. Most students engaged in digital curation activities prior and after lectures developed critical analysis skills of the teaching materials they are using.





Teachers and lecturers should become facilitators or mentors, but most curricula are content packed, with very standardized testing. And most teachers report limited opportunities for such pedagogy due to curriculum and assessment demands, lack of understanding from colleagues and general lack of time (Mirra, 2014). One of the main challenges limiting usage of content curation and e-learning in curricula is the nature of evaluation and assessment. More than a one and done process, it should be an ongoing process integrated into every step, through the entire learner experience.

Taking into account the growing importance of smartphones, content curation is a nice way to approach so-called mobile-learning. Most tools available have mobile versions and information can be easily managed not only with computers but also on a smartphone or a tablet. Students, everywhere, in their journeys and free time may look down at their screen and learn something relevant to their curiosity. Subdivision of knowledge or of recent information into subunits is also particularly appropriate for micro-learning. This is already much in use in follow-up of research through reading scientific research papers, but teachers and lecturers can also design capsules embedding information on a specific point of the training program enabling students to master and/or memorize knowledge. Another new concept, obviously not so new in daily life, of learning is that of active learning, asking student to participate in the building of evaluated and analyzed knowledge, not only absorbing it passively. Content curation can foster creative and critical thinking, implement student centered topics of interest and encourage collaboration. Benefits and positive effects of active learning and content curation towards knowledge gather positive attitudes towards learning, comprehension and memory, creative thinking and curiosity.

Connected Learning may be defined as “socially embedded, interest-driven, and oriented toward educational, economic, or political opportunity”. Connected learning is accomplished when a student is “able to pursue a personal interest or passion with the support of friends and caring adults, and is in turn able to link this learning and interest to academic achievement, career success” (Ito et al, 2013). All those approaches are covered by content curation: the choice of personal topics through interest and or passion help student be involved in searching, support regular reading of information material; collaborating with colleagues and making new virtual friends with similar interests and passions is a key driver of social networks and should be used for training and learning purposes; keeping virtually in touch with teachers and lecturers involved in similar activities can remove barriers between students and teacher; usage of web materials not only validated scientific publications but also press releases and social network material, in conjunction with teachers will open horizons for students to social impacts of their topic and educate students to constructive criticism of information found by chance on the web. All this practice is particularly useful not only for students willing to pursue their professional life in academic context, but also in industry and commerce, all those discipline and activities being more and more entwined and based for strategic intelligence on information searchable and found on the web.

Content curation can be and should be used not only for marketing purposes but also for teaching and learning by teachers at various levels of curricula, by researchers in their projects, by working professionals in their initial training as well as in their life-long learning. Applications are wide to master information literacies, knowledge management and strategic intelligence.



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## Group Flow States of Intergenerational Networks Within Age Friendly Academic Settings

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### Abstract

This paper proposes a theoretical framework for investigating group flow within intergenerational networks. The framework is based on preliminary observations of intergenerational engagement among faculty members of an online open university. In describing, explaining and predicting group flow dynamics, the framework borrows heavily from autopoietic theory (Maturana and Varela, 1987), systems theory (Bateson, 1972) and flow theory (Csikszentmihalyi, 1990; Kotler and Wheal, 2017). A flow state is described as “an optimal state of consciousness where we feel our best and perform our best.” Technically defined, it is the mental state of operation in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement, and enjoyment in the process. Flow states may be experienced not only among individuals but among groups, the latter termed as group flow or *communitas*. Autopoiesis, on the other hand, carries much intergenerational resonance since it is concerned with the renewal, regeneration and evolution of living systems. A university, constituting different generations of academics, would represent such a living system engaged in a continuing effort of self-renewal and self-reinvention. Oftentimes, age, generational and ideological chasms are wide enough to result in tensions that lead to system dysfunction even within open and online settings. During group flow states, intergenerational differences are diminished in a manner conducive to system renewal and reinvention.

**Keywords:** Flow States, *Communitas*, Autopoiesis, Age-Friendly University

### Introduction

#### *The Problem*

Organizations emerge from communication. Such is implied in the communicative constitution of organizations (CCO) represented by separate schools of thought in organizational communication theory (Torres, 2019). Luhmann’s Social Systems Theory (1997), in particular, submits that the entire social world is constituted through communication and through communication only. A university is a microcosm of the social world. Can Luhmann’s assertion be applied to an institution of higher learning, specifically, an online open university under circumstances of intergenerational transition? How does communication figure into the renewal, regeneration and evolution of a living organization? How is communication constitutive of a university in its liminal moments of transition?

#### *Purpose*

The UP Open University is the fifth constituent campus of the University of the Philippines system, founded in 1908 as a land grant college when the Philippines was still a US commonwealth. Compared to other UP campuses, the UP Open University is more progressive by nature due to the open education philosophies



that it espouses and more innovative by necessity due to its online delivery system. All of its 30 academic programs from baccalaureate to doctoral levels are offered online. The UP Open University is also Southeast Asia's first age-friendly university by virtue of the age-range of its faculty and student populations. Unlike other institutions of higher learning, it does not impose age limitations among its students. Furthermore, it encourages continued involvement of retirement-age faculty members either as extended full-time members or professorial lecturers.

Being the living system that it is, the UP Open University undergoes continuous albeit unobtrusive renewal and regeneration exemplified in the succession of leadership roles. With this "changing of the guards" comes shifts in ideological paradigms, dominant traditions, curricular focus and research agendas often redefining the sense of identity of the institution. At this liminal phase, generational and ideological chasms are wide enough to result in tensions that lead to system dysfunction even within open and online settings. Overcoming these chasms is now a subject of interest of the UPOU Faculty of Information and Communication Studies and the purpose of this paper as well.

### **Theoretical Framework**

Established in 2004, the Faculty of Information and Communication Studies is unique among UP constituent units as well as other national and international universities because of the clustering of computer science, information systems, multimedia arts and communication science under one college. FICS anticipated the convergence and, more importantly, appreciated the historical links between these domains. Early on, it cited the seminal work of Claude Shannon (1949) as evidence of this affinity. Traditionally, however, these ties are not reflected in established information and communication curricula and academic structure. Hence, the Faculty found itself compelled to justify its *raison d'être* to gain a solid academic foothold within the disciplinary space. Capitalizing on its innovative beginnings, its academic agility as well as the affordances attendant to open and distance eLearning, the Faculty turned to transdisciplinary sciences such as systems theory and discovered Autopoiesis as a potential buttress.

Autopoiesis is the process of self-creation, self-production and self-maintenance within and among living systems. The process is driven by cognition (Maturana and Varela, 1987) involving both information as an entity and as a process, i.e., communication. Adopting this as its theoretical scaffolding, the Faculty's core function is to study, explore and analyze how information and communication supports living systems at all levels and hierarchies, i.e., life itself. Autopoiesis is consistent with information science, human-machine interface, cybernetics, systems theory, environmental communication, knowledge management and networked communities – areas of study which has preoccupied the Faculty for the past decade. It also supports previous articulations on what the Faculty stands for.

1. Living systems are open self-organizing life forms that interact with their environment. These systems are maintained by flows of information, energy and matter.
2. Living systems occur at different levels of existence, from the simple to the complex (unicellular organisms to the most highly evolved), from the biological to the social, from the singular to the composite.
3. Autopoiesis is the process of self-creation, self-organization and self-maintenance among living



- systems. The process is driven by cognition.
4. Cognition within living systems is achieved through communication: the reception, processing and transmission of internally-emerging and externally-sourced information. Communication is a critical function among living systems and its substance is information.
  5. Information and communication studies are inextricably linked.

The challenge is to apply autopoietic theory in the intergenerational dynamic using the Faculty as the subject.

This paper proposes a theoretical framework for investigating system renewal and regeneration within intergenerational networks. The framework is based on preliminary observations of intergenerational engagement within the UPOU Faculty of Information and Communication Studies. In describing, explaining and predicting intergenerational dynamics, the framework borrows heavily from flow theory (Csikszentmihalyi, 1990; Kotler and Wheal, 2017) apart from autopoietic theory.

#### *Flow and Communitas*

A flow state is described as “an optimal state of consciousness where we feel our best and perform our best.” Performers, particularly, musicians experience it regularly. So do professional athletes, extreme sports enthusiasts and gamers. It is the state of mind that surfers seek when they go “off-the-lip” a giant wave or the consciousness that the Zen Buddhists monks aspire for in their constant mindfulness. It is both the poet’s and the rapper’s zone where creativity dispenses abundantly, spontaneously. Technically defined, flow is the mental state of operation in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement, and enjoyment in the process. Whether in sports, dance, music and any other creative endeavor, flow states result not only in peak performance but in peak experiences as well.

Kotler and Wheal (2017) enumerate four attributes of flow states, which come under the acronym, STER: selflessness; timelessness; effortlessness and richness. While in a state of flow, the sense of bodily self seems to dissipate. Time would either seem too slow or too fast. Every action done is effortless and faultless. And the entire experience is described as rich.

Kotler has commented in a YouTube interview that those who experience flow find it difficult to analyze it, while those who analyze flow, find it difficult to experience it, intimating the state’s extra-cognitive and ephemeral nature. As academics, the members of the Faculty of Information and Communication Studies fall under the second category. Apart from the desensitizing effect that intellectual analysis brings, making us hopelessly incapable of grasping the spontaneity of the phenomenon, we tend not to perform in public, compete professionally in athletics nor engage in extreme sports and online computer games being predisposed to the so-called life of the mind.

However, there have been vivid instances when we, individually or as groups, felt selflessness, timelessness, effortlessness and richness. Incidentally, flow states may be experienced not only by individuals but among groups also, the latter referred to as group flow (Csikszentmihalyi, 1990) or communitas, described by Turner (2012) as a “group’s pleasure in sharing common experiences” or “collective joy.”



In the case of the Faculty, under what circumstances do these flow states arise? These states manifest individually and collectively during episodes of intense, engaged academic discussion.

Under what conditions do they occur? Casual observation indicates the following:

Firstly, the novelty of subject matter appear to contribute to the manifestation of individual and group flow states. The fact that information and communication studies deal with cutting edge innovations and social disruptors have contributed much to this condition. There was always something to be excited about.

Secondly, an atmosphere of collegiality even between intergenerational groups exist. There were no dominance of ideas nor impositions of seniority. An environment where conditions that encouraged, in Turner's (2012) words, the "spontaneous feelings of belonging to flourish, illustrating the inherent informality of the experience." There existed a "temporary absence of the usual rigid social order."

Thirdly, the communicational abilities of the participants played a hand in triggering these states. Being part of an academic unit that specialized in communication implied the preponderance of skills beyond imparting information or plain academic debate. Besides explainers and elucidators, the group included a number of enchanters (Popova, 2016).

Fourthly, there exists an implicit awareness of what the participants can bring to the table. In an intergenerational discussion, for instance, the younger generation, who are about to replace the old guard, would be authorities on new technology. The older generation, who are about to hand over their leadership roles, are authorities on the social impact of this new technology. Both parties respect the value that the other brings.

Fifthly, there is a shared recognition of relationships among concepts discussed. This often occurs non-verbally with cues that a realization has been individually or collectively reached.

Lastly, there is a build-up of a spontaneous discovery of emerging patterns in the discussion that may potentially lead to new knowledge. In other words, collective "Ah ha!" moments characterize the exchange.

During these intense episodes of intergenerational exchanges, participants individually and collectively feel less conscious of themselves, lose their normal sense of time, generate ideas effortlessly and experience the richness of the moment joyfully.

### *Autopoiesis*

These intergenerational experiences also carry resonance in autopoietic discourse since the theory is concerned with renewal, regeneration and evolution of living systems. A university, constituting different generations of academics, would represent such a living system engaged in a continuing effort of self-renewal and self-reinvention. Oftentimes, the age, generational and ideological chasms are wide resulting in tensions that lead to system dysfunctions even within open and online settings. During the states of *communitas* described, intergenerational differences are diminished in a manner conducive to system renewal and reinvention.

## Preliminary Conclusions

Communication may indeed be constitutive of any social system, be it a network, an organization, a community or society. The flow states that manifest individually and collectively during intergenerational engagements and exchanges may be indicative of autopoietic progression within that system.

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## Talk to Them not at Them: A Teacher-Initiated Model of Engagement (TIME) in Online Learning

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### Abstract

This paper proposes that limited teacher-student interaction in large online classes can lead to a higher attrition rate. TIME as eLearning pedagogy can avert the situation. TIME is a cyber classroom management style comprising of student engagement techniques used to address attrition and ensure quality education. This model has been found to increase student participation in a research class in the Master of Development Communication program of the University of the Philippines Open University based on observations made in SY 2017-2018. Guided by the Theory of Interaction and Communication of (Holmberg 1995), the study employed a quasi-experimental research design. From February to May 2018, submission bins were carefully tracked. A spreadsheet was prepared to document students' submissions in the portal to include date submitted to find out if TIME can decrease attrition rate. The "treatments" include: output affirmation; active "listening" to questions raised; quick responses to queries; student alerts or notifications; providing direct instructions on what needs to be done instead of leaving responses to chance; providing transitions to encourage continuous conversation by posting questions that will require further thinking, action, and revert; conducive learning environment; and coaching and mentoring. Results were compared with the performance of students enrolled in the same subject from SY 2014-2015, SY 2015-2016, and SY 2016-2017, where TIME was not employed. Indeed, a difference was observed in terms of completion rates. Hence, it can be concluded that a responsive teacher encourages students to complete their tasks thus decreasing attrition rates in online learning. As independent learners, students can experience cognitive dissonance as a result of teachers' delayed responses to their questions. Teachers, on the other hand, have to fight against time to meet expectations. However, with MOODLE on mobile, a simple 'I'll get back to you shortly' is consolation enough for students to know that they are being attended to, which could lengthen their patience. A volatile learning environment where the teacher is separated from the learner could be compensated by a click of a button with a smiley at the end of the phrase to say 'I'm here to lend an ear:-).

**Keywords:** MyPortal, Attrition Rate, Volatile Learning Environment

### Introduction

In any learning environmental setting, the ultimate goal is the completion of learners. Sadly, completion of a degree or training program largely depends on enrollee/trainee performance. Pitman and Moodle (2017) forward several factors that affect student attrition in Australia. These are age, socio-economic status, location, and time on campus. However, in this study, the focus was on above-average student-to-staff ratios



as an indicator of student-lecturer interaction. The second was above-average ratios of part-time enrolments while the third was above-average ratios of external enrolments such as online students. Results showed that part-time and external enrolments were at higher risks of dropping out because they juggle work and studies. The same study cited that in the UK Open Universities, attrition rate was at 43.5%.

In a related study, Edwards and McMillan (2015) found that students who come from indigenous groups, part-timers, external students (online), over 25 years old, from far-flung areas and from poor socio-economic backgrounds have lower completion rates.

In a related study, Simpson (2013) suggests that institutional attitudes to student retention is the main barrier to student success in distance education. Similarly, Bawa (2016) forwards that institutions and faculty must recognize the importance of creating more interactive and better designed online course content. Müller's (2008) study on student's persistence showed that multiple responsibilities and insufficient interaction with faculty, technology, and coursework are influential factors.

If teacher-student interaction is important, how should students be engaged? Bigatel (2016) says strategies to encourage student engagement include: interaction and timely feedback, relevance and real-world application, and motivation/interest. Student-teacher interaction hastens understanding of contents, which could be done through dialogue, discussions or blogs. Interaction makes student feel supported in their journey. The courses being taken should be relevant where students can share their experiences. The motivation or interest of students to be engaged can be hastened using tools for online meetings. It can be implied that the key to decreasing attrition rates rests on how the teacher engages with him or her students.

In a similar study, Dixson (2010) found that student engagement could be strengthened through: effective online instruction. She said that "research into effective online instruction offers three conclusions: 1) online instruction can be as effective as traditional instruction; 2) to do so, online courses need cooperative/collaborative (active) learning, and 3) strong instructor presence (p.1).

Briggs (2015) identified 10 ways to overcome barriers to student engagement. He forwards that "Students may become disengaged if they feel isolated or if they do not get to interact with their instructor and peers" (p.1). These are:

1. Make first contact before the course begins;
2. Create an introductory activity;
3. Provide opportunities for learner interaction;
4. Encourage sharing;
5. Establish contact method and hours;
6. Provide directions often in various ways;
7. Provide effective and timely feedback;
8. Chunk your content;
9. Send reminders to keep students on track; and
10. Use a variety of multimedia and modalities.

How could educational institutions ensure completion rate when student's success largely depends on a number of influential factors? Similar conditions can be applied to DEVC 204 students, Communication



Research and Evaluation under the Master of Development Communication (MDC) program. The UP Open University uses MOODLE as its Learning Management System (LMS). Students enrolled in MDC are all online learners studying on a part-time basis.

DEVC 204 expects students to gain a better understanding of communication research and its role in development communication work. In addition, students shall acquire the ability to conceptualize and develop a research proposal, pre-test and evaluate selected communication materials, as well as plan and conduct a simple evaluation of a development communication program or project.

As indicated in the Course Guide, students have to submit six assignments in the submission bin due on the following indicative dates:

TMA 1 (Developing the Introductory Part of a Research Proposal)	20 February 2018
TMA 2 (Developing the Review of Related Literature and Methodology Chapters)	20 March 2018
TMA 3 (Evaluating a Development Communication Project)	10 April 2018
TMA 4 (Pretesting of Communication Materials)	15 April 2018
Term Project (Integration of TMAs 1 and 2)	1 April 2018
VPRP (Video Presentation of Research Proposal)	21 April - 5 May

**Table 1: Assignment submission plan**

However, students were given the option to submit anytime within the semester, dates being indicative. While there was some flexibility in submissions, all requirements must be in on or before 7 May 2018, the end of classes for the second semester of SY 2017-2018.

The study assumed that TIME can decrease attrition rate that encourages learners to complete the subject which appeared forceful but smoothly carried out. Thus, the study aimed to determine completion rate in teaching DEVC 204 during the second semester of SY 2017-2018 with TIME employed; find out how TIME interactions have influenced completion rate in teaching DEVC 204 during the second semester of SY 2017-2018; and compare completion rates of DEVC 204 in SY 2017-2018 to SY 2014-2015, SY 2015-2016, and SY 2016-2017.

**Theoretical Framework**

The Theory of Interaction and Communication by Börje Holmberg (1995) also known as “guided didactic conversation” explains the relationship between teaching effectiveness and the impact of feelings of belonging and cooperation that occur during mediated communication. This involves actual exchange of questions, answers, and arguments during the teaching-learning process.

Holmberg’s theory forwards seven assumptions (p. 27):

1. The core of teaching is interaction between the teaching and learning parties;
2. Emotional involvement in the study and feelings of personal relationship between the teaching and learning parties is likely to contribute to learning pressure;
3. Learning pleasure supports student motivation;
4. Participation in decision-making concerning the study is favorable to student motivation;
5. Strong student motivation facilitates learning;
6. A friendly, personal tone and easy access to the subject matter contribute to learning pleasure, support student motivation, and thus facilitate learning;
7. The effectiveness of teaching is demonstrated by student's learning of what has been taught.

With this grounding, a conceptual framework was formulated to enhance the teaching-learning process.

### **Conceptual Framework**

#### *Teacher-Initiated Model of Engagement (TIME)*

TIME was conceived of in an attempt to increase completion rate in courses taken. As a Faculty In-Charge (FIC), the goal is to see that all students complete the course. However, there is a notion that it is not the responsibility of the teacher of how their students perform. Thus, the high attrition rate in many courses is not in the program. While there is no study done about the attrition rate in MDC, the low graduation rate is indicative of high attrition rates. On this premise, more innovative online education pedagogy has to be developed in order to address the various factors that would influence completion.

Given that student-teacher interaction is one limitation in online learning, could the solution then be through the use of Information and Communication Technologies (ICTs)? Such interaction may have to be initiated by the teacher as the facilitator of learning. Regular online presence of the teacher may inspire students to get engaged and feel that they are not alone. This model dubbed as TIME, which stands for Teacher-Initiated Model of Engagement refers to a cyber classroom management style involving student engagement techniques to address attrition and ensure quality education.

These student engagement techniques to be initiated by the teacher are as follows:

1. Output affirmation

This is a process of giving positive comments to knowledge products submitted by students. Acknowledging outputs with kind words can lift the mood and spirit of the receiver of comments especially if these are in blue if one uses track changes. In commenting on outputs, the FIC can start with a few encouraging words like "the proposal looks promising," or the "very interesting topic," or "proposal is novel." Then, the FIC can start giving comments on how to improve on the submission like "Perhaps, you may want to tweak your research question to make it like a communication study." Comments on assignments can either break or make the students' day. It is like looking at a glass "half full" rather than half empty. Negative comments can lose interest.

2. Active "listening" to questions raised



Online learners go into the cyber classroom, which in this case is the “Myportal.” Making students feel that it is just a click away can compensate for the physical absence of the teacher. Questions raised have to be listened to at all times to sustain student's interest and the momentum for the search of knowledge. Innovative ideas should be entertained instead of blocked in aid of developing a critical mind. There are times when facilitators are not familiar with a certain theory or concept used in the research proposal, the tendency of the teacher is to change the idea of the student and insist on what they know.

### 3. Quick responses to queries

A short “I’ll get back to you shortly” could solve a student’s problem at that very moment. Since teachers also have a life to live, these short messages are “fillers” so to speak to tell students to just wait a bit for your substantive comments. With MOODLE on mobile, it is quite easy to respond to these messages that could mean a lot to the receiver. Teacher-student relationship is strengthened for that short but meaningful response.

### 4. Student alerts or notifications

Like using a credit card, notifications are sent when payment is due. In online learning, periodic reminders should be done. This could be a week before the deadline of an assignment. Attention of students who are delayed in submission be called to remind them of their obligations. This could be done through the portal or via SMS or yahoo messenger.

### 5. Providing direct instructions on what needs to be done instead of leaving responses to chance

The FIC should be able to indicate what needs to be done. Remember that the student is alone who has nobody but his or herself to depend on. Provide clear directions, suggest references, or provide sample works for students to benchmark or at least have an idea on the expectations. Students in DEVC 204 have to work independently in the absence of discussion forums. Thus, the FIC should always be available for assistance and guidance.

### 6. Providing transitions to encourage continuous conversation by posting questions that will require further thinking, action, and revert

The use of emoticons has become part of the lexicon. A smiley at the end of a sentence, comment, or question inspires students to revert with a smiley as well. For example: Got your submission! It is much better now with your revisions. What if you use agenda-setting theory instead? Whadyanthink?☺ This implies that the FIC conveys warmth and always ready to lend an ear.

### 7. Conducive learning environment

Unlike conventional schools, online learning environment relies on ICTs to communicate or interact with one another. Myportal should be likened to a living classroom where students are not treated as avatars but people who need guidance and constant interaction. Being strict with deadlines is good but not always necessary in view of the nature of distance education and the type of learners. With ICTs, communication is made faster and easier but if the other end of the line is closed, it is tantamount to visiting the teacher in

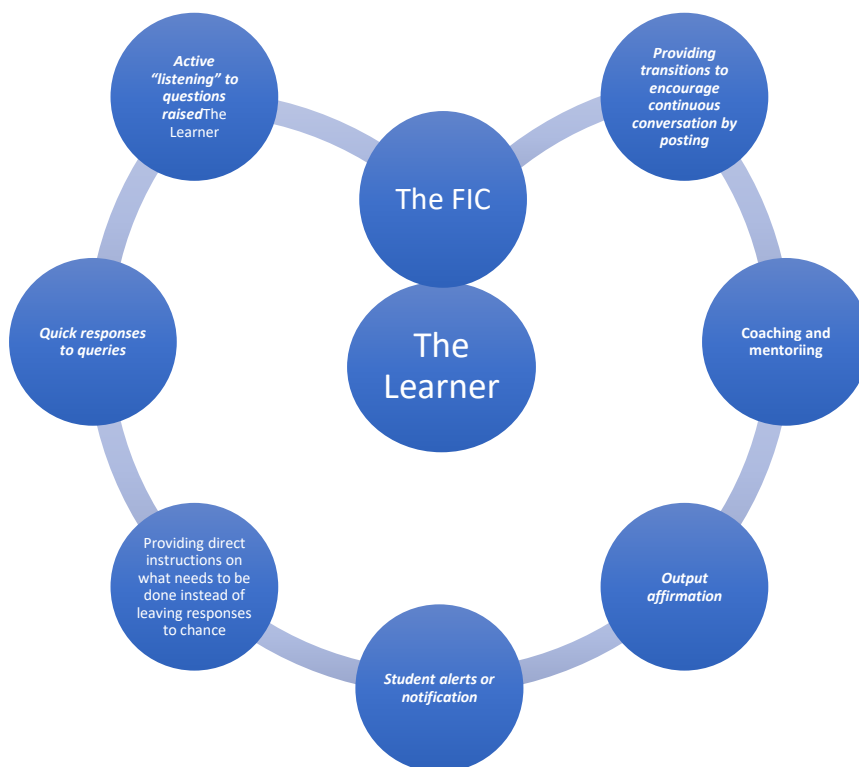


the office but nowhere to be found. Such absence creates frustration and disappointments, which may eventually lead to dropping out.

### 8. Coaching and mentoring

In classes where DFs are not available, oral consultation through Skype or any other online talk would be an alternative. Doing research is very different from writing a news article or producing a radio program. It requires dialogue and clear understanding of what needs to be done. The FIC can talk to each student at the start of the course, after the title submission, and before the Term Project submission. With these initiatives, students will be more engaged, pressured, and accountable of their respective performances.

In TIME, the teacher reaches out to the student and not the other way around. It is a dynamic, cyclical, and never-ending process to ensure quality education and a response to accommodating differing learning styles and online student predicaments with a heart to decrease attrition rates. In TIME, the student is at the centre of the teaching-learning process. In TIME, time is of the essence and therefore should not go to waste.



**Figure 1: Graphical Representation of TIME**

### Methodology

The study employed a quasi-experimental research design. From February to May 2018, submission bins were carefully tracked. A spreadsheet was prepared to document students’ submissions in the portal to include date submitted to find out if TIME decreased attrition rate. The “treatments” include:

1. Output affirmation;
2. Active “listening” to questions raised;
3. Quick responses to queries;
4. Student alerts or notifications;
5. Providing direct instructions on what needs to be done instead of leaving responses to chance;
6. Providing transitions to encourage continuous conversation by posting questions that will require further thinking, action, and revert;
7. Conducive learning environment; and
8. Coaching and mentoring.

#### *Data Gathering Procedure*

Submissions were extracted using engagement analytics by TMA based on indicative date of submission, which is one feature of Myportal.

#### *Data Analysis*

While submissions were based on indicative dates submitted, the last day of submission was also taken into account since the instruction provides that submissions can be made anytime within the semester or on before the set deadline.

Results are presented in graphs, which were compared then with performance of students enrolled in the same subject from SY 2014-2015, SY 2015-2016, and SY 2016-2017 where TIME was not employed. Descriptive statistics such as frequency counts, percentages, and means were used to analyze results.

### **Results**

#### *Completion rates of Tutor Marked Assignments*

DEVC 204 for the second semester of SY 2017-2018 was composed of 85 students. Of the 85, 4 officially dropped for personal reasons in the middle of the semester leaving 81 students. For purposes of computation, the total N for the study is 85.

For the first assignment, only 7 or less than 10% submitted TMA1 on indicative due date (20 Feb) since they were given an option to submit anytime within the semester. However, students were asked to submit their research topics as early as January prior to developing TMA1 requirements being sequential. Announcement in the portal was made to acknowledge submissions and comments given to guide students in developing their research proposal to wit:

By 4 March, this was the announcement:



*Hi, Guys!*

*Have read very interesting proposals. I'm waiting for the rest of the 35:-) Please submit soon so I can help you develop your term project.*

*It would be good to submit it now and not at the end of the semester so you will have enough time to improve on it.*

*cheers!*

*benjie*

**Figure 2: Course announcement**

The increase from 7 to 35 before 4 March could be attributed to the reminder as exemplified in TIME, the element of output affirmation. This was followed by the following messages starting 10 March:

The would be fallen 34:-)  
by [Flor Benjamina](#) - Saturday, 10 March 2018, 9:42 AM

Hi, Class,

I'm still waiting for 34 TMA1s.

Please send now so I can go over it to give you enough time to incorporate changes, if any, in your term project which is due sometime in April. Classes end on 7 May 2018. While you have been given the option to submit anytime within the semester, your term project should be submitted earlier for me to match you with your prospective adviser. I will send your term project to them to get their concurrence.

Cheers!  
Benjie

**28 more**  
by [Flor Benjamina](#) - Tuesday, 13 March 2018, 12:56 PM

Hi, Guys!

I'm still expecting 28 submissions. Can you please send those now? for those who have sent and have not been commented on, please advise.

Remember, **1 APRIL 2018** is the deadline for your term project.

thanks!  
Benjie

**Looking forward to the remaining 24:-)**  
by [Flor Benjamina](#) - Thursday, 15 March 2018, 12:32 PM

Hi, Class,

Twenty-four TMA1s more and were done with the first output. When kaya?

cheers!  
Benjie

**waiting for 19 TMA1s**  
by [Flor Benjamina](#) - Sunday, 8 April 2018, 12:09 PM

Hi, Pipol!

I'm still waiting for 19 TMA 1s:-). For those, who will present their proposal on 25 April, please make sure to send your term project so i can check on those. so far, 18 have submitted but not necessarily going to present on 25 April.

Please keep it coming.

cheers!  
Benjie

**Figure 3: Message thread from course**





In view of the extended deadline, a total of 75 submissions were received or 88.24%. The extension implies less students who will be enrolling in the course again, less cost on the part of the university, and promotes hope and enthusiasm to complete the degree. The little accommodation earned an extra mile for a lot of students who juggled work and studies.

Figure 4 presents the completion rate for TMA1 from SY 2014-2015 to SY 2017-2018.

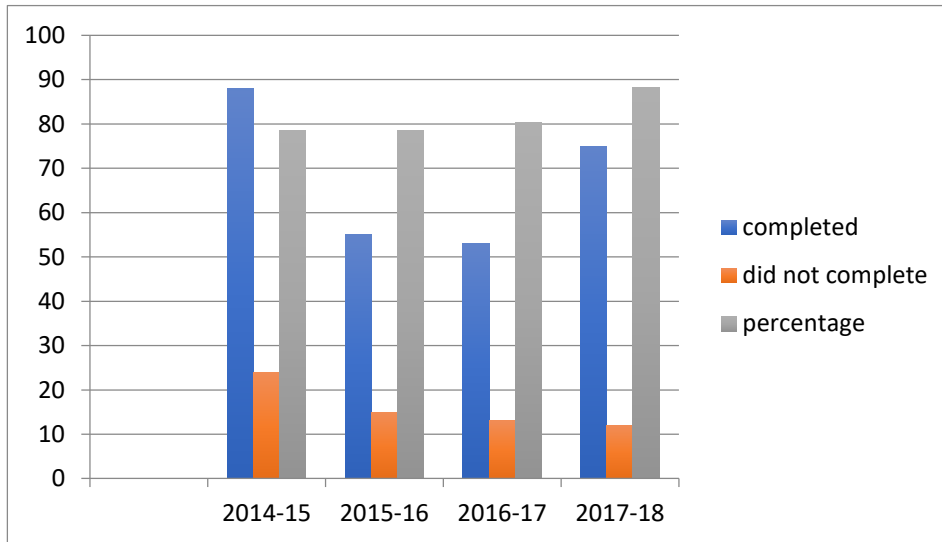


Figure 4: Completion rate for TMA1 in DEVC 204 from 2014-2018

In terms of TMA2, completion rate was 65.88%, which was expected since there were students who were only able to submit TMA1. Submission of TMA2 was dependent on TMA1, which connotes that if TMA1 has not been commented on, the student cannot proceed to developing TMA2 (Figure 5).

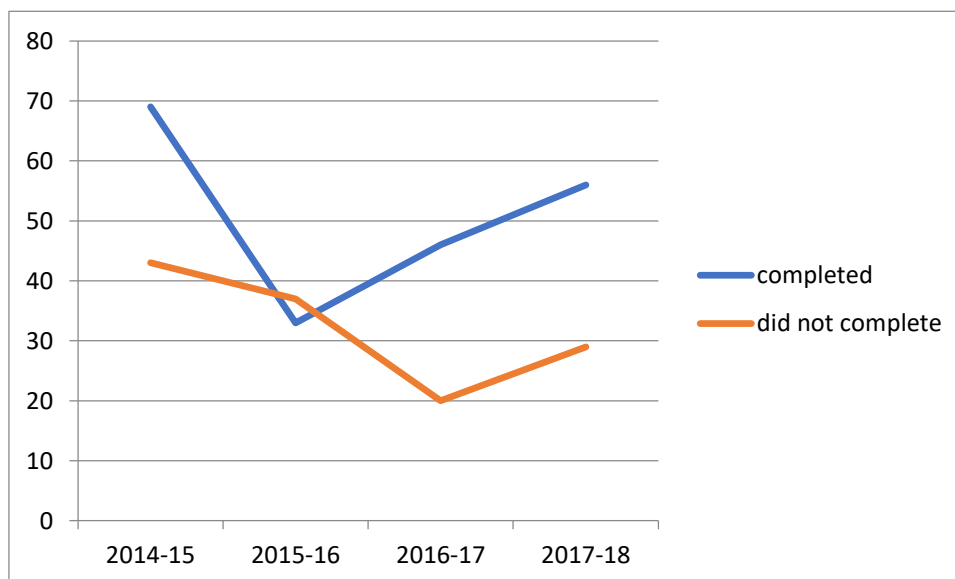


Figure 5: Completion rate of TMA2 in DEVC 204



The completion rate for submission of the Term Project reached 62.5% by end of the extension, which was a little lower than TMA2 at 65.88%. It can be surmised that changes to be made based on comments could have taken some time to complete. Figure 6 presents the completion rate for the Term Project.

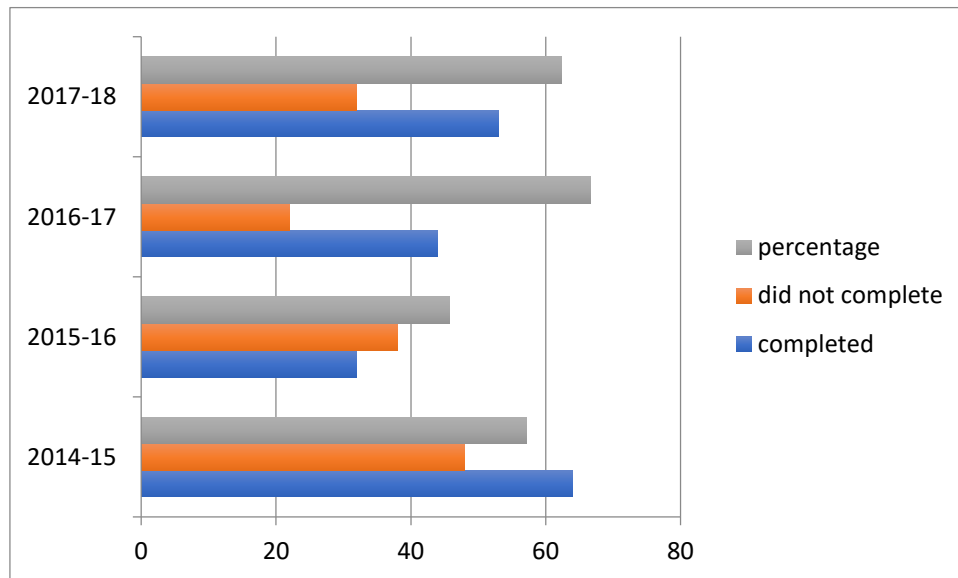


Figure 6: Completion rate of the Term Project in DEVC 204

As the deadline approaches, teacher engagement in the form of gentle reminders signalled students to heed to the call.

**Submit revisions using the same file**  
by [Flor Benjamina](#) - Friday, 13 April 2018, 3:23 PM

Dear Class,

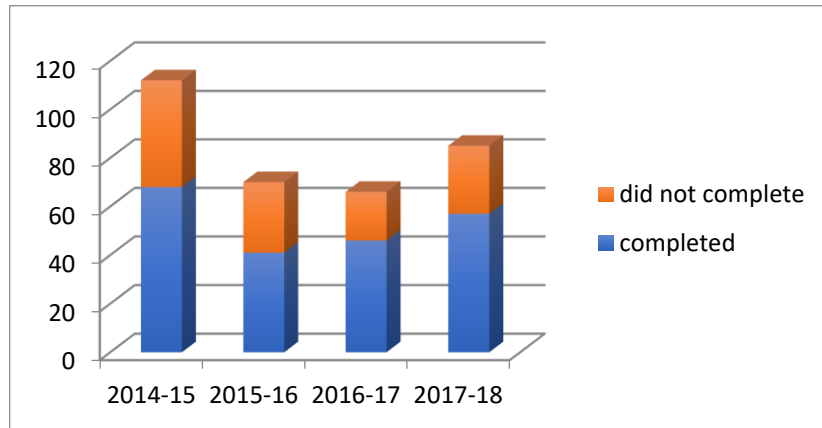
For most of you, I have made my comments in track changes. If you are planning to revise your submissions based on my comments, use the same file so I don't have to read all over again:-) and in word file.

cheers!

Benjie

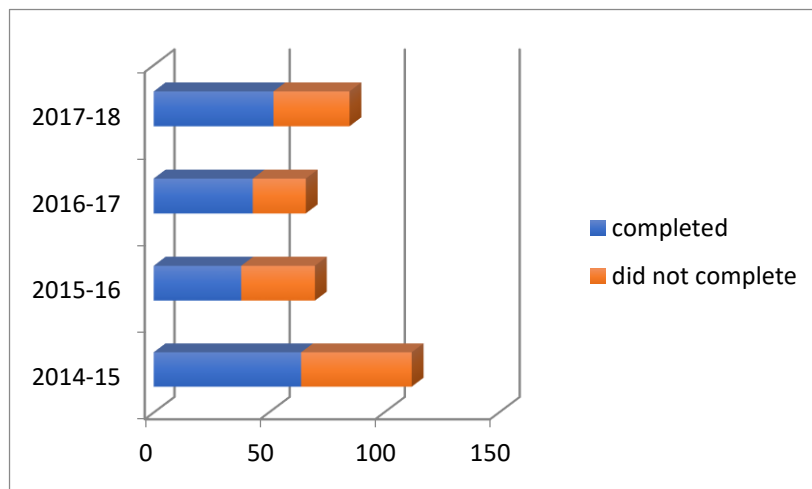
Figure 7: Course announcement

For TMA3, completion rate was 67.06%, which was a little higher compared to TMA2 and the Term Project because it is a separate requirement and requires a different skill. Not many MDC students have research background in their undergraduate years making it difficult to do one unlike TMA 3. It is also a kind of research but more on evaluation that requires a specific methodology to employ. It can be gleaned from the data that in the last four years, completion of this assignment was consistently high (Figure 8).



**Figure 8: Completion rate of TMA3 in DEVC 204**

TMA 4, on the other hand, which also required a different skill, had a completion rate of 61.18%, which is slightly lower than TMA 3. This assignment needs production of communication materials that have to be pretested. Again, it demonstrates skills on research but more laborious since it has to be conducted. Figure 9 presents the completion rate.



**Figure 9. Completion rate of TMA4 in DEVC 204**

The VPRP is the culminating activity. Students have to record themselves, upload the video publicly on YouTube for classmates or others to comment on. This exercise is like collaborative learning where the author gets comments to improve their research proposal. This could have been an easy 20% of the requirements but demands some skills like video production, which they all have undertaken in DEVC 206. There were those who have completed their Term Project but where not able to produce the VPRP due to lack of time despite the extension given. In all four years, the highest completion rate was 60%. Figure 10 presents the completion rate in VPRP.

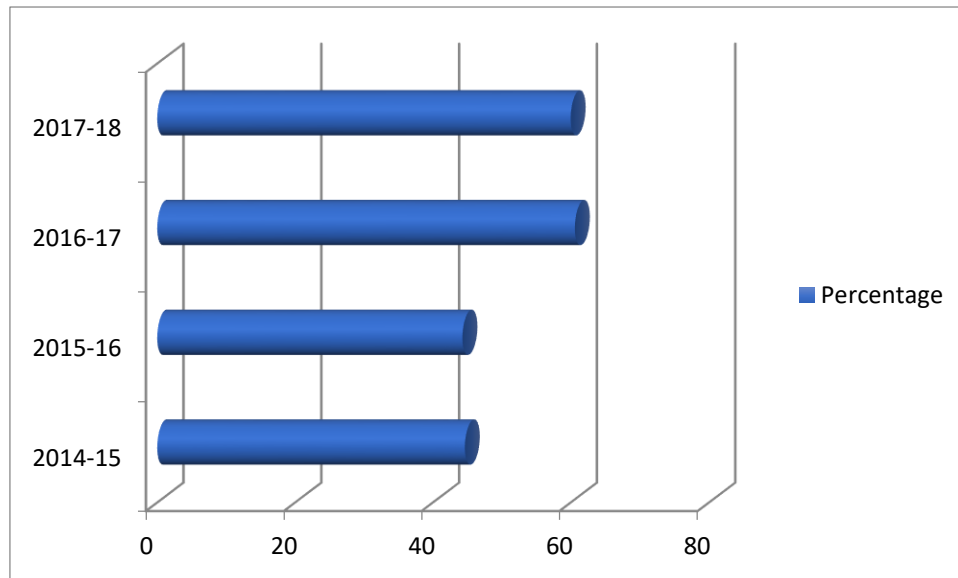


Figure 10: Completion rate in VPRP

Overall, completion rate for DEVC 204 was pegged at 60%. However, this figure would not have been reached without TIME. As well, submission rates for all TMAs have increased. Assuming that the portal for DEVC 204 had been closed on 7 May 2018 as scheduled, completion rate was a measly 38%. The offered extension gave students more time to complete their requirements. Students more often than not start reading what needs to be read but put them aside to go back to later which may be past the deadline. The constant interactions may have pushed students to comply. Keeping students updated of deadlines, what to submit, and answering all inquiries sent through email or via the portal added to decreasing the attrition rate (Figure 11).

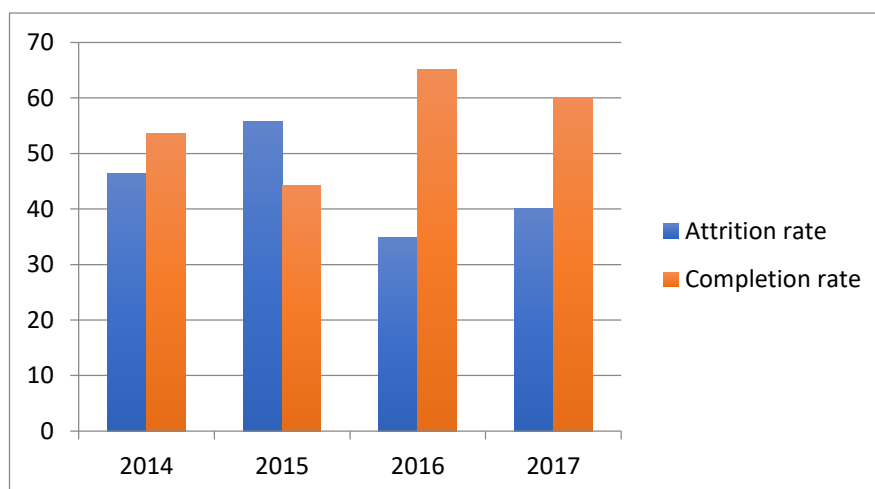


Figure 11: Completion rate in DEVC 204 in SY 2017-2018



## Discussion

The increase in completion rate of submissions could be attributed to TIME as an intervention. The tendency of online learners is to gain attention for them to participate as dictated by the communication platform. As online learners, the cyber classroom becomes a space for interaction and not simply as a medium to earn a degree or interact with the uploaded modules. MOODLE with its features is just like engaging with any social media platform or Facebook (FB) for instance. Submissions being done electronically simulate FB interaction. In social media, emoticons or emojis are used to communicate how one feels or express oneself. In like manner, submission of TMAs is like postings on FB or twitter or Instagram that expects the receiver to react. Reactions from receivers should be quick and spontaneous. Such feedback resonates how the FIC feels about the submission. Emoticons for one are highly communicative symbols as a response to the post. Of course, the emoticons in MOODLE are limited unlike in social media platforms.

Online learners who are mostly independent would always expect a quick revert. Once the FIC sends a comment, almost instantaneously the learner responds with an emoticon that communicates a positive reaction. Times have changed on how the online teaching-learning process is carried out because of the communication platform used. The virtual world becomes the real world where immediate feedback is expected. Feedback, however, should be positive or constructive to encourage learners to revert with a smiley in return.

Regardless of the nature of submissions, learners still feel that constant interaction can ease the tension of waiting for a response. Since teachers, more often than not belong to a different genre; it is therefore imperative to have a paradigm shift on how to treat their online classes. Gone are the days where the teacher is the authority in the classroom. Twenty-first century learning style is propelled by ICTs that requires instant reaction and accommodation. Such affordances are the nature of the digital communication.

While the teacher may not expect quick revert, learners behave otherwise. This is the reason why online teachers should be more engaging and accommodating. Self-expression, self-generated content, and self-indulgence are characteristics of cyber classrooms where learners can freely and openly write their thoughts and use emoticons or emojis that would help express what they want to say. With the various types of emoticons or emojis where one is desperately requesting for a deadline or needs to read more to beef up their review of related literature, one could receive a crying emoji or a closed palm that means an appeal that warrants an approval.

The constant reminders of deadlines likewise were received well as evidenced by the increase in submissions by assignment. As well, to show gratitude that learners are being taken care of. The pleasure of according attention is tantamount to compliance with a happy face because they no longer have to re-enrol the course even if they have not completed all requirements.

This implies that talking to the students and not reprimanding or scolding them can encourage participation. In cases where plagiarism has been committed which is not unlikely in online learning, a gentle reminder like “submit something that cannot be challenged” sends the message that submission was doubtful without directly hurting the ego of the student. In online learning, once the ego gets hurt, there could be a falling out just like in a relationship. In this case, screen relationship that calls for mutual respect regardless of the



wrong committed. Understandably, the absence of the teacher in online learning translates to cheating and if caught can lead to depression or mental health disorder.

Extending the deadline also means giving hope towards completing the course. A kind heart can go a long way for learners who are juggling work and studies and other responsibilities upon their shoulders. A strict teacher has to be more understanding, forgiving, and open to adapt to circumstances that learners are in despite the consequences of late submission of grades or salary deduction. Disciplining online learner can only hamper participation and shun upon because the virtual classroom is likened to how they behave in social media.

### **Conclusion**

Online learning affordances through TIME led to decreased attrition rates. TIME encouraged students to complete their courses and eventually their degrees. Opening the lines in online education affirms connectivity that shapes a healthy relationship between teacher and student. While the assumption that students in online learning are “fully autonomous learners,” reality speaks otherwise. Indeed, a volatile learning environment where the teacher is separated from the learner could be compensated by mediated communication methods through a click of a button with a smiley at the end of the phrase to say ‘I’m here to lend an ear:-).



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## From Theory to Platform: Designing Software to Support Online Wisdom Communities

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### Abstract

Online wisdom communities provide virtual spaces for diverse learners to discover collaborative solutions to real-world problems. Working for the common good, communities based on wisdom encourage both individual and collective growth. Based on sociocultural theory, we developed an instructional design framework, “WisCom,” that guides educators in cultivating culturally inclusive online environments, such as courses and web-based training sessions. Within the WisCom framework, practitioners can tailor existing tools and platforms, such as Moodle and Sakai, to encourage collaborative discussion and problem-solving. However, a platform created with the tenets of WisCom in mind has not yet been designed. Based on our previous research and practical work in higher education, we are now devising a custom platform to support an online wisdom community of instructional designers, instructors, trainers, and other practitioners. In our 2019 book, “Culturally Inclusive Instructional Design: A Framework and Guide to Building Online Wisdom Communities,” we outlined specific recommendations for building software informed by the WisCom framework. Some of the design considerations we identified included (1) integrated needs assessments and co-mentoring features; (2) built-in support to engage in the collaborative inquiry cycle, the social-learning-based process at the heart of the a WisCom experience; (3) support for a variety of input types, including verbal and visual options; and (4) well-designed communal spaces, for example, discussion forums that support both asynchronous and synchronous communication. Although existing systems can be adapted to cultivate wisdom communities, our research shows that technology designed with certain teaching or learning philosophies in mind is more likely to promote those philosophies when used by educators and students. This presents us with a core question: What would it look like to design a virtual space, from the ground up, to encourage the formation of a wisdom community? This paper attempts to provide preliminary answers by outlining the critical features of an LMS designed with the Wisdom Communities framework in mind. We first present a brief overview of the state of LMS research. We then describe core tenets of the system: communication over content, simplicity over complexity, connections to ideas and people, flexibility, and accessibility. Next, we detail six essential subsystems: needs assessment, co-mentoring, conversation, people, collaborative inquiry, and tracking. Finally, we provide concluding thoughts and outline next steps.

**Keywords:** Learning Management System, Sociocultural Learning Theory, Cultural Inclusivity, Software Design, Wisdom Communities.





## Introduction

This paper provides a detailed blueprint for the design of a next-generation learning management system based on the tenets of the Wisdom Communities Instructional Design Framework. My colleagues and I have spent nearly two decades refining this framework and, in 2019, we published the book *Culturally Inclusive Instructional Design: A Framework and Guide for Building Online Wisdom Communities* (Gunawardena, Frechette, & Layne, 2019) to catalog our work to date. The Wisdom Communities framework provides instructional designers, instructors and trainers tangible guidance to foster group dynamics that promote critical thinking, collaboration, creativity, and other 21<sup>st</sup>-century skills. By extending the tenets of sociocultural learning theory, the framework places communication at the heart of the learning process and emphasizes the value of co-mentoring and facilitation of learning over traditional student-teacher paradigms. The result is an approach to instructional design that prioritizes process over product, collective growth over individual achievement, and context over content. Integral to the framework is the premise that productive learning cohorts — what we call “wisdom communities” — must be inclusive, especially with regard to the global nature of contemporary learning and the many cultural perspectives that learners will bring to bear. Without accommodating diverse ways of thinking, a learning experience will likely disadvantage some participants, suppressing the group’s overall potential.

Over the years, we have noted a pronounced gap between instructional theories and frameworks on the one hand and the technologies that underpin online learning on the other, especially with regard to learning management systems, or LMSs. Modern LMS platforms incorporate traditional classroom paradigms — discussions, modules, assignments, gradebooks — and borrow heavily from the design of content management systems. The application of learning and instructional design theories, meanwhile, occurs in the implementation of the LMS, on a course-by-course basis, if at all. Like all software management systems, LMSs provide significant flexibility in how administrators and users employ them. Nonetheless, the current juncture provides an opportunity to consider the conceptualization of a new LMS, designed with an instructional design model in mind. The present analysis looks specifically at how the Wisdom Communities Instructional Design Framework might inform the design of a custom learning management system. First, we review current literature on learning management systems, with a focus on evaluating the effectiveness of existing systems through the lens of the learner experience. We then outline core tenets of a learning management system designed with the Wisdom Communities framework and provide detailed guidance on how to design six interconnected subsystems. We conclude with a summary of additional features to support collaboration grounded in sociocultural learning theories.

## Review of Literature

LMSs have become a cornerstone of online education. Nearly every college and university in the U.S. has adopted an LMS platform, and, worldwide, their usage continues to grow (Soykan & Şimşek, 2017), particularly in the developing economies of Asia and Africa, where researchers predict rapid adoption in the years ahead (Mtebe & Kissaka, 2015). Outside of academia, however, LMS adoption remains relatively low (Dousay, 2019), suggesting another potential area of growth.

Researchers have considered the quality of LMS solutions since their inception, with a focus on student perceptions around ease of use, reliability, functionality, and accessibility (Radwan, Senousy, & Riad, 2016). In one review of the factors that matter most to students when assessing in LMS, researchers found that



service quality, or the quality and timeliness of support, most impacted satisfaction (Ohliati & Abbas, 2019). Other researchers have emphasized the importance of systems that promote student enjoyment, satisfaction, along with interactivity (Fındık-Coşkunçay, Alkiş, Özkan-Yıldırım, 2018). Still others have found the use of learning design models to shape the implementation of a class matters most to learner perceptions of practicality and engagement (Hagen, Hibbert, & Kinshuk, 2006). This finding speaks to a limitation of LMS evaluation research, which tends to conflate the design of an LMS on the one hand with its implementation on the other. One early effort to establish a comprehensive approach to evaluation (Passerini, 2006) emphasized course design decisions such as limited content on each page and strategic link placement.

Another systematic review of learners' satisfaction with LMS (Ozkan, Ali, Koseler, & Baykal, 2009) focused on factors not endemic to an LMS, such as instructor quality, information content quality, and service quality. Another limitation of research into the effectiveness of LMSs concerns the depth of evaluations. Beyond assessing learner perceptions, analyses (e.g., Alenezi, 2018; Anand & Eswaran, 2018) tend to consider whether an LMS provides built-in email, messaging or discussion board features, without considering the quality of the tools' designs. Not surprisingly, when taking a "feature list" approach, comparative reviews of open source LMSs have found that leading platforms offer comparable functionality and usability, with nearly identical feature sets (Albarrak, Aboalsamh, & Abouzahra, 2010).

Some researchers have documented myriad types of engagement that LMSs encourage, including "offline" engagement with institutional resources and support staff (Barua, Zhou, Gururajan, & Chan, 2018). Yet, when an LMS faces more intense scrutiny, the results appear less clearcut. Moodle is the most popular open source LMS, particularly in Europe (Anand & Eswaran, 2018), and has been a frequent subject of evaluative research, with mixed results around its effectiveness. Some researchers found frequent problems with basic functionality, such as online chats and discussion forums, in the earlier years of Moodle's development (Kakasevski, Mihajlov, Arsenovski, & Chungurski, 2008). Others have found Moodle's functionality to be sufficient, but raised questions about how the platform organizes resources and content (Konstantinidis, Papadopoulos, Tsiatsos, & Demetriadis, 2011). More recent research found that at least one implementation of Moodle failed to foster collaboration and active learning, instead emphasizing the distribution of information and tracking of student performance (Theohari, 2019).

One area of promise in LMS research concerns the analysis of access logs, which include detailed notes about how and when learners interact with class content and one another (Lerche & Kiel, 2018). Despite limitation in what they can reveal about real-life behavior (Juhaňák, Zounek, & Rohlíková, 2019), logs provide valuable insights into learner behaviors to complement attitudinal surveys into their perceptions and opinions.

Despite their prevalence, at least in higher education, and the increasing reliance many institutions have on them, several promises of LMS technology remain unfulfilled. Early on, researchers saw potential for LMSs to foster collaboration and communication, predicting growth in the sophistication of these tools (Kljun, Vivic, Kavsek, & Kavcic, 2007). Yet, LMS communications functionality has changed little in the past 20 years. Others have concluded that the full potential for personalized online learning experiences that adapt to learners' needs and preferences remains untapped (Santos, Boticario, & Pérez-Marín, 2014). Meanwhile, whether learners receive adequate training and support remains a concern (Alenezi, 2018).



## Basic Tenets of the Wisdom Communities Learning Management System

On the whole, a review of existing research into the effectiveness of LMS technology points to significant opportunities for improvement and innovation. Based on this research, and on the sociocultural underpinnings of the Wisdom Communities Instructional Design framework, we propose a new kind of LMS, called *Colectivo*, designed around five core tenets. First, to support sociocultural learning, the system should prioritize communication over content. Rather than serving primarily as a means of organizing and distributing lessons and learning modules, the LMS should foster collaboration among learning cohorts (Sheshasaayee & Bee, 2017). Content, therefore, emerges not from premade lesson pages but rather via the interactions that unfold among learning cohorts. Second, the system should prioritize simplicity, eschewing complex feature sets in favor of sparse but well-designed subsystems that learners return to repeatedly (Kljun et al., 2007). Third, the system should facilitate connections to ideas and people. These connections can be conceptualized at three levels: within the cohort; within other cohorts who have adopted the same platform — the possibility of knowledge-sharing across learning cohorts remains underdeveloped; and elsewhere on the web. To facilitate the discovery of content and connections within a cohort, the system should offer a fast, intuitive full-text search feature. Fourth, the system should remain flexible, providing a high-quality set of default options but allowing learners to customize their experiences whenever feasible. These customizations might involve visual options such as color schemes, font sizes, along with how the system organizing information, for instance, whether it displays posts from newest to oldest or oldest to newest. Fifth, the system should be as accessible as possible. Accessibility can be understood both in terms of input, or how learners interact with the LMS, and output, or the ability to access content within the system. With regard to input, all critical functions should be achievable through any combination of mouse/trackpad/touch, keyboard and voice-based entry. For example, it should be possible to navigate the interface exclusively through the keyboard, or participate in discussions entirely through voice-based commands. With regard to output, accessibility improves when text-based alternatives accompany multimedia content, for example, alternative text descriptions of images, and closed captioning alongside videos and audio. Textual representations of content benefit learners with both visual and auditory impairments, along with students learning in a non-native language and participants logging in from noisy environments (Morris et al., 2016).

### *Subsystem Descriptions*

The aforementioned tenets manifest in the Wisdom Community LMS across six subsystems, which constitute the backbone of the learner experience. We envision close connections across the subsystems, most of which would appear as distinct navigational options within the LMS, accessible from any part of a class.

### *Needs Assessment Subsystem*

Needs assessments provide an understanding of participants' strengths, weaknesses, and preferences, prior to the start of a training session, or other educational experience. Traditionally, when needs assessments occur in the context of online learning, educators deploy them outside the confines of an LMS, for example, via standalone survey software. Although the results of a needs assessment delivered in this manner could be used to tailor what participants encounter once they reach the LMS, tighter integration makes it easier to use needs assessment results to inform participants' experiences. The first subsystem in the *Colectivo* LMS integrates needs assessment functionality and uses the results to build automatically a learner profile that



accompanies each participant throughout their development in the class. Facilitators can create custom assessments or choose questions from pre-existing banks populated by previous efforts to gauge learner readiness in other classes. For example, if the facilitator of one class creates questions to measure participants' familiarity with mobile technologies, those same questions could be adopted by the facilitator of another class to gain a similar understanding. In this way, the LMS creates connections across courses, and perhaps subject areas, to provide resources to future designers and facilitators. A needs assessment can be configured as a kind of checkpoint, wherein it must be completed before participants gain access to other class features. This also allows needs assessments to be used as pretests — a means of establishing baseline knowledge or attitudes prior to the start of the learning experience. When adding items to an assessment, designers can choose which groups have access to the results: the participant in question, facilitators, mentors, or the class at large. Results can become part of learners' profiles or appear in reports available to facilitators.

### *Co-Mentoring Subsystem*

We also envision a robust co-mentoring system that fosters productive mentoring relationships. This subsystem provides facilitators with a means of tracking and assigning mentor-mentee relationships. Unlike traditional approaches to mentorship, which delineate strict lines between mentor and apprentice, the Wisdom Communities framework takes a more nuanced approach, recognizing that coaching roles can be situational, and a mentor in one context might be a mentee in another. Likewise, one person's mentor could be another's mentee. With this in mind, the LMS would allow facilitators to make and review assignments in a non-hierarchical fashion, for instance, by drawing lines between circles of nodes to designate relationships. Once their roles have been defined, participants access lists of their assigned relationships from a control panel. Here, they can initiate communications with their connections and, in the case of mentees, monitor contributions to the community, giving feedback when appropriate. Commenting and annotation tools can be used to provide feedback on submissions, and facilitators and peers can provide feedback via the same vehicles, providing the opportunity for multiple layers of feedback on a single submission. Participants can then filter comments by role and engage in follow-up conversations with community members who have offered feedback on their work. Alerts can help mentors and mentees stay connected as a community develops. Mentors could receive alerts when their mentees engage in forums or submit work, for example, and mentee could receive alerts when their mentors comment on their work. Alerts can appear via email, SMS, and/or within the LMS, depending on an individual's communication preferences. Based on previous research, learners appear to benefit from timely, flexible reminders, especially when delivered to their phones (Iskandar, Thedy, Alfred, & Yonathan, 2015).

### *Conversations Subsystem*

This subsystem provides a set of tools for designing and managing collaboration across the LMS, replacing the discussion forums common to most other learning platforms. A key feature of communal spaces within the Colectivo LMS is support for both asynchronous and synchronous communication to accommodate diverse learner needs (Wang & Chen, 2009) (Kabassi et al., 2016). Rather than strictly differentiate the two forms of communication, as other LMSs might via "live chat" and "discussion forum" features, this LMS integrates them, providing a unified tool for both kinds of communications. Threading is possible up to five levels, providing ample opportunities to create structured conversations around themes. Documents can be



shared via attachments to messages, and a short profile accompanies each post, with an avatar, role identifier, and brief biographical sketch. These summaries link to full profiles and permit one-on-one communication, as detailed in the following section on the “people” subsystem. To enable synchronous communication, each space includes an indication of who’s present, with differentiation between presence in the class and presence within the specific forum. Visual cues indicate when someone is typing, and new messages appear in near-real time. Participants have the option to go “off-the-record,” that is, respond privately to a colleague, and facilitators can access dashboards with statistics and insights into when contributions have been made to the discussion, and by whom. Facilitators have fine-grained control over the visibility of posts in a conversation, making this a flexible tool that can also serve the purpose of an assignment-submission platform.

### *People Subsystem*

This subsystem extends the functionality of conversations with robust user profiles to increase social presence and an interface for one-one-one communications that mirrors the functionality of the conversation subsystem. User profiles include avatars, biographical sketches, links to contributions the learner has made throughout the class, and prompts to begin one-on-one chats. Those conversations can unfold in real-time or asynchronously, and participants receive alerts when they are not present to engage in a conversation immediately.

### *Collaborative Inquiry Subsystem*

The collaborative inquiry cycle (CIC) provides a structured approach to group problem solving within a wisdom community. Most interactions within a wisdom community center around the CIC; accordingly, a robust system for designing and deploying collaborative inquiries undergirds the Colectivo LMS. The CIC involves six stages, and this system accounts for each. At any given moment, a community could be involved in multiple collaborative inquiries, and facilitators and designers can configure and queue inquiries in advance. In this sense, a collaborative inquiry is a foundational building block in the Wisdom Community LMS — a core type of content around which most interactions flow. First, each collaborative inquiry must receive a title, or label. Then, when creating a new inquiry, designers and facilitators must articulate a problem statement by providing short answers to several key questions. They must define the nature of the problem, why it matters, and, in general terms, the task, or challenge, learners face. Successful collaborative inquiry relies on good problem statements, and, over time, new problems populate a repository of prompts from which designers and facilitators can draw inspiration. The next five stages in the CIC — exploration, resources, reflection, negotiation, and preservation — appear as subsections with the defined problem, each with its own layout and structure. These stages draw heavily on the affordances of the conversation system, providing consistent interfaces for interaction. Facilitators can control movement through the process, restricting access to steps until they deem the cohort is ready to move to them. In the exploration stage, the cohort defines a goal statement for their work, describes the deliverable that will emerge from the process, and lists action steps — to do items that will lead to the deliverable. Working individually and in small groups, in the resources stage, participants gather links and upload applicable documents, building a database of material tied to the action steps to which they have been assigned. In the reflection stage, the cohort convenes in breakout groups to assess the collective resources they have organized and journal impressions. In the negotiation stage, the larger group reconvenes to synthesize findings. In the preservation stage, the



group saves final outcomes and finalizes the deliverable, which could take the form of a handbook, white paper, timeline, schematic, or other document.

### *Tracking Subsystem*

A tracking subsystem provides facilitators and learners alike with a toolset for understanding both individual and collective development. This component provides quantitative and qualitative insights into the communications that unfold in the community, emphasizing engagement in collaborative inquiry and conversation over grades or late assignment ratios. Participants can view self-reports, and facilitators can participants' individual performance. Both groups can monitor the overall health of the community, and all data available via the tracking system fall within one of four categories, each tied to another subsystem: needs assessments, co-mentoring, conversations, and collaborative inquiry.

### **Additional Features**

The Colectivo LMS incorporates several features across each subsystem to improve accessibility and usability and enhance learner satisfaction. First, whenever possible, participants encounter multiple ways to add content to the system. Multimodal options allow for text input, file uploads, audio and video recordings, SMS-to-web connectivity, and more. Designers and facilitators can access a dashboard where available input options can be managed from a single screen.

Second, accessibility warnings flash whenever a configuration might deviate a standard of accessibility with regard to visual design, readability, or interactivity. Whenever possible, the warnings include proposed workarounds or solutions to the accessibility concern, for example, increasing the contrast between text and the background behind it. At any moment, a designer or facilitator can access an accessibility report that gauges the overall status of the class and run through a list of outstanding issues to make improvements.

Third, opportunities for learner support appear throughout the interface, in line with the finding that learning a system without difficulty correlates most strongly with perceived ease of use (Binyamin, Rutter, & Smith, 2019). A constant "Support" tab provides immediate access to assistance across multiple domains: transactional, or support related to communications within a class; pedagogical, or support related to instructional content; and technological, or support related to hardware and software, including compatibility issues and bugs. The LMS delivers support through several channels. A chatbot uses natural language processing to provide real-time responses to participant inquiries, providing links to relevant knowledge base entries, whenever possible, to provide answers. Assigned mentors and facilitators can also field questions they receive directly or through the support portal. Other participants can be alerted through the support portal when they, too, may be able to provide answers or clarity. When applicable, responses from mentors, facilitators and peers can be added to the knowledge base of support documentation to enhance the usefulness of the chatbot for future inquiries. Lastly, the LMS provides equal access to content and functionality, regardless of the device participants use to connect, addressing the concern revealed in previous research that learners do not see their phones as suitable for accessing online instruction (Bele, Mujkić, Bele, & Mujačić, 2015).



## Conclusion

To date, learning management systems have clustered around a common set of features, presenting similar affordances and limitations, with some variation in interface, ease of use, and interoperability. By and large, however, modern systems closely resemble not only one another but also their progenitors from the late 1990s. Not surprisingly, theoretical approaches have influenced the instructional designers and instructors who design and deliver online classes to a far greater extent than the technologists who build the platforms on which those classes run. Accordingly, learning and instructional design theories have influenced the implementation of LMSs to a far greater degree than the composition of the systems themselves. However, the emergence of new models and frameworks centered on communication and collaboration provides fresh opportunities to challenge assumptions about what a learning management system should accomplish. This paper has sought to provide detailed blueprints for developing a new LMS based on the principles of the Wisdom Communities Instructional Design Framework. First, relevant research was cited. Next, core design tenets were reviewed, followed by the six subsystems that comprise an LMS focused not on content but rather communication. Lastly, additional design features common to all subsystems were reviewed. We look forward to continuing to develop functional prototypes of Colectivo and to seeking out feedback from instructional designers, instructors, and students to make refinements to outlined features, refining the system in an iterative fashion.



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## Harnessing Massive Online Open Courses for Innovations in Museum Education and Beyond

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### Abstract

Exploring the shifting reach and potential of online education is key for future innovations in this space. Advances in Massive Online Open Course (MOOC) instructional design and new forms of multimedia technology, can transform teaching, facilitate multidimensional means of learning, improve public engagement, and revitalise disciplinary practices. Museum education faces many challenges in the digital age including the changing role of museums within society, online competition to the physical museum, addressing new forms of communication with a broad demographic of visitors, and the blending of the physical and the digital to improve user experience. Although many historical artefacts and collections are now available in attractive online formats, successful instructional design to harness the impact of these online artefacts within the teaching space can be challenging. This case study describes how a MOOC platform was used to present a medieval manuscript, the Book of Kells, as a learning object in the online space. Conservation issues, the physical display of multiple pages and interpretation of a complex object to a broad demographic, present particular challenges in the offline exhibition of this artefact. Online pedagogical tools were used in combination with digitised content and the platform, to reach learning objectives. A three-phase methodological approach was employed; quantitative analysis of learner data, qualitative evaluation of community engagement, and reflective practice on instructional design. Results describe how this MOOC opened a pathway to museum learning, engaged an online community to improve offline exhibitions, and presented online materials, expanding access to historical artefacts. Social learning, multimedia transformation of historical artefacts, and student creativity transformed traditional offline teaching materials into a more accessible, flexible and diverse learning experience. Learner satisfaction with MOOC content, instructional design and the scaffolding of multimedia resources was also found. However, results suggest that the MOOC not only educated learners about a topic, but also facilitated two way transdisciplinary discussion on how artefacts should be presented in the offline space. This in turn will be used to tailor the exhibition in line with public interest. This research contributes a new understanding of how MOOCs can inform practice for a field experiencing challenges in the digital age, broaden access to museum teaching, facilitate communication between museum curators and the public, and insert vibrancy into exhibitions through transdisciplinary discussions. It also presents a preliminary evaluation framework on how MOOCs can serve as a multidimensional means for learning for stakeholders such as learners, academics and institutions.

**Keywords:** Massive Online Open Course, Museum Education, Multidisciplinary Research.



## Introduction

Museum education faces many challenges in the digital age, including the changing role of museums within society (McCall & Gray, 2014), online competition to the physical museum, addressing new forms of communication with a broad demographic of visitors (Drotner & Schröder, 2014), and the blending of the physical and the digital to improve user experience (Parry, 2013). Although many historical collections are now available in attractive online formats, successful instructional design to harness the impact of online artefacts within the teaching space can be challenging.

Massive Online Open Courses (MOOCs) are large scale, web-based courses delivered by third level institutions and professional organizations via MOOC platforms such as Futurelearn, EdX and Coursera. Any individual with internet access can take a MOOC by engaging with open learning content through these online platforms. Over 101 million learners have accessed a MOOC, and more than 900 universities have used this type of online learning resource to deliver learning materials (Class Central, 2018). Social, economic, and environmental benefits of MOOCs have been mooted, both for institutions and learners (Lane, Caird, & Weller, 2014), and the open nature of MOOCs widens access to educational content for lifelong learners (F. Hollands & D. Tirthali, 2014). MOOCs can address museum education challenges by disseminating digitized museum resources and learning materials to large cohorts of the general public.

This research contributes a case study analysis of The Book of Kells MOOC delivered by Trinity College Dublin, hosted on the Futurelearn platform, and further presents a preliminary evaluation framework for multi-stakeholder learning in the MOOC space.

## MOOCs and Museums

Within the museum learning space, MOOCs have the potential to increase public access to archival content (Deacon & Kalejs, 2016), improve reusability of digitised resources, gather information from learners about the impact of a museum, and improve community outreach programs (Greenfield, 2016). These online courses could be of benefit to a broad spectrum of stakeholders, not merely learners. Lecturers found positive outcomes for museum teaching practice, engagement and outreach, learner interaction, and access to MOOC learner data (Mazzola, 2015). Curators could collaborate with MOOC learners to share new insights and ideas which could be used to plan future projects. Other stakeholders such as institutions could analyse MOOC learner activity, evaluate their museum projects, and increase visitor numbers through marketing.

Institutions such as the American Museum of Natural History (F. Hollands, M. & D. Tirthali, 2014), Museum of Modern Art (USA) (Mazzola, 2015), and National Museums Liverpool (Parry, Moseley, Gretton, Tunstall, & Mobbs, 2016) have all used the MOOC format to present, scaffold and teach materials housed in their physical museums or online catalogues.

The Book of Kells exhibition is one of Ireland's most popular tourist attractions. The 9<sup>th</sup>-century manuscript has been on display since the 19<sup>th</sup> century in the relatively confined space of the University's historic Old Library. Now considered a national Irish icon, visitor numbers have climbed steadily, peaking at just over one million in 2018. Given the books' location within a university, there is a particularly strong emphasis on



the educational aspect of the collections, both for general visitors, and undergraduate and postgraduate curricula. Conservation issues, the physical display of multiple pages, large numbers of visitors in a small, historically sensitive environment, and interpretation of a complex object to a broad demographic present particular challenges to this exhibition.

### Case Study

As part of addressing these challenges, the Book of Kells MOOC was developed by the Department of History of Art and Architecture, Loyola Institute and Library of Trinity College Dublin in 2018. Its aim was to provide insight into the history of the book, from competing narratives surrounding its creation, to its eventual home at Trinity College Dublin. It also explored how the book was made, the potential symbolism of its complex decoration, and its legacy in the modern age. Online pedagogical tools and instructional design techniques were used in combination with digitised content and the platform, to reach learning objectives.

To date, two iterations of the course have been delivered in October 2018 and March 2019, with a total of 13,428 learners accessing the course across both iterations. The majority of learners were from the United States (39%), United Kingdom (22%), Ireland (10%), Canada (6%) and Australia (4%). In total, 130 countries were represented by learners. Older learners were overrepresented in the course, with 80% of learners over 35 years and 36% over 65 years.

Step type	Description
Video	Each video contained images and subtitles and was on average, 5 minutes long. Videos were filmed on location (e.g. Kells, Co. Meath or Trinity College Dublin). Reflective questions were posed at the end of most videos to encourage discussion between learners.
Article	Text based articles were between 600 and 2000 words with images, links, recommended readings and additional resources included. Reflective questions were posed at the end of most articles to encourage discussion between learners.
Discussion question	Individual discussion questions were posed for learners to answer a big question (e.g. What did it mean to be a 9 <sup>th</sup> century scribe?).
Multiple choice question	At the end of each week, 10 multiple choice questions were posed to learners as summative assessment.
Exercise	Three multimedia exercises were included in the course; two interactive timelines and a calligraphy exercise.

**Table 1: Description of step types**

The four-week course had 59 individual 'steps'; a term denoting individual educational content pieces (e.g. video, article, discussion question, exercise or multiple-choice question). Course steps included 14 videos, 34 articles, 4 discussion questions, 4 multiple choice questions, and 3 exercises (see Table 1 for more details on step types). On aggregate, 383,356 steps were visited by learners across both iterations.



Each of the four weeks was themed, with week one looking at the history of the book, week two exploring how the book was made, week three at meanings behind its content and week four at diverse modern interpretations of the book. Various online tools and resources were used to scaffold the learning objectives and deliver content including comparable digitized manuscripts, discussion sections and online scrapbooks.

*a) Digitized Artefacts*

The digitisation of the Book of Kells served as a major learning tool within the MOOC. Learners were provided with links to digitized book folio numbers (Library of Trinity College Dublin, 2019) where they could visually manipulate the book for themselves. In many cases, learners were posed a question based on book content and were asked to access a digitized resource to answer a question. For example, an exercise using the Chi Rho folio asked learners to find and review elements on the digitized folio, and post a comment based on what they had found. The digitization of content allowed for strong interaction between learners and learning content. This was not previously possible due the minute scale of the of the artwork and to the physical presentation of single openings of the book on exhibit in Trinity College Library.

*b) Discussion Questions*

One of the central tenets of the Futurelearn platform is social learning (Futurelearn, 2019) facilitated through comment sections under each step. Discussion questions were developed to encourage social learning, ensuring the learning objectives were kept in mind. These questions were important for maintaining community engagement and encouraging critical thinking; however, they were also crucial for academics to ascertain whether the course structure was satisfactory, and if content was understood. Questions were posed both directly in line with content (i.e. within an article, video or exercise step), or a broad question designed to encourage general participation (i.e. a step in its own right).

<b>Step title</b>	<b>Discussion question</b>
Working practice	The Book of Kells originally had around 700 pages (we are not sure of the exact number). Thinking about the different elements that went in to creating the book, how long do you think it might have taken to make? What factors would you have to consider?
Commissioning the Book of Kells	What circumstances do you think might have led to the commissioning of a manuscript like the Book of Kells? Consider religious, economic or societal circumstances in your comment.
Intertwined men and animals	Find another example of these intertwined men and/or animals in the <a href="#">Book of Kells</a> . What do you think it might mean?
Mags Harnett - Scribe2Scribe:	What aspect(s) of the Book of Kells resonate most with you?
Contemporary art based on the Book of Kells	How would you translate these into contemporary text or illustration?

**Table 2: Examples of discussion questions posed**



*c) Padlet*

Encouraging learner participation and engagement was also enabled through an online scrapbook, Padlet (Padlet, 2019). Learners were presented with a video describing calligraphy used in the book and asked to draw their own image on paper. Many learners created detailed illustrations of letters using insular art techniques such as spirals and interlace, and then shared the illustration on Padlet. Over 400 individual illustrations were posted, allowing for learners not only to share their own experience and content, but to view others. This technique also supported evaluation as it demonstrated that learners understood the content and created new content based on what they had learned.

In order to evaluate the impact of the MOOC, a three-phase methodological approach was employed using mixed methods.

**Methodology**

The first evaluation phase used mixed method analysis of learner satisfaction via quantitative and qualitative post course survey data. This optional survey was shared with learners on the final step of the course. Secondly, learner comments from within the course itself were analysed to investigate learner engagement and interaction (i.e. comments under each step). NVivo qualitative text analysis software was used to analyse the text content. Thirdly, academics reflected on the course itself to ascertain whether the instructional design was successful in reaching the learning objectives.

**Results**

**Phase 1: Mixed Method Analysis: Learner Satisfaction**

Basic questions on course satisfaction were posed to learners on completion of the course. Results (n=1197) described how 98% of learners felt the course met and exceeded their expectations. The majority of learners gained new knowledge and shared this knowledge with others.

Question	Result
Did this course meet your expectations?	Better than expected 64% (n=768) Met my expectations 34% (n=406) Worse than expected 0.6% (n=8) Not sure 0.8% (n=10)
Did you gain new knowledge or skills by taking the course?	Yes 98% (n=1173) No 0.6% (n=8) Not sure 0.8% (n=10)
Since starting the course, have you shared what you learned with other people?	Yes 80.8% (n=962) No 19.2% (n=229)

**Table 3: Learner satisfaction**



Learner satisfaction with MOOC content, instructional design and the scaffolding of multimedia resources was found in the analysis of post course open-ended questions. NVivo analysis demonstrated that positive adjectives were mainly used to describe the course including ‘excellent’ (n=28), ‘great’ (n=22), ‘wonderful’ (n=20), ‘enjoyable’ (n=12), and ‘interesting’ (n=16). Other positive themes such as gratitude towards the academics and Trinity (n=81) and wishing to visit or revisit Trinity in the future (n=105) highlighted the positive impact of the MOOC for Trinity College. Instructional design was also commended by the learners with satisfaction with video content (n=52), course structure (n=17), exercises (n=8) and social learning. Access to the digital version of the Book of Kells and associated manuscripts, together with additional relevant links added to the learning experience. A small number of learners responded that they would have liked cheaper recommended books, disliked the paid element of a certificate upgrade, and found the comments distracting.

## **Phase 2: Qualitative Analysis: Learner Comments**

Qualitative analysis of learner comments suggest that the MOOC not only educated learners about a topic and encouraged engagement with digitalized artefacts, but also facilitated two-way transdisciplinary discussion on how artefacts should be presented in the offline space. This in turn could be used to tailor the offline exhibition in line with public interest, and programme future museum events. A total of 42,417 comments were posted in both iterations of the course from 4,834 ‘social learners’ (i.e. posted at least one comment). Each of these comments were posted either in response to a directed question or in response to a comment posted by another learner. Below describes two methods of facilitating MOOC community engagement, leading to discussions of value to multiple stakeholders.

### *a) Facilitating Newcomer Engagement*

Early in the first week, learners were asked to comment on the question “What is your country’s greatest national treasure?”. This simple and open question was selected as it had global appeal and encouraged learners to share geographically specific information about themselves. Research has found that providing geographical information is a common strategy for legitimacy in online community newcomers (Gallagher & Savage, 2015). Learners shared the country they were from and their perspective on a national treasure, allowing for both commenting and non-commenting learners to meet their fellow learners and watch the online community develop. A total of 4,666 comments were posted on this step, demonstrating how it functioned as a means of early community development.

This broad preliminary question served as a means for encouraging early stage discussion between learners.

### *b) Encouraging Interaction with Learning Materials*

Throughout the four weeks, directed questions facilitated strong course interaction. For example, “What did it mean to be a ninth century scribe?” prompted 2,039 individual comments. This question followed educational content on making the Book of Kells, the scriptorium, and the role of the scribe. It asked learners to reflect on the preceding four steps and share their personal opinions, rather than answering a true or false



question. This facilitated critical thinking and gave learners the opportunity to share their personal thoughts. It also showed academics that learners were internalizing and retaining learning materials.

Questions that followed a task also prompted large numbers of comments; for example, in the step “Cats in the Book of Kells” asked learners “Can you spot a cat in the Book of Kells?” and “What do you think cats represent in the Book of Kells?”. Almost 900 comments were posted with learners noting which folios they believed they saw a cat (i.e. they interacted with the online book), and what they felt they represented, such as industriousness, loyalty, and daily life (i.e. they reflected on their learning).

These within-course questions were crucial for inspiring learner interaction and content engagement, supporting academic evaluation of instructional design, and building a positive online community.

### *c) Curate the Book of Kells*

At the end of the course, learners were asked what they would do if they were the curator of the Book of Kells. Designed to aid reflection on the course as a whole; learners were prompted to consider all course elements, what topics were most important, and how to make to the book interesting for visitors in modern times. This served multiple purposes; for learners it encouraged reflection on all elements of the course, reinforcing what they had learned; for academics it highlighted whether learners were recalling what they had learned and their feedback on the course; for museum curators it gave ideas and insight from the general public about the exhibition. Learners posted 997 comments across both iterations on this step.

Suggestions for the onsite museum included having interactive areas or workshops where people could practice calligraphy, copy illustrations, mix dyes, and bind their own books. Integrating more technology into the exhibition was a common theme, such as using digital content in touchscreen kiosks (i.e. zooming in on digitized versions of the book and watching MOOC videos), interactive images, smartphone integrations, virtual reality and 3D scenarios. Conversely, physical pieces such as a scriptorium display, authentic tools, and a touchable replica of the book were also suggested.

In terms of content, there was disagreement between learners as to the fourth week of the course; modern interpretations (i.e. the book as a national symbol, as inspiration for modern literature etc). Some learners felt that it was irrelevant, whereas for others, it was their favourite week. The history of the book was noted as important learning content, and meanings behind illustrations should be integrated into the museum through large displays or quiet rooms for reflection and mediation.

Other suggestions such as staging interactive activities or calligraphy stations while visitors are waiting in queues, having resources for younger visitors (e.g. graphic novels), visual timelines, and Q and A sessions were shared.

### **Phase 3: Reflective Practice**

Academics reflected on the MOOC both during and after implementation. Particularly valuable was in the way in which learners from very different cultural/ academic backgrounds shared their insights in a

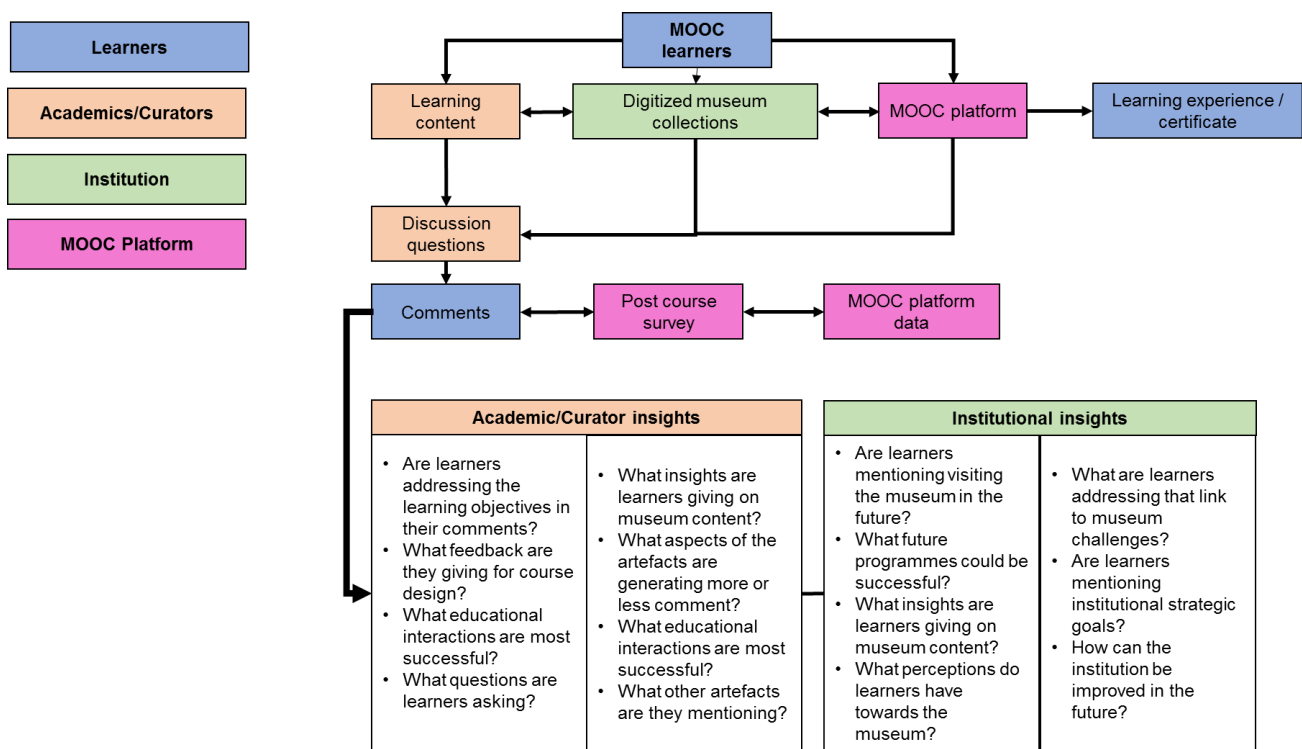




surprisingly positive and learned way, greatly enhancing the perspectives through which different themes were discussed and additional resources shared. This helped to inform teaching practice, both online and offline, and ideas for how the exhibition might speak to a wider audience. Also unexpected was the degree to which the MOOC helped to raise personal and institutional profiles of the MOOC providers. This was demonstrated through direct feedback, (by email or letter) e.g. requesting further similar courses, attendance by MOOC learners at public talks given by academics, both in Ireland and abroad and the significant numbers of learners who stated a desire to either revisit the Book of Kells exhibition or visit it for the first time now that they ‘knew more’.

### Preliminary Evaluation Framework

This research identified how discussion between learners, scaffolded by the MOOC platform, could support multi-stakeholder learning. Having explored the qualitative data from the course, a preliminary framework on how MOOCs can serve as a multidimensional means for learning for stakeholders such as academics, curators, and institutions is posed.



**Figure 1: Evaluation framework for MOOCs as a multi-stakeholder means for learning**

This framework can be used for evaluation purposes post-implementation. However, it is not limited to the museum learning space, and could be tailored to any discipline.



## Conclusion

MOOCs can be a means for supporting, promoting, and augmenting museums and their digitized assets. They can improve museum curation by facilitating critical commentary on artefacts and exhibitions, widen access to exhibitions that may be time-limited or oversubscribed, and give learners a taste of an exhibition prior to visiting. Increased visits to the museum due to MOOC marketing could help low performing museums, but conversely, MOOCs could augment a physical exhibition where there are space restrictions or visitors from a broad demographic who might have different interpretative requirements/preferences. Digitization of visual materials, discussion questions and online scrapbooks can be used in tandem to scaffold the learning objectives and encourage participation and engagement.

Results describe how this MOOC opened a pathway to museum learning, engaged an online community to improve offline exhibitions, and expanded access to complex historical artefacts. Social learning, multimedia transformation of historical artefacts, and student creativity transformed traditional offline teaching materials into a more accessible, flexible and diverse learning experience.

The preliminary evaluation framework presented is limited to the museum space, however, it could be refined and expanded to other disciplines (e.g. healthcare, business, professional learning). In effect, the discipline is not the focus on the framework, but the structure could be used to present the benefits of MOOCs in any discipline. It could be used both for development or evaluation purposes; MOOC developers should consider what they will learn from learners, and how they can develop the course in terms of their needs. Institutions should be aware of the power of MOOCs for marketing, increasing access to online materials and onsite visitor numbers.

This research contributes a new understanding of how MOOCs can inform practice for a field experiencing challenges in the digital age, broaden access to museum teaching, facilitate communication between museum curators and the public, and insert vibrancy into exhibitions through transdisciplinary discussions. It also presents a preliminary evaluation framework on how MOOCs can serve as a multidimensional means for learning for stakeholders such as learners, academics and institutions.

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## Online Education and Public Servants: Towards a Capacity Development Results Framework

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### Abstract

In the Philippines, attempts have been made to modernize the public sector through the use of Information and Communications Technology (ICT) that aims to deliver public services to the citizens in a more efficient and effective manner. Further, it has also been increasingly recognized that the use of ICT in education or online education can also develop the capacities of public servants to enable them to perform their tasks leading to better lives and futures. Online Education can deliver skills training and capacity development programs; offering self-paced and flexibility to choose content and appropriate tools. Online Education is a capacity development strategy for the public sector. Public servants can be trained at minimum costs. Moreover, it can reach people with different responsibilities such as top management and people who cannot afford to be away from home or office (Msomi, Munapo, & Choga, 2016). However, despite the initiatives of various countries in utilizing online education for public servants, there is no concrete framework on how to determine the results of this development strategy. Assessment of capacity development programs has always included three generic elements; namely; institutional; organizational and the individual level. However, in the use of online education, it is also important to include e-learning competencies of learners which is also an important factor in determining learning outcomes. This paper aims to propose a framework on how Online Education as a capacity development tool for public servants can be evaluated. It is important to put together indicators for capacity development and online education. This is important in order to determine how online education can be designed and enhanced to be more effective. Specifically, the paper aims to:

- a) Identify the environmental factors (policies, socio-economic and political) that could affect the implementation of Online Education;
- b) Determine the organizational factors (internal structure, processes) necessary to implement Online Education; and
- c) Discuss the e-learning competencies of learners (learner autonomy, reflection, etc.) to ensure success of the online program.

The study forms part of the dissertation proposal of the researcher and will utilize a review of literature related to capacity development and online education. The framework will be used in evaluating the implementation and learning outcomes of the Online Course of the University of the Philippines Open University, specifically the Master of Public Management Program which caters to public servants.

**Keywords:** Online Education, Capacity Development, Public Servants

## I

### Introduction

The field of education is one of the beneficiaries of technological advancements in recent years. Information and Communications Technology (ICT) has enabled education to become more accessible and inclusive as learners are more flexible on what and when to learn including how to choose content and tools. It can also deliver skills training and capacity development programs specifically targeted to public servants and decision makers. Msomi et. al. (2016) claimed that the goal of online learning for public servants is “to ensure that larger number of government officials are trained at minimum costs and that training reaches people with different responsibilities such as top management and people who cannot afford to be away from home or office.”

However, despite the initiatives of various countries in utilizing online education for public servants, there is no concrete framework on how to determine the results of this development strategy. Assessment of capacity development programs has always included three important elements; namely; institutional; organizational and the individual level. On the other hand, the results of Online Education can be assessed based on organizational capacity as well as learning outcomes.

### Objectives

This paper proposes a framework on how Online Education (OE) as a capacity development tool for public servants can be evaluated. It aims to determine the contribution of online education to capacity development of public servants. Moreover, it is expected that having public servants who have the necessary knowledge and skills could lead to better crafting and implementation of policies and programs as well as more efficient and effective delivery of public services. The framework will be utilized by the researcher in assessing the case of Master of Public Management Program of the University of the Philippines Open University.

### Specifically, the objectives of the paper include the following:

- a) Identify the environmental factors (policies, socio-economic and political) that could affect the implementation of Online Education;
- b) Determine the organizational factors (internal structure, processes) necessary to implement Online Education; and
- c) Discuss the e-learning competencies of learners (learner autonomy, reflection, etc.) to ensure success of the online program; and
- d) Determine the possible learning outcomes of online education at the individual level.

### Methodology

The study conducted a review of various online materials like journals and articles published by different development agencies. The review covered materials related to capacity development and online education.



### *Online Education as a Capacity Development (CD) Strategy*

Capacity Development (CD) has been defined differently by various development agencies. They define CD as an approach, a process or even an objective. Hope (2009) noted that capacity development has several definitions or conceptualizations. In these definitions, CD could be regarded, for example, as an instrument, a process, an objective, a general approach to development, as well as a change and transformation framework (Hope, 2009). Bolger (2009) provided examples by saying that the definition of CD as an approach could be “towards the reduction of poverty” while CD as an objective could refer to “targeting the development of an individual or organizational capacity.”

According to Lavergne and Saxby (2001 in Abdul & Ferdinand, 2014), “Capacity Development (CD) is a process by which individuals, groups, organizations and societies enhance their abilities to identify and meet development challenges in sustainable manner. Hope (2009) noted that CD is not a stand-alone training intervention but rather a strategically coordinated set of activities aimed at individuals, institutions, and sectors. The process must be owned and managed by the developing countries rather than their external partners. Oshionebo (2002) also mentioned that education/training is being regarded increasingly as the catalyst for social development and this could be accomplished through training and education provided by schools, colleges, universities and professional training and management institutions (in Abdul & Ferdinand, 2014).

CD interventions targets the knowledge and skills of people which usually come in the form of training and education. Vallejo and Wehn (2016) noted that CD interventions are implemented in diverse modes such as formal (basic and higher) education and distance learning; advisory services and peer learning to foster change and innovation within organizations and institutions; partnerships, knowledge networks, and collaboration for social learning; and leadership development of individuals and organizations to effect change.

Hope (2011) identifies Online Distance Learning (ODL) as one of the strategies that developing countries could adopt to address capacity deficit. This approach utilizes technology that allows online communication and expands access to training for a larger number of employees compared to classroom training. The use of ODL or Online Education (OE) has become prevalent in recent years as more countries have started utilizing ICT in education or online learning. Srećko Joksimović, et. al. (2009) tried to look at the various terms related to online education such as online learning, e-learning, distance education, computer mediated learning; and came up with a definition of online learning as “a form of distance education where technology mediates the learning process, teaching is delivered completely using the Internet, and students and instructors are not required to be available at the same time and place” (in Jefferies, 2009).

The Web-edu project uses a definition of online education that is based on Keegan's (1988, as cited in Paulsen, 2002) definition of distance education which is the separation of teachers and learners that distinguishes it from face-to-face education; the use of a computer network to present or distribute some educational content; and the provision of two-way communication via a computer network so that students may benefit from communication with each other, teachers, and staff (in Sabri g. Bebawi, Definition of Online Education as Distance Learning in <http://www.sabri.org/EDTECH-01/Definition.htm>).



### *Online Education and Public Servants*

In the context of public administration, it is important to identify who are public servants. The term “Public Servants” is a broad description of people working to achieve the greater good. Whether they are employed in the private or public sector, so long as their work serves the general public, they are called “Public Servants”. An inclusive definition of the term is “someone working in public services (even outside the public sector)” (Needham & Mangan, n.d.).

Public servants are entrusted with the responsibility of carrying out tasks of the government and providing services to the public. One factor that is unique to the public sector is the environment where they operate, given the political, social, economic and technological aspects which affect the implementation of government services. Public servants are expected to work in the executive, legislative branches of government including local government (Hayes and Reeves, 1984 as cited in Cabo, 1997)

UNESCO (2011) noted that the need for capacity seems to be more important in less developed countries and post-conflict states. This is because they are confronted by and vulnerable to several issues such as natural disasters, political issues and even security problems. Moreover, there is also an issue regarding ‘brain drain’ of qualified leaders, managers, researchers, scientists and workers in nearly all economic sectors. Capacity deficit not only affects the governance system but also threatens sustainability of technical cooperation and in achieving national and international development (UNESCO, 2011).

There is also a recognition on the need to integrate the use of ICT for capacity development of public servants. The use of ICT in human resource strategies is seen to improve the managerial, technical and professional skills of public employees (Committee of Experts on Public Administration, 2009). In terms of implementation of online education for public servants, the G20 countries (during the Moscow summit in 2013 noted the importance of human resource development and high level of performance among government staff, hence the concerned countries embarked on the use of e-learning as a means for education and lifelong learning (Ramona Camelia BERE; Catalin Ionut SILVESTRU and Lavinia Nemes, 2013).

Other public sectors around the world that have also utilized online education or e-learning within their organizations include the Korea Central Officials Training Institute (COTI) which introduced e-Learning for Korean government employees in 2009 (Hur and Im, 2013, p. 192 as cited in Msomi, et. al., 2016). Moreover, Msomi, et. al. (2016) also conducted a study on the conceptualization of e-learning in the public sector in South Africa. They noted the processes that needs to be followed in order to conceptualize e-learning in an effective and efficient way. In the case of Romania where they introduced blended learning to public administration, they concluded that connecting projects and activities that include training for public servants can contribute to ensuring efficiency and sustainability of e-learning (Ramona Camelia BERE; Catalin Ionut SILVESTRU and Lavinia Nemes, 2013). In Zaheer, et. al.’s article, they also discussed the role of e-learning as a tool for capacity building in developing countries, specifically in Pakistan. E-learning, as a tool for capacity development, addresses the issue of access to and quality of education (Zaheer, Jabeen, & Qadri, 2015).

Despite all these initiatives, there is very little effort to evaluate the use of online education to strengthen capacities. Hence, it is important to come up with a framework that will be able to determine the contribution of online education public administration.



## Towards a Theoretical Framework on the Use of Online Education for Capacity Development of Public Servants

In crafting a framework, there are two concepts that are considered – capacity development and online education. Based on the review of literature, there are proposed frameworks for CD but not related to Online Education. Although CD cuts across several social science disciplines, there is no agreed theoretical framework that would encompass all the various approaches, much more with online education as a CD approach. Kotvojs (2017) noted that there has been little guidance on how to evaluate capacity development activities. It was only in the late 2000s that a small number of models for evaluation of capacity development emerged.

For purposes on how CD results can be the illustrated, the Capacity Development Results Framework proposed detailed indicators that can be customized. This framework was aimed to increase the impact of aid in developing countries as well as to harmonize development efforts by various development organizations (Development Assistance Committee, 2008). It provided a common framework for: a) analyzing capacity constraints and opportunities with respect to any development goal in a country or local context; b) understanding the need for capacity development; and c) communicating about the results of capacity development efforts (Otoo, Agapitova, & Behrens, 2009).

The other framework is related to Online Education and it focused on organizational capacity and e-learning competencies of online learners. Learning tasks are designed in order to achieve the course objectives and learning outcomes. Hence, in an online education environment, it is important to consider the basic e-learning competencies that learners must have.

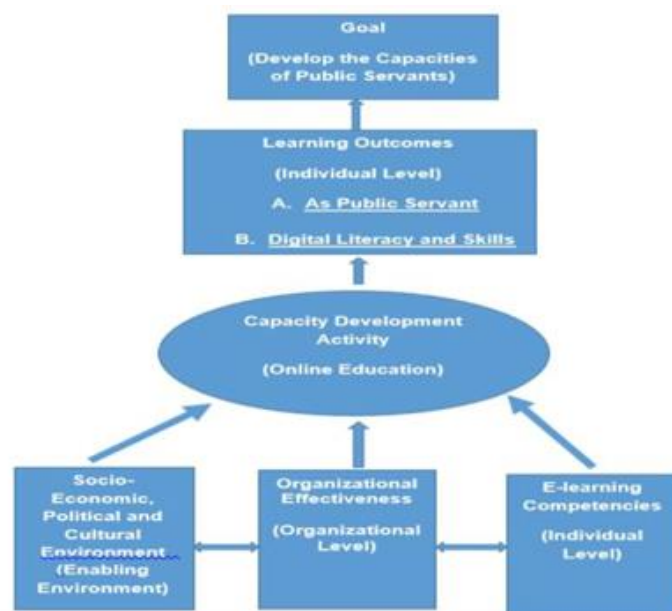


Figure 1: Proposed Capacity Development Framework for Online Education for Public Servants

### Explaining the Proposed Capacity Development Results Model for Online Education

The study proposes a framework that will integrate indicators of CD as well as Online Education. (See Figure 1.) The framework draws primarily from the Capacity Development Results Framework as proposed by Otoo,





et. al. (2009). Moreover, it focuses on the three levels of CD which is on the institutional, organization and individual levels. For the Online Education, indicators, it will use the indicators based on indicators of Quality Assurance by Jung, et al. and the e-learning competencies based on Parkes, et. al. (2013).

### **Factors affecting online education as a capacity development strategy**

There are three factors that could affect the implementation of Online Education, namely: a) the enabling environment (political, socio-economic and cultural environment; b) the organizational level (refers to the institutional factors affecting the implementation of Online Education); and c) the individual level (e-learning competencies).

#### *a) Enabling Environment (Political, Socio-Economic and Cultural Environment)*

The enabling environment that affects Online Education includes, political, socio-economic and cultural environment. Governments are expected to address basic issues like internet access with adequate infrastructure, language, computer literacy, etc. (Liyaganawardena, Y., Williams, S. and Adams, 2013). To ensure sustainability, it is important that policies are in place to serve as framework for the use of online learning. The policies serve as guides for institutions that want to harness the full potential of online education. If the government is not so supportive with this endeavor, then chances of failure is more likely to happen. Powell (2011), compared the effectiveness of the governments of Canada, U.S, and New Zealand in promoting online learning. He explained that in Canada and in the U.S, state governments are the ones creating policies for education. Powell found that while there are states that foster and promote online learning, there are some states that do not. This results in an uneven development of online learning.

This is supported by Smith (2012) who noted that government support, higher education policies, technological resources, cultural biases, and organizational rules can influence online learning in terms of its quality, accessibility, and efficacy. One important reason that online courses can have so many different outcomes is because there are larger political, economic and organizational influences that are guiding the implementation, practices and ultimately consequences (Smith, 2012). Bolger (2000) also noted that poorly conceived policies, high levels of corruption, or lack of legitimacy can make for a highly 'disabling' environment, while sound policies, high levels of commitment, effective coordination, and a stable economic environment can provide an enabling environment.

Aside from enabling policies, Bere, et al. (2014) noted that ICT infrastructure is a prerequisite for online learning and knowledge sharing for public administration. Before implementing any online program, it is important to look into possible challenges which include ICT infrastructure. Their study looked into the level of development of infrastructure among the G20 countries in 2010 and 2012. They found out that countries with high levels of infrastructure development are all high income countries from Europe, North America and Australia compared to the countries with lowest development of infrastructure include South Africa, Indonesia and India (Ramona Camelia BERE; Lavinia NEMES; Catalin Ionut SILVESTRU, 2014). Hence, in countries whose economies are struggling, acquiring the technologies for online education and allotting budget for the development of courses might be the least priority. On the other hand, developed countries have lesser problem with infrastructure. Tarus, Gichoya and Muumbo (2015, pp. 131-133) noted the situation in Kenya wherein e-learning implementation is hampered by not having proper ICT infrastructure such as computer labs, computers and network/internet connectivity and expensive internet bandwidth (as cited in Msomi et al., 2016).



Some specific ICT Infrastructure-related factors include expenses for online education technologies including software licenses and equipment maintenance, internet connectivity, and electrical supply. The lack of ICT infrastructure and support shows how technology itself becomes a hindrance for certain technological advancements. One social barrier that is often cited is the lack of ICT skills and knowledge of online courses which leads to resistance to open education and e-learning. A lot of developing countries still need to address the issue of illiteracy hence this can serve as a challenge. Given that they will be able to solve illiteracy per se, they then have to follow it up with digital and information literacy in order to equip learners with the critical skills in handling the voluminous information they can access online. It is also aggravated by the lack of understanding of the time needed in online learning (Stoffregen, Pawlowski, & Pirkkalainen, 2015). Culture also seems to play a role in online learning. For example, study by Mavengere and Rouhonen (2010) in Botswana as mentioned in Basak, Wotto and Belanger (2017) revealed that there are still some adjustments needed with the collaboration or sharing culture (Basak, Wotto, & Bélanger, 2017).

#### *b) Organizational Factors*

The effectiveness of organizations in implementing online education is considered to be another important factor in capacity development. Otoo, et. al. (2009) noted several indicators for organization arrangements which include clarity of mission; achievement of outcomes; financial viability; support of stakeholders; and adaptability in anticipating change.

The JICA (2004) also identified variables that could influence an organization's performance" which includes: human resources (capacities of individuals in the organization); physical resources (facilities, equipment, materials, etc.); intellectual resources (organization strategy, strategic planning, management, business know-how, production technology, program management, process management (e.g., problem solving skills, decision-making process, communications, etc.); inter-institutional linkage (network, partnership, etc.); incentive and reward systems; organizational culture and leadership of managers (JICA, 2004). It also refers to the internal structure, policies and procedures that determine an organization's effectiveness. (UNDP, 2010).

Studies on organizations implementing online education are anchored on indicators of quality assurance. In a study conducted by Jung et al. (2010) on quality assurance of distance education in Asia, they have identified 12 key areas of quality standards. These include:

- Vision, mission, values, and/or goals;
- Assessment and evaluation;
- Educational resources;
- Leadership, governance, and administration;
- Finance;
- IT infrastructure;
- Teaching and learning;
- Curriculum and course development;
- Student support;
- Faculty and staff;
- Internal QA system; and
- Research (Jung et al., 2011).



According to the study of Jung, et. al. (2011) of 11 Asian countries, only five of these 12 QA indicators were adopted by all these cases. They include: vision, mission, values and/or goals, assessment and evaluation, educational resources, teaching and learning, curriculum and course development; and student support. Some institutional barriers were also noted in the study of Basak, et. al. (2017). Insufficient departmental support (Meyer and Warnich, 2010); leadership support (Mavengere and Ruohonen, 2010); school leadership (Namafele, 2010), internal investment (Zhu and Mugenyi, 2015); and lack of support for training (Vencatachellum and Munusami, 2006) were identified to be some of the institutional barriers affecting online learning (Basak et al., 2017).

*Individual Factors*

One of the determinants on the success of Online Education lies at the individual level wherein there is a level of commitment as well as competencies that is required from the learners. According to Parry (1998), competencies are clusters of related knowledge, skills and abilities that correlate with effective performance in the task or role at hand. They are measurable and can be developed and improved (as cited in Parkes, Reading, & Stein, 2013). They include the following Parkes, et. al. (2013) identified the following e-learning competencies based on the literature:

E-learning Competencies	Description
Student Autonomy	decisions about when and where learning should take place; identifying learning outcomes; determining how learning outcomes will be achieved
Self-direction	self-awareness, self-monitoring, self-initiative, self-discipline and self-evaluation
Time Management	ability to set and prioritize goals, balance work and family with study commitments
Reflection	ability to reflect and build a bridge between what they already know and what they have learned, thereby engaging and making sense of the content
Computing and Internet Skills	ability to use browsers and search engines; understand URL configurations; locate websites; navigate through hyperlinks; evaluate web content; download and install plug-ins to view multimedia files; use tools that enable asynchronous and synchronous communication; and engage in collaborative and distributed learning activities
Interaction	ability to communicate with other learners and instructors, and technology
Identity and social presence	Degree or feeling of feeling, perception and reaction to others in an online environment.

**Table 1: E-learning Competencies and Description (Based on Parkes, et. al., 2013)**



## Learning Outcomes

The learning outcomes will be measured at the individual level. The online learners are expected to gain knowledge and skills that would help them in their tasks as public servants. Moreover, they will also improve their digital literacy and skills. For the learning outcomes, the indicators that will be adopted are taken mostly from the proposed capacity development framework designed for the World Bank. Bolger (2000) noted that e-learning provides opportunities to citizens to acquire different skills like communication, interpersonal, management and leadership skills that facilitate the capacity building of individuals as well as of organizations (a cited in Zaheer, Jabeen, & Qadri, 2015). As a public servant, the expected learning outcome will include the following:

- Raised awareness on public management
- Enhanced/New Skills related to the job as public servant
- Improved Teamwork in the office
- Fostered Coalition and Networks with other agencies
- Formulated a Policy/Strategy
- Implemented a Policy/Strategy (Based on Otoo, et al. 2009)
- Other outcomes (promotion, career improvement, etc.)

It is also expected that e-learning competencies will improve and result to:

- Improved autonomy
- Developed Self direction
- Improved Time Management
- Developed Critical Reflection skills
- Improved Computing and internet skills
- Improved Online Interaction and communication skills
- Improved identity and social presence (Based on Parkes, et. al;, 2013)

### *Capacity Development Goal*

In the proposed framework, the goal is to strengthen the capacities of public servants in carrying out the task of government and delivering public services. Hence, it is expected that they will gain knowledge; enhance their skills and competencies; improve their attitudes towards delivering public service. Consequently, it is also expected that this will contribute to better crafting and implementation of policies as well as more efficient and effective delivery of public services.

## Conclusion

Online Education is recognized as a capacity development strategy for public servants. Hence, it is important to come up with a framework in order to determine its contribution as a capacity development strategy. The proposed framework integrates indicators based on capacity development models as well as online education, particularly e-learning competencies. The framework proposes three important factors affecting the implementation of Online Education; namely: the enabling environment, the organizational indicators, and the individual factors. The learning outcomes can be measured at the individual level wherein there is an improvement in the knowledge and skills as a public servant, complimented by the improved digital skills



and competencies. The framework will be utilized in determining the learning outcomes of the Master of Public Management Program of the University of the Philippine Open University.

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## Empowering Learners in India Through Open Schooling: A Status Paper

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### Abstract

Education is a continuous process to which people from all ages and backgrounds should have access. Open Schooling provides opportunity for individuals to complete their school education anytime in life with its in-built flexibilities. It has gained recognition as an effective and alternative method of schooling in India after the establishment of the National Institute of Open Schooling (NIOS). The NIOS was established by the Government of India to cater to the educational needs of school drop-outs and disadvantaged groups. Today, it is the largest Open Schooling System in the world with a cumulative enrolment of 2.81 million. Its mission is to reach all by breaking physical, mental, socio-economical, geographical or any other barriers. The NIOS uses new technologies for training and teaching purposes mainly to increase access and ensure quality. In the year 2016, the institute was conferred COL's Award of Excellence for Institutional Achievement in Distance Education in recognition of its quality. With its open and flexible approach, the institute has trained about 1.5 million previously untrained in-service elementary teachers in a short span of time. The following issues will be discussed in the paper:

1. Impact of ICT in improving access to open schooling in India
2. Contribution of NIOS in skill development
3. Recognition of its On-Demand Examination System
4. Training of in-service untrained elementary teachers

This paper will highlight the role of NIOS with its various learner-friendly characteristics and its emergence as a potential and powerful system of education in India.

**Keywords:** Access, Quality, Flexibility, Openness, Training, Technology

### Introduction

In the age of Science and Technology, education plays a vital role in the economic, social and cultural development of a country. Several empirical studies have revealed that education has a positive correlation with productivity and thus, there is need for lifelong learning. Substantial efforts towards the goal of universalization of education made by the State Governments and the Central Government of India, have resulted in a phenomenal increase in the percentage of enrolment at all levels of education in the country. The innovative schemes and policies launched by the State Government have reduced the percentage of school dropouts at the primary, upper primary, secondary and senior secondary levels. Yet, 62.1 million children are out of school in India due to various reasons, one of which is rigid regular system of education. The number of school dropouts is continuously increasing in society. The Open and Distance Learning (ODL) system of education has been designed to overcome all these hurdles that inhibit universalization of secondary education.



## The National Institute of Open Schooling

The National Institute of Open Schooling (NIOS) was established by the Government of India in 1989 with the objective to serve the educational needs of school dropouts, out of school children, marginalised groups of the society and differently abled people through open and distance learning. An autonomous organization under the Government of India, Ministry of Human Resource Development (MHRD), it is the largest open schooling system in the world with around 2.02 million learners currently on roll at the secondary and senior secondary levels. NIOS has a widespread national and international network with 22 Regional Centres, 3 Sub-Centres and about 6,622 study centres for its Academic and Vocational Programmes within and outside the country. The annual enrolment rate in NIOS is approximately 5,00,000 learners. The NIOS offers courses at primary, secondary and senior secondary levels and various vocational education courses and life enrichment programmes through open and distance learning mode. It also offers teacher education programmes such as Diploma in Elementary Education (D.El.Ed.) and Professional Development Programme for Elementary Teachers (PDPET).

Of the 105 million children who drop out of school every year, 10 million differently abled children who are excluded from the mainstream education system and 240 million adult illiterates who do not have access to a regular education system derive educational benefit from NIOS. In addition to them, sports persons who must train and travel all through the academic year and persons with chronic medical illness or learning disorders benefit from this system. Thus, NIOS caters to the needs of a heterogeneous group of learners at the school education level in India. However, the target groups of NIOS include:

- Out of school children
- School dropouts
- Girls and women
- Scheduled castes and tribes
- Rural people
- Urban poor
- Unemployed
- Partly employed
- Differently abled children
- Minorities

The special features offered by NIOS fulfil the requirement of the learners belonging to different client groups. These features are as follows:

- It imposes no maximum age limits but expects learners to be 14 years and above.
- It offers various choices of subjects including many regional languages for academic and vocational courses.
- Choice is also offered in the mediums of instruction.
- A learner can combine Academic and Vocational subjects.
- Every learner is given five years' time and nine attempts to clear the examination which helps in reducing the psychological pressure on the learners.





- There is a provision of On Demand Examination System at the secondary and senior secondary levels conducted throughout the year.
- There is a facility of Transfer of Credits from other national and state level boards.
- Part admission is also available wherein a student can take admission in one or more subjects and on passing, will be issued only the statement of marks.
- It provides multimedia study materials, including audio and video to supplement the printed self-learning modules.
- Provides continuous assessment through Tutor Marked Assignments (TMA)
- It provides Learner support through its study centres which organise Personal Contact Programmes (PCP).
- It provides 24 x 7 Call Centre support to its learners.
- Online admission facility is available 24 x 7
- There is a facility of e-service for correction and updating of records

#### *Use of Information and Communication Technologies (ICT) in NIOS*

The NIOS strives to use ICT in almost all of its activities and programmes, particularly as a significant strategy for "reaching the unreached". The usage of ICT for facilitating learning definitely is a thrust area for enhancing the quality of courses offered by the National Institute of Open Schooling (NIOS). The focus in recent years has been a transition from print-based instruction system to the ICT supported instruction dissemination.

NIOS provides multi-channel, multiple media teaching-learning packages for instruction and self-learning. The different components used for teaching/learning include self-instructional print and audio-video materials, radio and television broadcasts, face to face counselling/tutoring, laboratory and hands-on experience, teleconferencing, video conferencing, interactive radio counselling, interactive multimedia CD-ROM and Internet-based learning, and the use of mobile phones for instant messaging.

Mukta Vidya Vani, a web radio programme is also being used as a means of communication for learners. Educational programmes are broadcast regularly on different topics of secondary, senior secondary, vocational and teacher education to educate students. An application called "NIOS Connect" helps to gather information on various programmes offered by the NIOS. Community Radio Service has been launched by the NIOS, covering a radius of 10-12 km to be able to reach out to more than 10 lakh listeners for 3-4 hours every day. This facility is used to create awareness amongst the local communities, in general and particularly the learners who are enrolled in the NIOS for various courses.

#### **NIOS Online (e-Governance)**

The Ni On Project, a unique initiative in the field of school education, which is conceptualised to enable NIOS to move in the direction of e-governance so that it can provide better educational services to its learners as a service provider and also improve efficiency, transparency, accountability and cost effectiveness with high quality. Such an e-governance initiative has not only helped to bring about a structural transformation of NIOS to a higher level of openness in education but also allows NIOS to play a lead role in the horizontal transfer of this technology to other State Open Schools and Open and Distance learning institutions of developing world.



## Admission

NIOS took a significant step of providing the facility of On-line Registration for admissions and On-Demand Examinations under the NIOS Online (Ni-On) Project. Salient features of online admission include:

- Admission process made simpler and faster
- Freedom to select study centres of choice through a computerized system on a first come first served basis
- Admission open throughout the year
- Improved Learner Support Services and faster addressing of problems

### *On-line Course material:*

The entire NIOS course material is available on the NIOS website for the benefit of its learners. The syllabus, Tutor Marked Assignments as well as question papers of previous examinations held are also available on the website.

### *Student Information System:*

The student information system beginning from registration to certification has been computerised. So also are the processes of registration, scanning of admission forms, pre-examination work, conduct of exam, secrecy work, spot evaluation, result processing and result declaration.

### *Learner Support Centre (LSC):*

As part of the NIOS on-line initiatives, a Learner Support Centre (LSC) is established to address the grievances of the learners, be it for admission, examination result, TMA, issue of Identity Cards, general counselling etc. The LSC functions on the pattern of a call centre with on-line support in the form of counselling by trained executives. The LSC functions with the support of toll free service at 1800 180 9393 by the caller. Proper connectivity is established with the NIOS Regional Centres for better and effective communication services.

### *Examination*

The National Institute of Open Schooling (NIOS) conducts two examinations during April and October every year. While trying to enhance flexibility in the timing of summative assessment, NIOS came up with the innovative concept of ICT based On-Demand Examination (ODE), where assessment takes place when the learner considers himself/herself ready to take an examination on one or more subject. Not only is ODE independent of time but it also allows the learners to improve their performance until they are satisfied with the mastery level set by them individually. Thus, ODE has extended and enhanced the dimension of openness in the Open Schooling System where examination is self paced and the degree of performance is controlled by the learner. Undoubtedly, such a system provides a more flexible evaluation system vis-a-vis the traditional fixed schedule Public Examination. ODE also reduces pre-examination stress. Significant characteristics of ODE include:

- ODE allows the student to take the examination when he/she feels they are ready. Readiness depends on the Student and not on the institution.
- ODE permits the student to choose the date of his/her examination.
- ODE reduces the threat of failure in examination.

- ODE removes frustration, loss of self esteem, peer group ridicule, and depression that are generally characterized by the Term-End Examination.
- Under ODE, the degree and level of performance is decided by the student who can reappear in the examination as many times as s/he wants, till satisfied.
- ODE is also helpful in eliminating malpractices in examinations, as it is a system where the tools for evaluation are unique for every individual student. The question paper for each Student is different having comparable difficulty levels.
- ODE respects the individuality and sovereignty of the student.

The implementation of the On-Demand Examination has proved that it is learner centric, learner friendly and stress free examination system. It has established transparency in the examination system. Use of ICT has facilitated generation of 5.3X10<sup>4</sup> different Question papers from mere 1000 Items in its Item Bank. The On Demand Examination is conducive to establish the autonomy of learner in the pace of study. If the Open Learning System is able to provide the facility of On-Demand Admission and On-Demand Examination, it would bring about a revolutionary change in the education system.

### **Vocational Education Programme**

To create employment opportunities, NIOS provides a programme based on the need for Vocational Education and Training (VET) and responding to the growing demand of skilled manpower, NIOS offers various vocational education courses in new areas.

A wide range of courses pertaining to different trades and vocations are offered. At present, approximately 59 vocational subjects in the following areas are available through a strong network of Accredited Vocational Institutions (AVIs) all over the country.

- Agriculture and Animal Husbandry
- Business and Commerce
- Computer Science and Information Technology
- Engineering and Technology
- General and Life Enrichment Courses
- Home Science and Hospitality Services
- Health and Paramedical Sciences
- Library and Information Sciences
- Safety and Security Services
- Teachers Training

Presently, 103 courses are on offer in the broad areas of Agriculture and Animal Husbandry, Business and Commerce, Computer and Information Technology, Engineering and Technology, Health and Paramedical, Home Science and Hospitality Management, Teacher Training etc. Many of the vocational courses are in collaboration with the industry. Revision of courses is being carried out in the light of the National Skills Qualification Framework (NSQF). These vocational courses will be industry driven based upon National Occupational Standards (NOS) set by Sector Skill Councils (SSCs) in the following sectors - (a) Agriculture and



Animal Husbandry. (b) Information Technology. (c) Health and Paramedical. (d) Home Science and Hospitality

## **SWAYAM**

“Study Webs of Active Learning for Young Aspiring Minds” (SWAYAM) is a MOOCs platform programme initiated by Ministry of Human Resource Development, Government of India and designed to achieve the 3 cardinal principles of Education Policy viz., access, equity and quality. Massive Open Online Courses (MOOCs) are free online courses available for anyone to enrol. MOOCs provide an affordable and flexible way to learn new skills, advance your career and deliver quality educational experiences at scale. The NIOS has been identified as one of the partners of the National MOOC initiative for SWAYAM. The courses through SWAYAM are being delivered at secondary and senior secondary levels on the principals of four quadrants of learning –audio/video tutorial, e-content, e-resource (web support, chat, blog, discussion forum) and self-assessment through an indigenous IT platform that facilitates hosting of all courses. NIOS is developing online courses at school level for out of school learners and Elementary Teacher Education. There are 44 courses of NIOS being offered on SWAYAM Platform - 14 at Secondary level, 16 at Sr. Secondary level, 4 Vocational courses and 10 courses of Diploma in Elementary Education (D.El.Ed.). The objective of this effort is to provide the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

## **Virtual Open Schooling**

NIOS launched the Virtual Open Schooling (VOS) during the year 2014-15 to serve learners through online courses for their education and skill development. The VOS Platform of NIOS has a Learning Management System (LMS) for giving information and direct interaction among learners and teachers in respect of Online Admission, Discussion Forum, Blogs, Online Classes through Video Conferencing, Online Assessment, etc.

Currently, NIOS is offering two Vocational Education Courses under VOS:

1. Certificate in ICT Applications
2. Diploma in Rural Technology

## *Literacy Programmes*

NIOS is one of the certifying agencies for the Prime Minister’s vision of Digital India. Pradhan Mantri Gramin Digital Saksharata Abhiyan is a scheme to make six crore persons in rural areas across states/ union territories digitally literate. Under this programme, about 52 lakh learners have already been successfully assessed and certified by NIOS. In addition, the NIOS in collaboration with the National Literacy Mission Authority (NLMA), Government of India has been engaged in conducting basic literacy assessment of neo-literates under the Saakshar Bharat Abhiyan (Literate India Project) across the country. Around 10 crore adult learners have been assessed, of which, about seven have been certified as successful. Furthermore, a Memorandum of Understanding (MOU) has been signed between NIOS and Common Services Centres Special Purpose Vehicle (CSC-SPV) for assessment and certification of Digital Literacy under National Digital Literacy Mission (NDLM), Digital Saksharta Abhiyan (DISHA) and Cyber Gram Yojna Community Health Projects.



## **Stellar Projects**

### *Educational Opportunities for Jail Inmates*

One of the prioritised and differently-abled client groups to which the NIOS reaches out are Jail inmates. Free and flexible education is imparted to them by supplying study material free of cost and conducting examination in the jails. Facilities are extended to complete their studies even after they are released from jail. Personal Contact Programmes and Practical sessions are also conducted in the jail premises.

### *Extending Education to Army Personnel*

NIOS extends education to armed personnel who have joined the Armed Forces at an early stage and were forced to discontinue their studies. NIOS has designed a special package of courses for jawans, which will equip them with the skill needed to seek employment after retirement through improved and higher level qualifications.

### *ASHA Certification Project*

ASHA Certification Project is a tripartite Memorandum of Understanding between the Ministry of Health and Family Welfare, Government of India, National Health System Resource Centre (NHSRC) and NIOS, aimed at addressing the Millennium Development Goals (MDGs) of the Health Related Indicators Programme. The ASHA (Accredited Social Health Activist) is a trained female Health Activist who is selected from the community who is responsible for educating the community on health issues and undergoes a series of modular training sessions that equips her with the necessary knowledge, skills and confidence to be able to perform her tasks. One of the key components of the National Rural Health Mission is to provide every village in the country with a trained female community health activist or ASHA as she is known. Selected from the village itself and held accountable for it, the ASHA is trained to work as an interface between the community and the public health system. The ASHA Certification Project aims to certify around nine lakh ASHA Learners, ASHA trainers and accredited training sites in all states and union territories of India. NIOS is playing a vital role in certifying the ASHA trainers along with enhancing the quality of services provided by them. So far about 18607 ASHA learners have been registered for the Project and out of that 16487 certified.

## **Teacher Training**

Teacher Education is one of the most important components in determining the quality of a teacher. The number of untrained teachers is so large that it was not possible to train all of them through the face to face formal system. Therefore, alternative strategies like Open and Distance Learning (ODL) system was chosen as it was considered to an effective strategy to complete this gigantic task. With this backdrop, it was decided to develop and implement an elementary teacher training programme through Open and Distance learning mode for untrained teachers teaching in elementary schools.

### ***Diploma in Elementary Education (D.El.Ed) programme***

The Teacher Education Program that leads to the Diploma in Elementary Education (D.El.Ed.), which aims to prepare teachers for the elementary stage of education, that is, from classes I-VIII. This phase covers children of 6-14 years for whom education is a fundamental right. The purpose of D.El.Ed. Program is to prepare



teachers who are able to gradually evaluate and improve their skills, professional practice as teachers by critically reflecting on it, who can understand that teaching is embedded in the social context of the learners and who can engage with context and subject matter that they will be teaching. The student-teachers will also be familiarized with the modes of inquiry and epistemological frameworks of their subjects, along with how students learn so that they can expand and use teaching methods that are responsive to the learning desires of all their learners in distinct and plural settings of elementary classrooms. The D.El.Ed. programme is thus a specifically designed package for in service untrained teachers working in primary/ upper primary schools of different states of the country. The programme has been developed by the Academic Department, NIOS on the initiative of Ministry of Human Resource Development (MHRD), Govt. of India, keeping in view the NCF 2005, RTE 2009 and NCFTE 2010. The Programme aims at enabling the target group to develop in them skills, competencies, attitudes and understanding to make teaching and learning more effective. NIOS has been vested with the authority to train the untrained teachers at Elementary Level.

#### *Professional Development Programme for Elementary Teachers (PDPET)*

NIOS also provides PDPET, a six-month bridge course to all those teachers who possess a B.Ed. (Bachelor of Education) degree and are teaching students of Classes I-V.

#### *Early Childhood Care and Education (ECCE) Course*

The ECCE offered by the NIOS aims at training learners with a special focus on women to enable them to be involved in pre-school, crèches and day care centres, in their own village/town or neighbourhood. It forms a strong base for primary education as a feeder and support programme.

### **Conclusion**

A large number of learners who are of school going age, especially the differently-abled and women still remain out of the education net. Open and Distance education carries great strength in reaching out to the unreached. It has ample scope to use various media and technologies to make education accessible to all through different channels. The complete potential of the distance mode of education needs to be realised to provide education to even small isolated learners as well as very large groups of learners. The NIOS has accomplished the task of empowering out of school children with flexible learning models, which have been designed to be affordable and accessible. The NIOS will continue to march ahead with the challenge of reaching out to more and more such learners with the understanding that every learner has a distinctive and divergent need.

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## Bridging the skills gap in the Data Science and Internet of Things domains: A Vocational Education and Training Curriculum

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### Abstract

Data Science and Internet of Things are among the key drivers regarding the skills and competences needed by IT professionals. Given the value that Data Science and Internet of Things have for the EU economy and society, the foreseen skills gap at these two domains, and the rapid and continuous evolution of these technologies, make the skills required by IT professionals increasingly sophisticated, and the need to be constantly updated imperative. The SENdIng project aims to address this skills gap, by providing IT professionals with knowledge, skills and competences that meet the current needs of Data Science and Internet of Things industries and are transferable and recognized among European countries. To achieve this goal, SENdIng has designed and will deliver a learning outcomes-oriented multi-disciplinary VET curriculum. The curriculum covers three areas -Data Science, Internet of Things and Transversal Skills- and is divided in educational modules and learning units at three levels of proficiency: Introductory, Core and Advanced. The modularity of the curriculum permits each trainer to build a separate learning path that serves his/her specific training needs. The VET curriculum for each domain will be delivered in three phases: 100 hours online courses, 20 hours face to face training and 4 months work based learning.

**Key Words:** Data Science, Internet of Things, Vocational Education and Training, curriculum, online training, work based learning

### Introduction

Data Science and Internet of Things (IoT) pose an unprecedented opportunity for all kinds of businesses, whether they are B2B, B2C or B2G. In addition, their value for the EU economy is huge; it is projected that the EU Data Economy will reach €739 billion by 2020 and will represent 4% of the overall European GDP (EC Digital Single Market, 2019), while IoT with a value of €120 billion will solely contribute to an increase of 7 points of European GDP by 2025, through productivity improvement and value distributed to end customers (AT Kearney, 2016). These progressively build complex ecosystems of new business models and supply chains, from IoT vendors and system integrators, to the number of industries that exploit the huge volume of data coming from a myriad of devices to extract useful information using Data Science technologies.





However, one of the main barriers preventing the full exploitation of Data Science and IoT potential, is the skills gap observed at both domains. According to predictions, the demand for Data Scientists will increase up to 28% until 2020 (Columbus, 2017), while the 43% of the companies are reporting the lack of appropriate analytical skills as a key challenge (Press, 2015). At same time, the unfilled Data Science positions are estimated at 485,000. In addition, the need for IoT skills is huge, as 68% of businesses still struggle to hire IoT experts (Wright, 2018). These predictions, together with the rapid evolution of Data Science and IoT technologies and their application in many industries make the skills required by IT professionals increasingly sophisticated, and the need to be constantly updated imperative.

Although Higher Education Institutions (HEIs) and Vocational Education and Training (VET) providers attempt to catch up with this new Data Science and IoT wave by providing relevant academic and vocational training programs, the complexity of the Data Science and IoT scientific domains and applications, the variety of the economic sectors exploiting IoT and data analytics, and the diversity of end-users and technical options available in both fields, result to consensual problems faced by all stakeholders in the value chain of education and training: the IT professionals in their career orientation, the organizations designing training programs at several educational levels and the businesses as recruiters of IT professionals. While in the Data Science field there are some developments in defining the required skills and competences (Manieri et.al., 2015; Mikroyannidis et.al., 2017), the respective developments at the IoT domain are very limited (World Economic Forum, 2016). In addition, although transversal or soft skills are among the key skills of the future employees (José and Serpa, 2018; Institute for the Future, 2011), the current Data Science and IoT training programs are only technical-oriented and do not commonly provide the learners with such skills.

At this paper, we present a multi-disciplinary and learning outcomes-oriented VET curriculum for the training of IT professionals on transversal skills and Data Science and IoT technologies. The curriculum has been designed in the context of the EU project SEnDIng (<http://sending-project.eu>) which aims to address the skills gap of IT professionals at Data Science and IoT domains. To achieve this goal, SEnDIng has developed and will deliver to IT professionals a VET program using innovative teaching and training methodologies. Furthermore, a reference model has been designed for the vocational skills, e-competences and qualifications for Data Science and IoT experts, which is compliant with the European eCompetence Framework (eCF) and the European Skills, Competences, Qualifications and Occupations (ESCO) classification, ensuring transparency, comparability and transferability between European countries. The curriculum for each domain (Data Science and IoT) will be provided in the form of blended learning combining also work based learning: 100 hours of online self-paced courses, 20 hours of face to face training on transversal skills and 4 months of work based training. The trainees will be certified having successfully completed the three phases of training and a final exam.

The main contribution of SEnDIng VET curriculum is two-fold. In contrast with other training programs that provide only technical skills at the Data Science and/or IoT domains, the SEnDIng curriculum combines technical knowledge and skills with cross-domain transversal skills and competences. In addition, it includes a work based learning phase which commonly lacks from current vocational trainings at Data Science and IoT domains.



### *The SEnDIng VET curriculum*

Curriculum is increasingly seen by stakeholders as a dynamic framework guiding the teaching and learning processes, and as a steering mechanism for quality. According to the European Centre for the Development of Vocational Training (2010), “a curriculum is a normative document (or a collection of documents) setting the framework for planning learning experiences”. Depending on the country, the type of education and training, and the institution, curricula may define, among others, learning outcomes, objectives, contents, place and duration of learning, teaching and assessment methods to a greater or to a lesser extent.

### **Methodology for curriculum development**

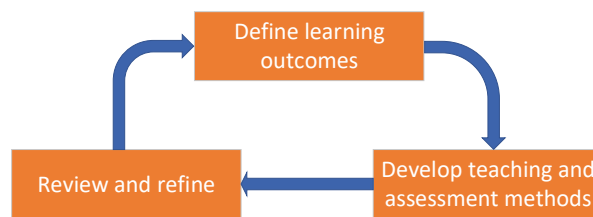
The methodology applied for the development of SEnDIng VET curriculum is based on the constructive alignment approach. This approach maximises the conditions for quality learning by ensuring alignment throughout the process, from the forming of learning outcomes, to the choice of teaching methods to assessment. It assumes that when learning objectives, assessment methods, and teaching and learning activities are intentionally aligned, the outcomes of learning are improved substantially (Blumberg, 2009). The process of constructive alignment emphasizes that learners are central to the creation of meaning, and must be provided with opportunities to actively select, and cumulatively construct their own knowledge (Biggs, 1996). According to Biggs, “The fundamental principle of constructive alignment is that a good teaching system aligns teaching method and assessment to the learning activities stated in the objectives, so that all aspects of this system are in accord in supporting appropriate student learning.”

The elements involved in the process of constructively aligning the educational modules are three: (i) defining the learning outcomes, (ii) choosing the learning and teaching methods that can lead to attainment of outcomes and (iii) assessing the learning outcomes of learners. The process followed for developing SEnDIng curriculum consists of three stages (see Fig. 1):

- Define curriculum goals and design learning outcomes. We adopted the European Parliament Council (2008) recommendations on the establishment of the European Qualifications Framework for lifelong learning, to design the learning outcomes of the curriculum in terms of knowledge, skills and competences. According to these recommendations: (i) knowledge is defined as the outcome of the assimilation of information through learning; it is the body of facts, principles, theories and practices that is related to a field of work or study, (ii) skill is defined as the ability to apply knowledge and use know-how to complete tasks and solve problems and (iii) competence is defined as the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.
- One of the main challenges we faced with the definition of Data Science and IoT learning outcomes is the broad spectrum of disciplines that can be included in the curriculum of these technology domains and their accordance with the specific needs of the respective work places that they are applied. For these reasons, the learning outcomes of the curriculum were designed in two phases. At the first phase, we developed the macro-level design of the learning outcomes based on a research of related programs and a survey among companies that currently run Data Science or IoT projects, or are interested to run such projects in the near future. Then at the second phase, we

developed the micro-level design of the learning outcomes that is the design of the learning outcomes of each separate educational module of the curriculum.

- Developing teaching methods and forms of assessment. We developed the teaching methods and forms of assessment covering the three phases of SEnDIng VET program: online, face to face and work based learning. The assessment methods are in accordance with the learning outcomes of each module, aiming to foster a deep approach to learning.
- Reviewing and refining the curriculum. The review cycle is defined as a systematic approach to evaluating, reviewing and revising VET curricula within a specific timeframe which aims to identify gaps and weaknesses with a view to increase their effectiveness and continuously improve VET trainees learning experiences (UNESCO-IBE 2013). Normally it involves several phases including: research and selection; revision and development; implementation; as well as evaluation and monitoring. Reviewing is not a retrospective process, but it is an integral part of the module development, providing information before, during and after the process.



**Figure 1: Curriculum development process**

### Curriculum characteristics and structure

The key characteristics of SEnDIng curriculum are:

- Multi-disciplinarily. The modules developed cover both technical knowledge and skills at Data Science and IoT domains as well as transversal skills and competences. The transversal skills aim to build upon academic and experiential learning and to prepare the IT professionals for engaging within the business environment in a creative way, communicating effectively with the internal and external environment of a business and acting in a collaborative way.
- Modular. For each domain, the curriculum is separated in educational modules. The modules have been designed by selecting and ordering the types of learning activities that trainees undertake to achieve the learning outcomes of each module.

Each module is further divided in training units at three levels of proficiency:

- Introductory (I): The educational module is introduced and its most important aspects are given.
- Core (C): All core aspects, principles and methods of the module are covered in sufficient detail as necessary to apply the knowledge and skills on the job. The learner becomes able to discuss matters with other stakeholders and acquire more knowledge when necessary.
- Advanced (A): Advanced aspects of the module are covered in sufficient detail as necessary to apply the knowledge and skills on the job.



This permits the learners to create their own learning paths according to their needs. As the learning outcomes aimed by the transversal skills training are horizontal, the educational modules of the transversal skills are not split into the three training units (Introductory, Core and Advanced).

#### *Learning outcomes-oriented.*

The curriculum give emphasis on what an individual should know, understand and/or be able to do at the end of a learning process. Such curricula consist an effective way to avoid potential mismatches between academia and industry, and furthermore to promote active learning and inclusive training.

Considering the aforementioned curriculum definition, the structure of a training unit includes the following elements:

- Objectives. The objectives of the training unit indicate its general direction or orientation in terms of its content.
- Learning outcomes. The learning outcomes of the training unit in terms of knowledge, skills and competences.
- Content. The content of the training unit.
- Learning methodologies. The learning methodologies applied for the delivery of the training unit.
- Assessment methodologies. The methodologies applied for the assessment of the learning outcomes.
- Duration. The duration of the training unit. The indicative duration of each training unit is as follows: (a) Introduction: 1 to 2 hours, Core: 3 to 10 hours and Advanced: 5 to 10 hours.
- Pre-requisite. Pre-requisite knowledge and skills to be able to attend the training unit.

#### *Curriculum Educational Modules*

The Data Science educational modules developed are the following (see Fig. 2):

- Introduction to Data Science (DS-EM1). This module is an introduction to Data Science: different roles involved in Data Science projects, common Data Science applications and methodologies.
- Python for Data Science (DS-EM2). This module aims to provide to the learners knowledge and skills for big data analysis, data visualization and machine learning using Python.
- Statistics for Data Science (DS-EM3). This module aims to provide to the learners knowledge and skills for inferential statistical analysis, visualization and machine learning, using the R language and environment for statistical computing and graphics.
- Storing and Retrieving data (DS-EM4). This module aims to provide to the learners knowledge and skills to work with Hadoop ecosystem and its applications at storing and processing large volumes of data distributed across commodity servers.
- Applied Machine Learning (DS-EM5). This module aims to provide to the learners knowledge and skills to work with machine learning technologies.
- Data Visualization (DS-EM6). This module aims to provide to the learners knowledge and skills to build effective and engaging data visualizations.

The IoT educational modules developed are the following (see Fig. 2):



- Introduction to IoT (IoT-EM1). This module is an introduction to the IoT: the basic principles of IoT applications, the different roles involved in IoT projects and their duties.
- IoT Devices (IoT-EM2). This module introduces the “Things” in the IoT, the different IoT devices (sensors, actuators, peripherals), their electronics, as well as, the different microcontrollers and how they can interact with the IoT environment.
- IoT Communication Technologies (IoT-EM3). This module introduces the plethora of communication protocols and standards that are used for signalling and data exchange in IoT systems in a comprehensive and visual way.
- Architectural Design and Applications in IoT (IoT-EM4). This module presents the key aspects of an IoT system architecture (IoT edge devices, gateways) with emphasis on server-side infrastructure solutions (cloud computing service models, deployment models and public cloud providers).
- IoT Security and Privacy (IoT-EM5). This module presents common security risks raised in an IoT system and possible measures to create a more secure environment. It aims to create a sense of awareness to the learner of the possible security breaches and how to avoid them by adapting appropriate security measures.
- IoT Business Value (IoT-EM6). This module aims to make the learners aware of IoT business value, by presenting the advantages of exploiting the IoT into the business world providing real use cases.

The transversal skills educational modules developed are the following (see Fig. 2):

- Effective communication and presentation (TS-EM1). This module aims to provide to the learners knowledge and skills for effective communication and presentation.
- Change management (TS-EM2). This module aims to provide to the learners knowledge and skills for change management.
- Team working (TS-EM3). This module aims to provide to the learners knowledge and skills for effective team working.
- Goal setting (TS-EM4). This module aims to provide to the learners knowledge and skills for effective goal setting.
- Creative thinking (TS-EM5). This module aims to provide to the learners knowledge and skills for creative thinking.

For a complete description of the educational modules, please refer to SEnDIng project (SEnDIng, 2017).

### **Curriculum European Qualifications Framework (EQF) level**

Considering the qualification levels that the SEnDIng curriculum addresses, we defined that EQF level 5 is the most appropriate as the main beneficiaries of the vocational trainings will be IT professionals with working experience, or graduates from Higher Education Institutions. The learning outcomes relevant to qualifications at EQF level 5 are defined as follows (European Commission, 2008): (a) knowledge: comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge, (b) skill: a comprehensive range of cognitive and practical skills required to



develop creative solutions to abstract problems and (c) competence: exercise management and supervision in contexts of work or study activities where there is unpredictable change; review and develop performance of self and others.

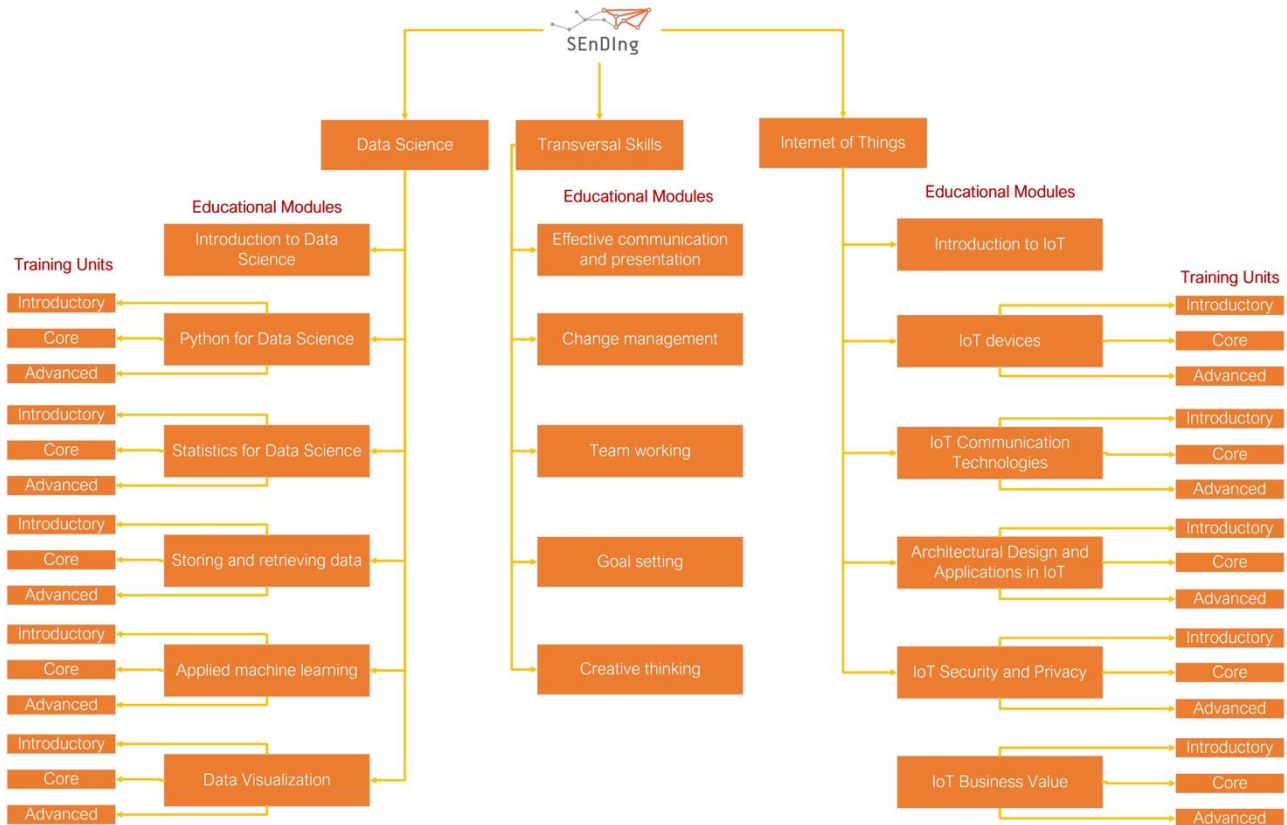


Figure 2: Curriculum educational modules

## Conclusion

This paper presents a modular and learning outcomes-oriented VET curriculum for the training of IT professionals at transversal skills, Data Science and IoT. The curriculum will be delivered in autumn 2019 into three phases by combining online self-paced courses with face to face training and work based learning. The advantages of SEnDIng curriculum rely on (a) its modularity which permits the learners to build their own learning paths, (b) the combination of technical knowledge and skills with transversal cross-domain skills and competences and (c) the work based learning phase enabling the learners and especially those who lack professional experience to apply the knowledge and skills gained through the online and face to face training at real working environments. The SEnDIng curriculum can be easily exploited by training providers at each level of education (VET, higher education, adult education) in order to extend the offering of their training programs.

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## Extension Activities in Higher Education: A Process that Promotes the Social Inclusion

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### Abstract

This paper aims to present the adoption of virtual scenario as an approach to facilitate social inclusion. The SABER Comunidades is a virtual scenario-based web application. It consists of a set of thirteen virtual scenarios that seek to contribute to the formation of professionals in health primary care in Brazil. The virtual scenarios were designed from real life situations. These virtual scenarios do not include an active orientation by a teacher or tutor, the students themselves are responsible for acquiring knowledge through reading, and navigated in the provided content, performing the activities. They could collaborate with each other through discussion forums if required. To assure efficacy of learning, several elements of design and interaction, pedagogical innovations, as well as active learning strategies were included in order to make content acquisition more dynamic. The use of common daily situations promotes social inclusion and stimulates a vision of reality. A virtual scenario as an educational resource has to be designed to help explore many factors and aspects of a problem, and provide feedback on problem solving and decision-making.

**Keywords:** Flexible Learning, Extension Actions, Virtual Scenarios, Technological Innovation, Higher Education, Social Inclusion.

### Introduction

Open and Distance Education for lifelong learning is a demand in the health training area. Face-to-face, flexible and open education are placed to evolve and evaluate the process of social inclusion and entrepreneurship in Higher Education (HE) (UK Universities, 2018). The insertion of the DE into people's daily lives has also been observed in the corporate world. Changes in business needs, with more complex tasks and projects and shorter execution times, requires greater professional qualifications, as well as changes in the way organizations work (UK Universities, 2018). With the greater dynamics and demands of the market, more and more people are submitted to trainings and courses different modalities in order to add value to the professional competences and the institutions to which they are linked.

Structuring a course for a health professional in primary care means dealing with the work process, and integration and interaction between workers and assisted population. Developing an online platform is a complex task that involves multiple demands, such as selecting appropriate materials, qualified people and resources, especially technology, so that the learning objectives can be achieved. Strategies that allow collaboration and exchange of experiences between participants should be defined, otherwise students will be harmed, and the course will not succeed. This becomes even more complex when it comes to creating not only an isolated course (an instance), but a programme with several courses. The coherence and uniformity



of content must be logical and must also meet the needs of adults who already have professional experience in the subjects addressed, not to mention the importance of a viable and lightweight technology solution. In this way, the educational offer will fulfil its formative role for the students who enter it. The importance of education and health promotion is universally evoked from the Sustainable Development Goals (SDG) 4 and 3 and their targets, from Agenda 2030 (SDG, 2015). The subobjective 4.7 from SDG 4 has as a target (UNESCO, 2017):

The knowledge, skills, values and attitudes required by citizens to lead productive lives, make informed decisions and assume active roles locally and globally in facing and resolving global challenges can be acquired through education for sustainable development and global citizenship education, which includes peace and human rights education, as well as intercultural education and education for international understanding.

The subobjective 3.8 from SDG 3 has a target (United Nations, 2017):

Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)

This study, in particular, addresses the use of elements that aim to stimulate the engagement and interest of professionals and the population aided by educational objects. The current educational paradigm needs a pedagogical innovation, because the student is becoming the main actor of the teaching-learning process. In this context, this work presents the web application based on virtual scenarios SABER Comunidades, as an innovative initiative that had a proof of concept and a version that has been used in extension and specialization courses linked to the Department of Biomedical Engineering of the Federal University of Pernambuco (DEBM-UFPE), the process of developing virtual scenarios presented and used by postgraduate students in a subject of health informatics.

After this introduction, this paper is structured as follow: Section 2 presents fundamental concepts for better understanding; Section 3 presents methodology and the strategic actions defined to achieve the objective; Section 4 discusses the proposal and outcomes and, finally, Section 5 concludes the study and discuss possibilities for future works.

### **Fundamental Concepts**

The insertion of technologies in education systems has been increasingly frequent. Little by little, Distance Education (DE) is showing that it can be useful in overcoming the border of the classroom and that it is possible to provide a quality teaching-learning process (Silva; Shitsuka & Paschoal, 2015), even for presential courses. Thus, students benefit from reduced costs and flexible learning (UK Universities, 2018):

- a) pace of study (from part-time to accelerated courses);

- b) flexible learning across higher education institutions, further education colleges and alternative providers, and;
- c) different ways of delivering learning (including classroom-based, online and employer-based learning).

In this section we present the concepts that are important to develop using the features of SABER Comunidades, as well as presented to the students during the semester. Most of activities in the health informatics subject are related to the available virtual scenarios.

### *Epistemic Fluency*

A tendency that is appearing in the educational environment is the search for comprehensive knowledge through the so-called "Epistemic Fluency". In education, researchers and teachers work on ways to elicit the "epistemic cognition" of students and help them become more knowledgeable, that is, to develop "epistemic fluency." Epistemic fluency is the capability to recognize different types of knowledge and work flexibly with different forms of knowledge (Markauskaite & Goodyear, 2018). For example, effective actions on climate change, obesity, cybersecurity or arms control need specialized knowledge of research on these issues, combined with knowledge of areas such as economics, politics and law (Markauskaite & Goodyear, 2018). The epistemic fluency was very valuable in these two areas for the proposal of the SABER Comunidades professional education, multidisciplinary research and for the graduate students.

### *Health Promotion in Brazil*

Primary healthcare in Brazil, due to its social and preventive nature, is an opportunity to develop digital and social inclusion, once it allows the integration and continuous training of professionals, as well as educational actions with the population.

According to the "The Ottawa Charter for Health Promotion", Health Promotion is "the process of enabling people to increase control over, and to improve, their health" (WHO, 1986). In this sense, we can highlight the usage of health situations and protocols based on real cases as a way to improve professional performance, allowing continuing theoretical and practical learning. Additionally, we can highlight that several forms of information can be used by the users of the health services, the population. This kind of action allows permanent education in order to improve the quality of their lives and healthcare (WHO, 1986). Hence, we can realize the importance of the means of dissemination of knowledge through technology as a way of to improve access to information about health, as well as its benefits when used on a large scale.

The model of Health Promotion in Brazil enriches programmes and strategies of primary healthcare in the Unified Health System (UHS) (Sistema Único de Saúde), currently represented by Family Health Strategy (FHS). FHS is the priority strategy of Brazilian Ministry of Health (MS) to organize primary healthcare –one of its foundations is to provide universal and continuous access to health services with quality. This reaffirms the basic principles of Brazilian Healthcare System: universality, equity, decentralization, integrity and community participation – through users' registration and linking (Rowe et al, 2007). Despite easy access to information, users are still considered individuals with lack to health information. On the other hand, with the received information, the users will be capable of making decisions to prevent diseases and illnesses, as



well as able to assume new habits and conducts (MacKay & Harding, 2009). These data point to the social relevance of the project presented in this paper.

### *Virtual Scenarios and e-Learning*

Virtual Learning Environments (VLE) are spaces for organizing the contents and resources of an open or distance course, usually based on the web. VLE allows interaction with diverse media (e.g. texts, audios, videos, animations, virtual scenarios, among others), didactic activities (e.g. games, questionnaires, case studies) and interaction among those involved in a course, such as coordinators, teachers, tutors and students (LINS et al, 2015). Scenario-based strategies allow students to organize and structure answers to presented situations, as well as allow the usage of practical activities that represent or even require other activities and knowledge obtained on the real world. In fact, virtual scenarios are alternatives that allow the appropriate usage of multimedia tools to support defined educational goals, complementing traditional learning objects, such as books and booklets. Through virtual scenarios, we can use multimedia resources to present common situations, usually followed by other learning objects, such as videos, images, animations and exercises. In this perspective, the student becomes the lead author of the associated discoveries (Canizares 2005).

### *Distance Education Systems*

There is a relatively high diversity of Distance Education (DE) support systems and one of the differentials lies especially in systems development processes in an appropriate manner. Moodle is the most popular virtual environment (MOODLE, 2012). It is a platform developed in open source for the management of content for e-Learning. Lins and other authors (2015) present the experience of constructing a self-instructional distance course in the health area: (i) Requirements Identification: this comprises of capturing information for the following steps; (ii) Elaboration of the proposal: the main product of this stage is the graphic design, which describes the main characteristics of the course to be developed; (iii) Evaluation of the proposal: the graphic design is evaluated. In parallel, systems development teams and support software begin modeling prototypes in order to analyze the feasibility of proposed technical / technological solutions; (iv) Development: with the approved graphic design, the entire course is detailed and developed. Two points are worth mentioning: (i) the importance of the construction process to guarantee the quality of software solutions to support distance courses; and (ii) the multidisciplinary involved in the process of creating DE systems, which covers professionals from different areas.

### **Methodology and Strategic Actions**

One of the educational strategies considered interesting to allow the usage of the available technological resources is through virtual scenarios, allowing the interactivity and best stimulus to learning. Through virtual scenarios we can use multimedia resources for presenting situation-problems, commonly followed by other learning objects. In this perspective, the student becomes the main author of the associated findings, especially based on SDG 3 (3.4) and SDG 4 (4.3). All methodological actions were planned with integrated extension activities to academic proposals and involved a group of students of biomedical engineering and computer science, as well as teachers and researchers. Therefore, the main idea of this educational project was the development and assessment of a technological environment to support educational activities for health professionals based on studies and virtual scenarios of daily situations in primary healthcare. All



planned actions are a stimulus to practice extension and promote social inclusion. The development cycle was composed by 4 phases:

- Phase 1. Identification of professionals' workspace and multidisciplinary teams – an ad hoc literature review was performed; defined areas of study – health promotion and life quality; area of interest: primary healthcare.
- Phase 2. Capture and select materials – reading and researching; drafting writing of didactic materials; design and structure of the content according to daily situations; initial graphic proposal.
- Phase 3. Planning to integrate virtual scenarios versus discipline – presentation of web application; selection of available virtual scenarios at SABER Comunidades (up to two); Discuss the motivation behind the educational object and define activities in the context of Family Health Strategy (FHS).
- Phase 4. Development and assessment of planned activities in phase 3.

To achieve the objectives to develop the virtual scenarios the following steps were performed:

1. Understand the content generation: it comprises the bibliographical review of the subject to prepare the whole material related to the discipline and linked to common daily professional activity.
2. Graphic design definition: development of the layout of the educational object.
3. Content transition: the pedagogical strategies are clearly documented in this step, considering the virtual scenario navigation and activities/exercises definition related to subject.
4. Subject development: implementation of the defined graphic design and content transition on web platform and linked to the virtual scenario, if required.
5. Test: the virtual scenario is tested to identify and correct bugs, as well as to establish improvement points.

The material developed for each area of interest, as well as virtual scenario previously identified, represent, on average, 5 hours of content classes and practical activities each.

## Proposal

The age of the information society promote several opportunities, including socio-economic and cultural ones, in which knowledge and learning have become valuable assets of each individual. Extending the use of internet through social media, for example, requires training in order to understand new ways of using digital learning objects in their respective domain of interest. In this context, digital inclusion plays a vital role for social inclusion, and it is necessary to take into consideration some aspects (Baumgart, 2006):

- a) insertion of people on job market and generation of income;
- b) improvement of the relationship between citizens and public entities;
- c) improvement and facilitation of people everyday tasks;
- d) increase of cultural and social values and citizenship improvement;
- e) spreading of technological knowledge.

## SABER Comunidades

SABER Comunidades (Saúde, Bem estar e Educação em Rede) - Health, Welfare and Networked Education consists of an environment to support the teaching-learning process focused on health education. The target audience currently consists of workers from the Unified Health System who participate in refresher courses, specialization courses and communities assisted by these professionals, also postgraduate students. The application is still in Portuguese (Saber, 2018). Next year will begin the translation into Spanish and English.

SABER Comunidades is a set of virtual scenarios. Different situations are presented, usually accompanied by other resources such as videos, animations and exercises, complementing traditional learning objects (books, articles, electronic presentations). It is important to note that the stories presented in SABER Comunidades are representations of real situations, but without the rigor of simulating such situations in every detail. In other words, it is possible to complement the learning, based on experiences close to the real and on the didactic materials made available in the extension and specialization courses. The application provides a variety of scenarios containing case studies, where, in a community, several health situations will be addressed. For this purpose, the city of Pontal dos Coqueirais was conceived (Figure 1).



**Figure 1. Pontal dos Coqueirais – map view**

The city Pontal dos Coqueirais is presented with some points of view: history, geography, economy, leisure, and infrastructure. There is the view of the urban and rural area in the coastal area. Everything is planned to accommodate situations that represent the day-to-day problems experienced by the health teams that work in primary care. Figure 1 shows 28 locations in the Pontal dos Coqueirais. Number 5 is the unit that represents the Family Health Strategy (FHS) – Family Health Unit named Unidade de Saúde da Família dos Canaviais. The virtual scenarios were elaborated as one of the possibilities of insertion of learning objects in the educational offering - course of extension (refresher) or specialization. Thus, there are a variety of opportunities for use as well as forms of representation. As we said before, there are thirteen episodes available in the SABER



Comunidades related to locations in the Pontal dos Coqueirais. Numbers 1 to 28 pointed in the map view (Figure 1).

**The episodes are:**

1. What is Distance Education? – This episode discusses what is Distance Education and the experiences experienced by students.
2. Social determinants of the health-disease process, the example of John Snow – This episode presents how was control of the cholera epidemic occurred in London in 1854, by observing the determinants of the disease.
3. Social organization and its influence on the health-disease process – To understand that the thinking of the social group in which the user is inserted influences their decisions about health.
4. Health Education Policies: Telehealth, PROVAB, UNA-SUS – To know the policies and actions of Health Education proposed by the Brazilian Ministry of Health and identify actions present in the municipality of the workers and students' workplace.
5. The use of epidemiological data in the context of the health-disease process in the community – To demonstrate the importance of epidemiology in the holistic context of collective health. The individual should be analysed as part of a community that can suffer all the influences of the environment in their state of health.
6. Diagnosis of the territory covered by the family health team – Encourage teamwork; to support in performing the area diagnosis; reflection on problem identification and how to address them.
7. Social services in the neighborhood of Canaviais – To understand the concepts of interdisciplinarity and their importance to the work process of family health teams; stimulate teamwork; support in performing the area diagnosis; reflection on problem identification and how to address them.
8. Planning in the daily life of family health teams – To sensitize professionals working in primary health care on the importance of planning to enhance the work of family health teams.
9. Operational aspects of health planning – Know local planning and participatory tools to organize the work process of the health unit and understand the importance of each planning moment to organize the work process.
10. Evaluation in the Family Health Strategy – Recognize the importance of health assessment as a tool to support the planning of interventions in the Family Health Strategy (FHS); reflect on the evaluation components: evaluation of structure, process and outcome.
11. Arrangements, policies and health programs for children in Brazil and in the world – The student should be able to: i) to identify sociohistorical determinants and the situation of childhood in the world and in Brazil; ii) to point out the contemporary challenges in child health care actions; iii) to know the legal bases of child protection; iv) recognize the main axes of integral attention to children's health; v) to reflect on the adequacy of pacts and programs of child health care in Brazil and in the world for reducing social inequalities and child health.
12. Access and accessibility to women's health care services – The student should be able to: i) to reflect critically on the programs, policies and pacts directed to the health of women and their implications in the scope of the basic attention and the Family Health Strategy (FHS), with emphasis on the accessibility of the users; ii) recognize and relate the role of health professionals in the FHS in the planning of actions and in the assessment of risk and vulnerability in women's health in daily life.



13. Attention and care to the elderly patient – Reflect on the role of family health team members in planning actions and assessing the health risks of the elderly.

## Discussion

Considering the technological advances and the identification of different pedagogical strategies, this paper presents the adoption of virtual scenarios as a way to implement social inclusion. The SABER Comunidades enables handling of relevant features in the Sustainable Development Goals (SDG) 3 and 4 including concepts of health promotion, open and distance education features, extension activities in primary health care and pedagogical innovations for refresher and specialization courses, for the teaching of postgraduate students. Sustainability and the Agenda 2030 bring as a main concern the promotion of Lifelong Learning. A diversity of aspects is important to consider improving quality of life:

- I. access to preventive and health promotion actions through training programs and continuous digital inclusion;
- II. the technological innovation development for the contexts involved in permanent training actions, digital and social inclusion, encouraging action research and teaching applied to real situations.

We understand that the adoption of virtual scenarios in health postgraduate courses brings lessons that should be actively considered:

1. The importance to structure a didactic transition team to support the teachers to produce differentiated didactical materials suitable for online and presential education;
2. The social inclusion and the attendance in the community daily lives.
3. The need to coordinate health managers participation, which should focus not only on how to use virtual scenarios in strategic actions, but also on evaluate the system adopted;
4. Differential provided by periodic monitoring strategies and evaluation of activities developed by teachers and tutors;
5. The evaluation of each proposed action from postgraduate student to enrich the social inclusion and to facilitate the entrepreneurship.
6. Knowledge in the workplace - Our research focus has been on professional education - where students are being helped to prepare for work in areas such as family medicine, collective health, emergency and emergency care, or care regulation. In these courses, students often receive assessment activities designed to help them connect academic knowledge with practice in the workplace and the performance of their professional tasks. The difficulties students face in doing this are not really "transfer" problems, but rather the need to understand that daily practice of actions requires varied forms of knowledge in order to deal with a specific situation.
7. Working with multidisciplinary teams - The second area of our interest examined how multidisciplinary teams of academics learn to work together. This was a problem we faced since the first specialization course proposed in 2011. A challenge in structuring the technological platform to be used, but also in the pedagogical knowledge required to choose the distance education approach.



## Final Considerations

The use of Distance Education platforms enables the serialization training processes of professionals from different areas, accelerates the integration and access to technologies. In this light through the main lessons learned, we highlight:

- i) the importance to structure a didactic transition team to support the teachers to produce differentiated didactical materials suitable for online education;
- ii) the need for teachers and tutors qualification to participate in the online courses, which should focus not only on how to use virtual learning environments, but also on the differences in the didactic-pedagogical mediation and the evaluation system adopted; iii) differential provided by strategies for periodic monitoring and evaluation of the activities developed by teachers and tutors.

We understand that these lessons should be actively considered in future projects:

- a. The importance to structure a didactic transition team to support the teachers to produce differentiated didactical materials suitable for online education;
- b. The need for training teachers and tutors to participate in online courses, which should focus not only on how to use virtual learning environments, but also on the differences in the didactic-pedagogical mediation in the system adopted;
- c. The expanding role of online learning - It is very important to better understanding of the educational process, a more comprehensive student assessment and consequently the personalization of education;
- d. Address various Educational challenges to better understanding how technology is changing today's classrooms – global competition between Higher Education Institutions and the target workforce
- e. The adoption of new innovations and digital inclusion - dealing with the characteristics of groups or individuals in virtual learning environments, distance or presential;
- f. Provide instruction tailored to improve the quality and efficiency of learning and teaching;
- g. The controlled costs and real budget that is necessary to support operational and financial decision making.



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## Pedagogical Innovation in Lifelong Learning: The Use of Technological Mediation in the Formation of Preceptors in Health in Brazil

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### Abstract

This paper is about the experience of the Specialization Course of Health Preceptory of the Federal University of Rio Grande do Norte (UFRN), offered in the hybrid modality, as an innovation of training in health. Our arguments are based on five reasons. The first one is that the course incorporates goals and targets of the UN-Agenda 2030 for Sustainable Development, such as the increase in financing and the recruitment, development, training and retention of the health workforce in developing countries (SDG 3); inclusive and equitable quality education and promote lifelong learning opportunities for all (SDG 4). A second reason is the innovative and dynamic pedagogical project concerned with learning with the use of ICT; combining theory and practice; defining formative routes; and breaking with the conception of preceptory as an area of specific clinical work, situating it as a pedagogical activity. Our third argument is about the course aim, which is the training of health professionals as preceptors who will work in University Hospitals (UH) in federal universities of the Brazilian Hospital Services Company (EBSERH). The function of preceptor is exercised by higher level professionals, highly qualified in the specialized areas in health, playing a strategic formative role in Brazilian public health, combining teaching and assistance in service. Thus, they are simultaneously responsible for the last stage of the formative route and the first stage of professional activity. We present two more reasons: the methodology used, strongly self-instructional, focused on the field work in each of the UH, assuring scalability of offer; economy of the project; national coverage; suitability to local reality; and open and online learning enhanced by technology. The elements of mediation are the tools of LMS developed, enabling autonomous interaction of students with contents through a pedagogical design that allows building their own knowledge. For this purpose, the didactic material is produced with interactive language and is led to reflection about the relationship between theory and practice. Finally, we highlight the formative scale of impact. The first offer will be as a Specialization Course with full load of 360 hours, organized in self-instructional modules, with the offer of 2,500 vacancies distributed in forty UH. By the end of the first offer of the specialization course, the modules will become MOOCs, without pre-requisites and with continuous offer, widening the access and continuity of formation with micro-certification, OERs developed are granted licenses CC 4.0, non-Commercial share alike.

**Key Words:** Educational innovation, Lifelong learning, Education for health, learning enhanced by technologies, internship, mentorship in health education



## Introduction

The dimension of the Brazilian Unified Health System (SUS) gives relevance to the human formation of workers and to the educational processes in health. From its principles and guidelines (Brasil, 1990), the equity with the recognition of the social and regional differences and the vulnerabilities of the patients; the integrality and the longitudinality of care in different levels of attention to health; and the universality of care with the regulation and adequate location of health assistance, the learning scenarios of attention to health have been developed in the places of offer of healthcare, which also, and necessarily, turned out to be strategic backgrounds to pedagogical production.

In such spaces, the aim is to make workers in health and users of the Unified Health System (SUS) creatively and innovatively meet, in a dynamic process where everyone learns. This dynamic background in constant change of knowledge in health and technological advances have fostered transformations in the field of education in health, being increasingly necessary the training of professionals capable of caring, teaching, and managing their professional practices. In this background of conceptual changes, transformation of practices and new demands of teaching and learning, the preceptor and the preceptor agency play a fundamental and strategic role in the education and health networks (Lima and Rozendo, 2015). The expectations towards the preceptor in health are currently higher and involve a new conception of this professional, who must respond to the demands of current times, such as: constant and permanent update concerning the contents; development of specific technical skills, always according to current standards of accreditation used in the audits of several professional societies; positioning, in the learning processes, as active participants (Marinho-Araújo, 2014) and on a dialectical and transformative perspective, promoting transformation to himself, to the students, and to the health service.

Besides, we understand that it is fundamental that the preceptor's personal competences are aligned with the commitments made in UN-Agenda 2030 for Sustainable Development, with respect to SDG 3, which addresses health and welfare in a broad sense and to SDG 4, which ensures inclusive and equitable quality education and promote lifelong learning opportunities for all. And, as a direct result, the development of the competences of health professionals in training under their direct attention, such as:

- competence of systemic thinking which allows the comprehension of systemic functioning of attention in health, considering the reality and concrete possibilities of SUS;
- normative competence for the comprehension and formulation of protocols of attendance, considering the local reality and the social constraints;
- competence of collaboration, considering that the maintenance and reestablishment of health is a result of multiprofessional and transdisciplinary work; and which also depends on the adherence of patients, family, and society;
- competence of critical thinking to search for better therapeutic possibilities in each individual case, considering the evidences and the social constraints;
- competence of self-knowledge to build significant learning throughout the training process in service and to continuation of learning throughout professional life; and
- competence of integrated resolution to clinical cases.



In this context, the significant changes in the competences of preceptors caused by accelerated transformations in the world of work, such as the constitution of networks of attention, the creation of multiprofessional programs, and the contributions of the experiences of matrix support and care, are evident. Thus, with the competences and constraints mentioned, training professionals in health in University Hospitals is more than just training a professional in a specialty. These changes raise a strong concern with the permanent training of these professionals who must establish a new relationship with the institutions, programs, technical and undergraduate students, and the professionals in internship programs. On the other hand, we can state that there is an extremely favorable context for the development of innovative proposals of training, using the mediation of the new technologies of information and communication, which enable putting in practice special pedagogical actions and very distant from the traditional approach like, for instance, with the active methodologies of teaching and learning. Therefore, the training of preceptors must aim at improving the practice of preceptory in its educational aspects, with the use of diverse formative activities, qualifying human formation in health.

In this text, we analyze the experience of the Specialization Course of Health Preceptory, of the Federal University of Rio Grande do Norte (UFRN), offered in the hybrid modality, as an innovation in the formation in health, that has been offered to professionals who perform activities of preceptory in University Hospitals of the federal network of higher education. Some words about the SDG 3 and 4 and the challenges in the personnel development in health. It is internationally acknowledged that people development in health, considered the dimensions of initial formation and throughout professional life; and the recruitment, allocation and the retention of professionals who work in health are challenges which were not properly and sufficiently addressed by the time of the Millennium Development Goals, which preceded the UN-Agenda 2030 for Sustainable Development. In an evaluative analysis of the work force in health until 2015, we found evidences that:

- The curricular changes in the formation of professionals of health were negligible and did not allow the approach to the demands of society, and the necessities of public health and the loco-regional economy;
- The insufficiency of the number of professionals, the inadequate distribution in the most vulnerable territories, the outdated and decontextualized competences; and the low resolution performance of the work force of health hindered the effectiveness, efficacy and relevance of health policies. Thus, the access and quality of the assistance in all the levels had direct consequences;
- A formative process with academic programs directed to the outdated content instead of being focused on education based on evidences of health and competences offered through active methodologies leads to low quality of the assistance, especially in specialized care;
- The resistance to new models of care with definition of roles and sharing of responsibilities by the assistance of patients; the widening of offers of home care; the use of ICT in education in health and in care must be addressed with effective policies. (WHO, 2015).

Therefore, the offer of learning processes of health professionals which occur throughout their lives is essential so that we can align to SDG 3, which determines the need to ensure healthy lives and promote well-being for all at all ages.



## The structure of the Specialization Course of Health Preceptory

The Specialization Course of Health Preceptory was planned for the duration of 48 weeks, with course load of 360 hours, in distance learning modality, developed in the Virtual Learning Environment of the Unified Health System (AVASUS) of Brazil, and the presentation of the final course paper to on-site board. Its general aim is to “improve the practice of preceptory, in its educational aspects, by using diverse training activities, qualifying personnel development in health”, and is grounded on three principles: the use of active methods of teaching and learning, such as learning based on problem-solving and peer instruction, among others; pedagogical mediation through technological devices; and the approach to lifelong learning and personnel development in health.

Underpinned by the formulation of professional competences (Dutra, 2017), and principles of interaction and dialogism (Rodríguez-Ardura and Meseguer-Artola, 2016) and, besides, considering that a considerable amount of preceptors had no educational experiences with technological mediation, the course will have an initial period of adaptation in AVASUS, so that the students may know and get acquainted to the pedagogical project, the academic guidelines of the course and for the students, and the tools available in the virtual environment of teaching and learning. It is important to consider that in this Course we consider competences as defined by Rabaglio (2011): “knowledge, skills, and attitudes that differentiate people and have an impact on their performance in all the areas where they move”. Still according to the author:

*“The definition of Competence is based on a triad known as KSA, which are the knowledge, skills, and attitudes of a person. Each position needs a specific and complete combination of KSA, and the associates must have compatibility with this profile in order to reach efficacy in results. The knowledge refers to the position’s need of academic training, technical knowledge, specialties. The skill is related to experience, practice (living), domain of knowledge. Finally, attitude represents emotions, values, and feelings, expressed by human behavior.” (Rabaglio, 2008, p. 10-11).*

The course aims at the development of a wide competence to analyze and critically evaluate the context where preceptory is developed, applying innovative processes, which focus on safety for patients and professionals and creating possibilities of training which result in more effective professionals, aligned to the social, technical, technological, and economical constraints of the place in which they are inserted. For this purpose, the course was structured in three formative itineraries or routes where students have autonomy to make choices; decide the route of building knowledge from their interests and necessities; and build and re-build the formation route as a fundamental principle. Massaka and Ribeiro (2011) propose that preceptors must experience formative processes, not fragmented, that enable a reflexive attitude towards their practices, which may contribute to the formation of students under their preceptory. They constitute a route of studies for lifelong learning, the description of formative routes that students may follow, enabling their qualification to the pursuit of studies and insertion in the world of work and in professional practice. For this course, the itineraries were organized intentionally and systematically, structuring educational offers which enable a cohesive and continuous training route, vertically or horizontally.

There are three formative itineraries proposed to the Specialization Course in Health Preceptory:



- Active methodologies in Preceptory
- Monitoring and evaluation in Preceptory
- Preceptory in Permanent Education in Health

The curriculum framework is structured in five axes and fifteen modules, as it is shown in the following table:

AXIS	MODULES	COURSE LOAD (CL)
1- Basic	• Introductory Approach to Preceptory in Health	15h
	• Principles and Guidelines in the Unified Health System	15h
	• Permanent Education in Health: concepts and fundamentals	15h
	• Basic Knowledge of Distance Education	15h
	• Education in the practice backgrounds	15h
	• Patients safety	15h
CL Axis 1		90h
2- Active Methodologies	Introduction to Active Methodologies	15h
	Active Methodologies 1: Learning Based on Problems	30h
	Active Methodologies 2	15h
CL Axis 2		60h
3- Evaluation	• Evaluation: concepts, fundamentals and application	30h
	• Evaluation Modalities	30h
CL Axis 3		60h
4- Fundamentals of Preceptory	• Preceptory Plan I (With 30 hours of tutoring)	30h
	• Health in Community: integration teaching and service	30h
	• Hospital Environment: teaching in practice	30h
CL Axis 4		90h
5- Preceptory Plan	• Preceptory Plan II (With 60 hours of tutoring)	60h
CL Axis 5		60h
Total Course Load		360h

**Table 1: Curriculum framework of the Specialization Course of Preceptory in Health**



As we can see, the axes 4 and 5, with the modules Preceptory Plan I (axis 4) and Preceptory Plan II (axis 5) comprises 30 and 60 hours of tutoring, respectively, while the other modules are self-instructional. The students will also have 90 hours of supervision to the development of the final paper. The modules with tutoring and supervision allow the students to have a differentiated and unique view of the formative practice background in each of the university hospitals in all the regions of Brazil with particular socio-locoregional and epidemiological features. At the end of each self-instructional module, the evaluation of the academic performance is done through an Evaluative Questionnaire comprised of objective and multiple-choice questions. The modules “Preceptory Plan 1 and 2” are preparatory for the final course paper, which will be presented on-site in public sessions of defense carried out in university hospitals where the future preceptors are functionally bound. In those on-site sessions, the concluding students of the course will present their preceptory plan (final course paper) to a local judging panel. We must highlight that the carrying out of this academic rite will have the support and participation of the teaching and research managers and technical directions of the university hospitals.

## Conclusion

In the architecture of the course we analyzed in this text, the format of self-instructional modules was often used. In education enhanced by technologies (Busarello et al, 2015; Pereira et al, 2017), self-instructional contents are those where the students learn on line, with intense support of technological devices. In this case, the elements of mediation are the tools of the virtual learning environment themselves, enabling the autonomous interaction between students and contents through a pedagogical design that allows them build their own knowledge. In order to do so, the didactic material is produced with interactive language and is led to the reflection about the relationship between theory and practice in students’ reality. Education enhanced by technology is characterized by new practices of learning and allows the wide usage of Open Educational Resources (OER) – a set of materials available to everyone and which can work as new resources, meeting the democratic and economic principle of reusability (Litto and Mattar, 2017). For us, OER must be available in Free-Access Public Repositories and, in this case, in AVASUS itself. We also defend that the usage license must follow the model CC 4.0, non-Commercial share alike.

The use of self-instructional modules emphasizes the autonomy and independence of students in building their knowledge. Wedemeyer (1973, p.76, apud Keegan, 1996, p. 62) defined “[...] independent student as an independent person not only in space and time, but also potentially independent in control and direction of learning” (p. 294). The didactic material used in self-instructional educational offers must be developed with contents whose themes are accessible; use of clear and somewhat colloquial language, easy readability, and moderate amount of information; explicit instruction and suggestions, showing the adequate and/or inadequate procedures concerning the most important themes for succeeding in the learning process. Besides, the material must promote the formulation of questions, the reflection about the content and stimulate the students emotionally so that they show personal interest in the content; use a personal style, with the use of personal pronouns and possessive adjectives; highlight the switches in themes through clear and visibly perceptible textual marks (Holmberg, 1995, p. 3).

Based on this analysis and on experience with self-instructional modules, we can state that they offer, throughout the course, benefits and attractions such as: constant use of mediation through technological





devices; immediate delivery of results of assessments, allowing adjustments needed; pedagogical practices focused on students; creative, original and humanized approach to contents; easy access to contents; flexible structure; possibility of students' autonomy; immediate feedback to the results of the activities proposed; attendance of diverse learning styles; open access to scientific research repositories; use of open-code software for educational purposes; and the possibility of content update.

Another innovation is that the tutor acts significantly in specific moments throughout formation. Thus, we recognize the relevance of tutor's role in assuring the alignment of the students to the formative route chosen. The tutor encourages learning, clarifies doubts, and helps solving questions raised during the study. We must emphasize that in such tutoring model it is essential that the students recognize a personal and democratic space of trust, where they find support to the development of significant and autonomous learning. Another comment on evaluation is still pertinent. The evaluation of learning in education enhanced by technologies happens in a space that Moore (1993) called "transactional distance". It is much more than just a geographic separation between professor and student, but the creation of a psychological and communication "vacuum", responsible for potential "noise" and misunderstandings between the professor's inputs, their decoding by students, and providing feedback. When evaluating students' learning, it is impossible to disregard an evaluation of the quality of transactional distance where it occurred, analyzing these two variables in depth. A flexible and "oxygenated" structure, combined with a democratic, clear and pedagogically stimulating dialogue can extraordinarily facilitate distance learning.

The evaluation in courses which use the mediation of technologic devices has some specificities, such as:

- The meaning of aspects like the quality of the didactic material used, which acts intensely on the cognitive strategies of building concepts that compose the course content;
- The efficacy of tutoring, promoting diverse forms of interaction, the facilitation of socio-communicative aspects, and the use of technological tools;
- The checking, not only of the development of cognitive competences, which strengthen the theoretic body which it is intended to develop with the course, but also of the ones which are related, for instance, to the investigative ability and the 'unfolding' of the course, of its formative routes, leading to lifelong learning.

Evaluation requires also the application of several evaluative forms and strategies which go beyond the checking of the students' learning curve, but of all the formative ecosystem established by the course. It must be observed that, in teaching and learning virtual environments, the reliability of the evaluation depends directly on efficient systems of communication for the necessary feedback of both processes (teaching and learning). This model – of deficit learning – emphasizes factual contents, valuing the summative modality of assessment. The opposite model – of opportunity –, on which this Course is based, is concerned with the consistency and reliability of evaluation, emphasizing its formative modality, offering several options of evaluative situations and stimulating the students' autonomy.

We finally note that the Specialization Course of Preceptory in Health we hence presented is constituted as an innovative experience in human formation in health with the usage of mediation of information and communication technologies and it is a great responsibility to develop a national-scale program in an area of



high relevance and priority in the demands of human formation in health, and it required a proof of the solidity and quality of the course.

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## Reimagining Future-Ready Curricula, Teaching and Learning in Online Education

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### Abstract

Teaching is usually about imparting existing knowledge and skills to students, with the goal of enabling them to use it in current contexts, addressing current challenges and tasks. It is at most only marginally interested in the nearby future and not really focused on shaping or transforming it. There is a need, however, to heed the call of the conference to start thinking about transforming and reimagining better futures. However, before reimagining online education, for the sake of better futures and transforming lives into something different or better, the future should be imagined in terms that are more specific. Only then, we will know better how to prepare students for their futures. There are several pressing reasons for this. The first is the realisation that the half-life of knowledge is becoming shorter. Several studies point to the fact that knowledge and skills gained in courses and qualifications are dated or even outdated within less than five years. The second is the emerging impact of artificial intelligence, automation, technology and quantum computing. Several studies point to the fact that knowledge and skills gained in courses and qualifications are dated or even outdated within less than five years. For this reason, online education needs to be reimagined too. The question is how? What should stay the same and be retained, what needs to be added and discarded? In order to answer these questions, it is important to imagine the future. Until "Back to the Future" becomes a reality, this will be done by means of a literature review on two aspects, namely reports and publications on possible future scenarios, and changes that are expected to take place. Included here are reports from the World Economic Forum, publications from futurists, and websites about expected changes in professions and the workplace. Based on this, skills needed by students to be future ready will be identified from the available literature. The final part is discussing how to include these new skills in the curriculum of online courses. Practical examples in terms of course content, assessment strategies and the teaching of future-ready skills are highlighted. The curriculum used in online education should be reimagined to still attend to the past and the present, but adding an informed focus on the future, in order to be able to transform lives and contribute to better futures.

### Introduction

"The future is not what it used to be!" This is an old saying, probably true since time immemorial, pronouncing several shades of feelings of uncertainty about what is to happen in the future, and especially how we are to prepare for it (see a well-researched history of the saying by Garson in <https://quoteinvestigator.com/2012/12/06/future-not-used/>). Fact is, the future is looming large, and we are on the cusp of a new era and at the start of the 4<sup>th</sup> Industrial Revolution. Artificial Intelligence and automation, for one, is already changing our worlds and the workplace. Many reports about expected changes are seeing the light, as well as contemplations about future ready schools and curricula.



Aligned to this is the question whether Education, and Online Education in particular, is preparing our students for the futures they are being faced with. Are we delivering future ready students? Are our courses and curricula imparting the kinds of knowledge and skills our students need to cope in years to come?

This paper is a concise literature review about the kinds of skills, knowledge and attitudes students need to manage the future. A brief overview of reports and books on future expectations is presented, followed by a focus on students' skills in terms of identity, mastery and legacy. The latter classification stems from my research on effective learning strategies, which was translated into a program called the Golden Spiral of Lifelong Learning, presented in schools, universities and the workplace (Gous 2018), and is worded in the mantra "I learn for a reason".

### **"The Future is not what is used to be"**

We are on the cusp of a new era and at the start of the 4<sup>th</sup> Industrial Revolution. According to a report on the World Economic Forum, changes in the workplace is going to create in twelve years' time – the time it takes a child to complete school – between 400 to 800 million people who will need to be retrained and reskilled because their jobs have become obsolete. Research on the half-life of qualifications have shown that people who complete their degrees now, will have a half-life of their knowledge that necessitates 5 to 6 hours per week of dedicated and serious learning just to keep abreast of new developments in their fields.

Several reports and publications have been generated on expected disruptive changes in the workplace over the next 3 to 32 years. In the World Economic Forum report published in 2018 called "Eight Futures of Work: Scenarios and their Implications" the changing world of work is mentioned.

Several factors contribute to the expected changes. Technology is the most important. Automation, robotics and artificial intelligence are bound to make some jobs obsolete, change some others, and create some jobs that do not exist yet. The world, which has become a global village, creates mobile and migratory labour and brings about demographic changes. Education changes in the sense that face-to-face institutions do not have monolithic student populations any more, which has been a characteristic for distance education and online education for a long time. All of this brings about that the talent needs of workers are changing and expanding.

As a result of this, a 2018 report on "The Future of Jobs" the World Economic Forum (WEF) points to the need of re- and up-skilling of workers, brought about by changes in the workplace. According to the report, by 2022, a mere 3 years from now, 54% of all workers will need significant reskilling and upskilling. These will range from additional education and training of up to 6 months (35% of workers), up to 12 months (9% of workers), or more than a year (10% of workers). The kind of knowledge and skills that they will need additional skilling in, will be basic mastery of new developments in their fields, but also aspects such as innovation, analytical thinking, as well as active learning and learning strategies.

In terms of what is being expected to happen in Africa, a 2017 report by the WEF "The Future of Jobs and skills in Africa – Preparing the region for the Fourth Industrial Revolution" points to the influence of automation on work. The report predicts that more than 40% of all work activities in Africa are vulnerable to automation - 41% in South Africa, 44% in Ethiopia, 46% in Nigeria and 52% in Kenya, even though it may be toned-down by low labour costs and counterbalanced by the creation of new jobs. Even so, the report



underscores the need of skilling and re-skilling in Africa. In South Africa, by 2020 39% of core skills required across occupations will be entirely different. 41% of firms in Tanzania, 30% in Kenya, 9% in South Africa and 6% in Nigeria are inadequately skilled, and this pattern is set to continue or may even get worse in the future.

Yuval Noah Harari (author of *Sapiens*, *Homo Deus*, and *21 Lessons for the 21<sup>st</sup> Century*) predicts the emergence of a new class of people by 2050. He calls them “the useless class” – people who are not just unemployed, but unemployable. According to him,

“... the big danger of the appearance of a useless class is not because of the absolute loss of jobs, it’s because of the difficulty in retraining and reinventing yourself.”

From this and other reports, it is clear that radical change in the world of work is not only inevitable, it is already happening. It is therefore important for educational institutions to take this into account in their teaching offerings, their curricula as well as the kind of skills they teach their students. The challenge for distance and online educational institutions is even bigger, in the light of their diverse student populations. What needs to be taught?

### **The Need for a Different Set of Skills, Added to Content Knowledge**

Curricula needs to include content that is up to date in terms of their discipline, relevant to their contexts and meaningful in terms of application. In addition to this, it needs to include the teaching of skills needed not only to master the prescribed content, but skills to become “future ready”.

According to reports, “future readiness” entails aspects such as lifelong learning skills, cognitive flexibility, creativity, critical thinking, and emotional intelligence, and not merely mastering content by means of rote learning. According to the 2017 White Paper by the World Economic Forum titled *Realizing Human Potential in the Fourth Industrial Revolution: An Agenda for Leaders to Shape the Future of Education, Gender and Work*, education should be thoroughly reimaged to include the following:

1. expanded access to early-childhood education;
2. ensuring the ‘future-readiness’ of curricula;
3. investing in developing and maintaining a professionalized teaching workforce;
4. early exposure to the workplace and career guidance;
5. investing in digital fluency and ICT literacy skills;
6. providing robust and respected technical and vocational education and training (TVET);
7. creating a culture of lifelong learning; and
8. openness to education innovation.

It is clear that current curricular content and educational offerings need to be expanded and augmented. It calls for a balancing act between the past and current disciplinary content, but also a future oriented openness, and readiness for content that is developing or not even developed. The only way to prepare for something that is still unknown, is to empower students with skills, habits, attitudes and abilities to master new knowledge as it emerges.



Research on the half-life of qualifications have shown that people who complete their degrees now, will have a half-life of their knowledge that necessitates 5 to 6 hours per week of dedicated and serious learning just to keep abreast of new developments in their fields. In 2017 Deloitte brought out a report called “The 2017 Deloitte Global Human Capital Trends: Rewriting the rules for the digital age”. They surveyed more than 10,000 business and HR leaders from all over the world, focussing on the challenges ahead in an intensely changing demographic, social, digital and economic landscape. In the chapter “Careers and learning: Real time, all the time”, they wrote:

What does it mean to have a career today? More specifically, what does it mean in a world where careers span 60 years, even as the half-life of learned skills continues to fall to only about five years? In the past, employees learned to gain skills for a career; now, the career itself is a journey of learning.

As companies build the organization of the future, continuous learning is critical for business success. For today’s digital organizations, the new rules call for a learning and development organization that can deliver learning that is always on and always available over a range of mobile platforms.

Thomas and Brown (2011, CreateSpace) wrote in their book “A New Culture of Learning: Cultivating the Imagination for a World of Constant Change” that

learning requires **content** - which can be taught, **skill** -which can be mentored, and **disposition** - which can be cultivated.

Ehlers and Kellerman (2019) published a report on *Future Skills – Future Learning and Future Higher Education*, a Delphi survey of an international panel of 50 experts from academia and business. The survey evaluated the readiness of higher education institutions within the next 5 years to teach their students the kind of skills needed to be future ready. According to the experts, these institutions are not ready to teach in ways and develop curricula and systems to engender future skills that are becoming increasingly relevant and important.

*Ehlers and Kellerman (2019: 3) define future skills as*

*“the ability to act successful on a complex problem in a future unknown context of action”. It refers to an individual’s disposition to act in a self-organised way, visible to the outside as performance.*

They divided the future skills into three interrelated dimensions, namely a subjective dimension, an object dimension and a social dimension. *The subjective dimension* relates to an individual’s subjective, personal abilities to learn, adapt and develop to be able to productively participate in the workforce of tomorrow, actively shape the future working environment and involve themselves into forming societies to cope with future challenges. The future skills linked to this are:

1. Autonomy,
2. Self-initiative,
3. Self-management,
4. Need / motivation for achievement,
5. Personal agility,
6. Autonomous learning competence, and
7. Self-efficacy (2019:3).

The object dimension relates to an individual's ability to act self-organized in relation to an object, a task or a certain subject matter related issue. It is about mastering knowledge, but additionally to connect it to motivation, values and purpose, as well as using it in an organised way. The skills related to this are

- a. Agility,
- b. Creativity,
- c. Tolerance for ambiguity,
- d. Digital literacy,
- e. Ability to reflect (2019:3).

The social dimension relates to an individual's ability to act self-organized in relation to its social environment, the society and organizational environment. The skill profiles are

1. Sense-making,
2. Future mindset,
3. Cooperation skills, and
4. Communication competence.

The report also reflects about whether higher educational institutions are structurally ready and pedagogically able to teach and support the learning of these. They identify four aspects that need to change in institutions to be so.

The first is the future skill university, which redefines *graduate attributes*. The current "reduced / narrow focus on academic and valid knowledge acquisition as a means to provide correct answers for known questions based on a curriculum which is focused on defined skills for fixed professions" *is to be replaced*





with a “next mode” of studying, with the focus on future skills, such as autonomous learning, self-organization, applying and reflecting knowledge, creativity and innovation (2019:4-5).

The second is the networked multi-institutional study scenario, where higher education moves from a “one institution” model to a multi-institution one, providing qualifications through alliances of several institutions (2019: 4-5).

The third is the “my-university” scenario where students have the choice to build their own personalized curriculum. It is no longer a fully predefined and ‘upfront’ given structure, but rather a more flexible, personalized and participatory model in which students actively cooperate with professors / teachers / advisors in curriculum building of higher education programs (2019:4-5).

The fourth model is the lifelong higher learning scenario, where higher education institutions no longer focus on preparing students up front for future a profession, but compliment it with lifelong learning offerings (2019:4-5).

The period for the adoption and implementation of these scenarios, are more than 10 years from now for the first three, and within the next 5 years for the fourth (2019: 4).

To summarise, it is clear that traditional education focussed on the acquisition of past and current knowledge and skills. Existing knowledge and skills were taught to students, who had to learn and master them. The goal was to be able to apply them in present settings such as known jobs or careers. The new knowledge economy of the 21<sup>st</sup> Century questions the ability of this to deal with its complexities and rapidly changing nature. For this reason, the need to teach and learn other kinds of competencies emerged in order to help students become future ready. Because technologies are responsible for the rapid changes and complexities, the focus is often on teaching technological skills, as well as skills related to use technology to teach and learn. However, the realisation has dawned that personal attributes, characteristics and skills are equally important, and should also be taught and mastered.

The future is now. The future calls for different skills sets to be taught and acquired. Higher education institutions are not ready to provide it. Will Distance Education be able to do it sooner than 5 or 10 years?

### **Future Ready Distance Education, Teaching and Learning**

Macro systems of Higher Education, such as accreditation of qualifications and curricula, are cumbersome to change. That is why any of the above suggestions will take as many as 10 years to put in place. It is clear and crucial that these changes should be attempted, and that it should be done as quickly as it is feasible. What is within reach to change immediately, though, is how we teach our subjects. It is right now within our locus of control to attend to the aspects of Identity, Mastery and Legacy in a single lecture, and by doing it, attend to the learners’, the subject’s and discipline’s yesterdays, todays and tomorrows.

There are even some aspects of online and distance education that will make it easier to do than is the case at contact tuition institutions.



As has been pointed out, traditional teaching focuses on mastery of current knowledge, and assessing the mastery of known understanding. The development of the identity of the student, in other words their personality attributes and characteristics were seen as falling outside of the scope of practice of the institution and the lecturer. In similar vein, a focus on how the subject and discipline is going to change was also not a major concern. This was the case where students were present in face-to-face classes and often part of a homogenous group from similar contexts, aiming to apply their gained knowledge in comparable circumstances. Being at a distance, made it even more difficult or even impossible to personalise teaching and learning to all students.

The diverse student population hailing from dissimilar backgrounds and studying asynchronously is actually a positive aspect in terms of engendering future readiness. Lecturers who take it seriously that their students are from different contexts, will make sure that their content takes this into account, and that it has to be made relevant in meaningful in more contexts than the one from which the lecturer or the establishment hails.

With this reality clearly in mind, the way each lesson is taught can be planned, according to a scaffolding framework to make sure all relevant and important aspects are attended to. This framework is called The Golden Spiral for Life-Long Learning, and is based on aspects of learning as identified and practiced by age-old pedagogical wisdom, as well as current mind, brain, and education science.

Six broad aspects of learning are placed on a spiralling trajectory through a learning landscape. These six are 1) future perspective (dream), 2) planning, 3) the learning curve, 4) productive mistakes, 5) help and support, and 6) assessment of progression. A seventh aspect is present at each of these six, namely a metacognitive reflection on each of them on its own and all of them working together (Gous 2018: xx).

The point of departure is always the endpoint of the spiral, namely the future perspective. This is supported by the work of Wiggins and McTighe on backward planning. They compared two kinds of planning performed by students. Backward planning starts at the envisioned goals and outcomes and then formulates actions from a current point of departure. Forward planning starts at the point of departure, and plans actions steps towards the envisioned goal. While the action steps of the two groups of students were similar, the motivational value of backward planning outperformed the forward planners (McTighe, & Thomas, 2003: 52-55; Wiggins, Wiggins & McTighe, 2005; Jones, Vermette and Jones, 2009: 357-361; Wiggins & McTighe 2011).

Starting each lecture with the future in mind in terms of meaning and relevance is important for motivation to learn. Adding to this a focus on envisaged future developments in the discipline, field or subject, and how the current knowledge may contribute towards future change, is crucial to make students aware that they are responsible and able to create the future they want to see. In this way, the future blossoms concurrently become part of the past and present in an organic whole like the yesterday-today-and-tomorrow flowers.

Future studies in disciplines are just as important as the histories thereof. It is, however, just as specialised an area of research that needs to be mastered than becoming an expert in the subject, its history and applications itself. For this reason, it will be necessary for subject societies and professional bodies to devote special attention to envisaged future developments. This knowledge should be made available to educators to include in their lectures.



## Future Ready Economics

Becoming future ready and future fit is the combined responsibility of all involved in the discipline – from the lecturers who should be at the forefront of knowledge mastery, to the students who have to make it part of their identity, to the professional discipline leaders who should keep an eye on the legacy.

An example in case is the teaching of economics. Tieleman (2019) shared some thoughts in *The Conversation* (<https://theconversation.com/why-the-world-is-due-a-revolution-in-economics-education-112785>), arguing the case **Why the world is due a revolution in economics education**. Tieleman is a co-founder of Rethinking Economics in the Netherlands, and he does part-time work for a charity dedicated to a fairer, more sustainable economic system Our New Economy. According to him,

Economic thinking governs much of our world. But the discipline’s teaching is stuck in the past. Centred around antiquated 19th-century models built on Newtonian physics, economics treats humans as atomic particles, rather than as social beings.

Real world issues were not addressed, for example in the Netherlands, real-world problems, from climate change to inequality, were seriously treated in only 6% of all modules and that only 2% of methods courses were not focused on statistical work. He concludes:

Let’s hope that we don’t have to wait for the present generation of economists to retire before this can happen. By that time, it might be too late.

This example show how people involved the field and knowledgeable about the discipline become future-oriented, advocating the teaching of their discipline in a way to get their students future-fit.

## Future Ready Life Skills and Biblical studies: Example of a Course Focusing on a Combination of Content and Context

*Ehlers and Kellerman (2019: 3) mentioned the subjective dimension of necessary future skills, amongst others an individual’s subjective, personal abilities to develop skills such as self-management, personal agility and self-efficacy. In a module offered at the University of South Africa, this has been attempted. The module (OTS2603) is titled “Life orientation: Biblical perspectives”, and is on NQF Level 6, bearing 12 credits, resorting in field: 07 Human and Social Studies, Sub-field: Religion. The purpose of the module is stated as*

“...for students to gain knowledge and skills that will enable them to use the Bible meaningfully in the process of life orientation in their personal lives, or when they act as facilitators of the learning area Life Orientation in schools.”

According to the range statement,

“The scope of this module includes biblical perspectives on the learning outcomes of the learning area Life Orientation of the National Curriculum for schools in South Africa. Attention is given to all five learning outcomes mentioned in the National Curriculum, namely health promotion,



social development, personal development, physical development and movement, and orientation to the world of work.”

The first assignment focusses on mastery of content, as can be seen from questions posed:

#### *Question 1*

Describe what the getting-answers approach entails, and list the reasons why many people prefer it to the understanding questions approach. Also mention on which pages in the study guide you sourced the information. [10]

#### *Question 2*

How do groups arrive at a decision? Name 4 social decision schemes, and mention briefly how each of these schemes influence the way people understand the Bible. Then describe what “group think” is, and how this influences Bible reading. Also mention on which pages in the study guide you sourced the information. [15]

TOTAL: [25]

The second assignment has a different purpose, namely

- (a) To gain insight into the nature of, and ways of dealing with, life crises as important elements of life orientation.
- (b) To assist you in integrating the contents of the prescribed book with your personal experiences regarding life crises.

The questions posed was intended to help students link facts with personal relevance application in real life situations.

#### *Question 1*

Describe a life crisis you had to deal with. On which terrain of your life did the crisis manifest, and how were other walks of life affected by the crisis?

(Important note: because a life crisis is very personal and may even be traumatic, it is important to know that the marks given for your answer will be related to the way that you describe your life crisis, not for the content of what you are describing. Make sure you mention the terrain on which it manifested and how your life was affected by it.) [10]

#### *Question 2*

Which of the coping strategies mentioned in the prescribed book are appropriate for dealing with a crisis of this nature? Motivate your answer. Also mention on which pages in the prescribed book you sourced the information. [10]

#### *Question 3*



The prescribed book offers detailed explorations of the Exodus story, Genesis 1, and Lamentations 4. Do you think those explorations provide you with insights into ways of dealing with your particular life crisis? Make reference to the texts and the discussion in the prescribed book. [20]

TOTAL: [40]

The reaction of students to these questions are positive. Some do mention that they are used to being asked content knowledge questions, and this is new to them. Even so, most report that the experience to apply what is often taught as dogmatic truths in a way that is near to life, is enriching and life-changing. This is but one example how content, context and personal relevance can be put in a creative interplay.

## Conclusion

Preparing for a rapidly changing and unknown future is a challenge. Basic and thorough subject knowledge will always be indispensable. Personal abilities to master the unknown is the missing link between past, present and future, and should and could be taught as part of any curriculum. In this way, a balanced approach is reached, that still attends to indispensable past knowledge and current application, but adding a required future ready perspective.

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## Measuring – and Engendering – Lifelong Learning Readiness

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### Abstract

At the end of the day, a learner or student needs to be able learn and to master what is needed. Students in face-to-face learning situations are generally assumed to have more direct access to support with regards to their learning strategies and habits, but indications are that it does not happen. At school, students are often merely coached to pass, and at institutions of higher learning, students are expected to be able to learn independently. Distance education students are usually studying on their own, having to learn without peer and even institutional support. For these reasons, the ability to learn, and especially to know, have, and use life-long learning habits and strategies, are crucial. This paper reports on the development and viability of a questionnaire designed to assess the learning readiness of learners, based on what reputable research has shown to be effective and ineffective learning strategies and habits. The goal of the questionnaire is firstly to assess their levels of competency, but eventually to assist learners in acquiring, mastering and using the strategies and habits necessary to handle a rapidly changing world. The questionnaire was piloted on a small (n=31) student sample from a university in Russia, with more pilots underway in China, Mauritius and South Africa. The paper concludes by presenting the preliminary results obtained.

### My DEDE – Distance Education Damascus Experience

Many years ago when I was a young lecturer, I had a life-changing experience with a student. It was just after I graduated with my PhD, and I was quite sure I knew it all, or at least most of it. I also taught a Distance Education course for first year students with more than 4500 enrollees. It was in the paper-and-post phase of Distance Education (Taylor, 1995: 4), and if students wanted a human to talk to, they could phone, attend a face-to-face group class that was conducted once or twice a year, or make an appointment to come and see me in the office. This student arrived without having made an appointment, which did not suit me at all. Even so, he came a long way at considerable cost to him, so I reluctantly agreed to the meeting. He was a stately older man, probably almost twice my age, neatly and formally dressed. I asked him how I could be of assistance. I expected the usual response that they have a problem understanding the work, to which I usually requested that they should be more specific, with their favoured response “It is the work in general...”. He, however, was more specific, stating that it was the third time that he was attempting to pass the course, and he does not know what he did wrong to have already failed twice. My immediate reaction was that I suspected that he just did not study, probably not even had the prescribed textbooks. I tried to be polite, however, and asked how he is actually preparing for the exams. He then took out his textbook, and said, “I open my book, and I read, and read again, and I read again.”

I could see from his book that it has been read, but even so, it was in pristine condition, with not a mark in it. So here he was, for the third year in my first-year course, working hard, but still failing – and asking



someone who was probably the age of his children for help, that someone being mildly irritated by this situation.

It was at that moment that it struck me right between the eyes. The problem did not sit on the other side of my table. He received the content of the course, and he did what he thought was best. In any case, in his mother tongue the word for “read” and “study” was the same. For the first time I realised a part of the problem sat on my side of the table. I gave them content to study, and I assessed their knowledge of it. That was what I thought I was employed to do. Seeing him there in front of me, though, I realised for the first time that was not enough, not sufficient, not near being responsible from my side. I realised that if I do not also teach him the ability to master the prescribed content, I was not educating him. I also realised how much I learnt over the years, and how much matters changed in the subject I just graduated in. I realised that learning is much more than a short-term mastery of content in order to pass a text or exam – it is a life-long journey where I have changed in ways of mastery and in the use of the content I am in the process of mastering, and the same is true about my students.

That day I spent a long time with him, and I am glad to say he did pass the course that year. In the process, I benefitted immensely from the experience, because that started a life-long learning journey about how to study effectively, and how to teach others to do so. In the process I read many books about it, attended courses about it, and presented workshops on it. Looking back, I also see that a lot of what I once believed and even taught about effective learning, did not stand the test of time, and is currently seen as neuromyths. Part of me is a bit ashamed that I not only believed some of the things I read and heard, but also repeated and taught them. However, even that experience taught me a lesson, namely that the world and science is changing, and keeping up with change is part of the essence of learning. The scholarship of Teaching and Learning being not my primary field of expertise, albeit an essential part of my profession as lecturer, called for a framework to make sense of this field. For this reason, I formulated two scaffolding schemas to organise research results in easy-to-remember and ready-to-use ways.

The first is to describe learning in three movements, namely Identity, Mastery and Legacy. Learning is so much more than merely memorising. It involves the Identity of the whole person in all aspects of being. It is drawn towards leaving a Legacy, and along this journey being influenced by the experience of meaningfulness (or not) of learning, and how it supports the learner’s journey towards his or her life goals. It is impacted upon by the habits and strategies the learner employs in search of mastery.

The second framework is what I call the Golden Spiral of Life-long Learning. Based on Gestalt Theory as well as Mental Schema Theory, it depicts learning as a trajectory, with pertinent milestones along the way. It is a scaffolding framework or a sense-making schema, summarising all aspects of the learning journey, and it is based on research about what effective learning entails, as described by research in the Sciences of Learning. It depicts the learning journey as a Fibonacci spiral where each aspect along the spiral adds to the value of the preceding in an ever widening and enhancing manner, with an overarching eye on metacognitive understanding of the constituent parts – mirroring the formula 1.6, which is that of the Fibonacci code. The spiral depicts the fact that learning is not an atomized, disjointed “ten-tricks-to-ace-maths” kind of activity. It is a coherent, mutually supportive set of habits and strategies, each individual aspect enhancing the effect of the others. The milestones are aspects of learning – learning goals, preparing and planning for learning,



actual learning strategies, learning from mistakes, learning help and support, and progress management. An overarching aspect of reflecting on each of these aspects are also important – being metacognition.

Research in the learning sciences is usually focussing on small, isolated aspects of learning, in order to meet the expectations and habits of scientific research. This makes it difficult even for seasoned insiders to have a comprehensive view of the field, and to categorise individual research contributions. It makes it especially difficult for practitioners and second-discipline users to use research results in practice. The sense-making ability of the Golden Spiral has been tested and preliminary results published (Gous 2018).

There are some publications that attempt to provide a more comprehensive summary of what effective learning entails, which I consulted in developing the Golden Spiral. Amongst these are:

- Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J. and Willingham, D.T., 2013. Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, 14(1), pp.4-58.
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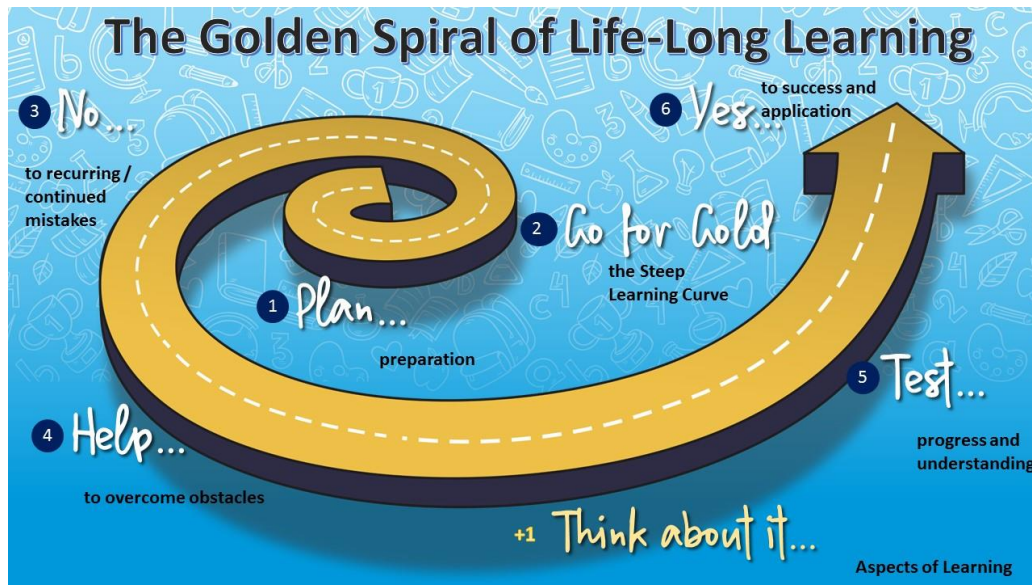
What is depicted in the spiral, is an extraction of what these and other publications mention as predictors of academic success as well as essential aspects of effective learning, but operationalised into a useable set of habits and strategies for everyone who is somewhere on their learning journey. In this way, it is not a recipe, but aspects one can encounter frequently and repeatedly along the way.

The spiral depicts the fact that learning is not an atomized, disjointed “ten-tricks-to-ace-maths” kind of activity. It is a coherent, mutually supportive set of habits and strategies, each individual aspect enhancing the effect of the others.

**Yes: the goal:** The last aspect is actually the first aspect, and is about why a person studies. This can be part of a long-term life goal, translated into a medium term qualification goal, and made concrete in a short-term study session goal. Although the goal is at the end of the spiral, it is in actual fact the starting point, as in the theory of backward planning versus forward planning (McTighe and Thomas, 2003; Wiggins et al, 2005).

**Plan:** How to reach for the goal, how to plan the learning activity. When the goal is clear, action steps to reach it are necessary. This is once again divided into long, medium and short-term action steps. It is also about focus and being available to learn.





**Figure 1: The golden spiral of life-long learning**

**Go:** How to perform the learning tasks. This aspect is how to memorise and understand data, information and knowledge, and how to master necessary skills. The goal here is to be aware of many learning strategies, and to choose those geared for the specific learning task at hand.

**No:** How to manage mistakes and failures. Mistakes and failures are always part of learning. It is important to expect them, and to learn from them – what kind of mistake it was, and how to correct and, in future, avoid them.

**Help:** How, where and when to seek necessary help and support. Help needs to be sought after a person attempted a task. Only then can a person know what kind of help is needed and from whom it can be requested, such as from sources, experts or peers.

**Test:** How to assess progress. Assessment of a person’s level of understanding needs to be done all along the way, and not only when writing tests and exams.

**Yes:** Arriving for the sake of departing again. Arrival at a pre-set goal gives feelings of accomplishment. A short-term goal fits into medium and long-term goals, and therefore the arrival at the goalpost is immediately the departure to the next part of the journey.

**Plus One (metacognition):** Thinking about it – reflecting on and understanding the process and the constituent parts. Understanding each of these aspects as well as how they fit into a coherent schema is important for the sentient use thereof.

### **Learning Readiness**

The question is, though, how much do learners know about themselves as learners, about effective and ineffective learning habits and strategies, and about goal directed and meaningful learning. For this reason, learning readiness is defined in this paper as the awareness of aspects that lead to effective learning, the use



of learning habits and strategies that has been proven to be effective, and the discontinuation of habits and strategies that has been proven to be not effective. In this way, it is a narrower understanding of the term, which is usually defined as “Learning readiness is the physical, motor, socio-emotional, behavioural, linguistic, and cognitive skills indicating preparedness to receive formal educational instruction.” (Millians M. 2011).

### **The Development of the Questionnaire**

In order to explore this view of learner readiness, a questionnaire was developed to measure participants’ awareness of the above-mentioned aspects as well as their use of strategies and habits identified by reputable research as to which are regarded as being effective or not. The questionnaire investigates each of these aspects along the depicted learning trajectory (Bradburn, Sudman and Wansink, 2004; Brace, 2018; Leppink, 2019).

However, merely identifying what they know and do not know, what they do and don’t do, is not enough, and to my mind also not ethical. A subsequent goal is therefore to make learners of all ages aware of all of these aspects and eventually to provide feedback about results. In this way, they will have a better idea about their strengths and weaknesses in their learning armor, thereby providing guidelines for growth and remedy.

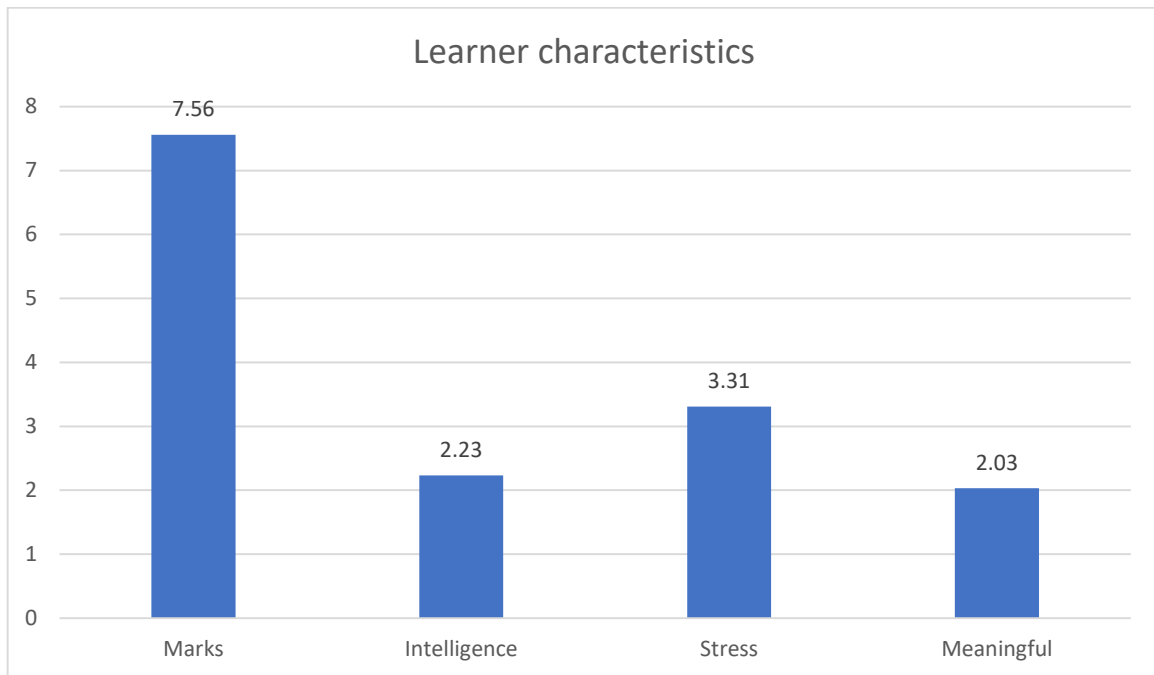
The questions posed in the questionnaire are the following, with the rationale of each question as well as the research upon which it is based. Most of the questions have 5 possible answers, namely very much like me, mostly like me, somewhat like me, not much like me, and not like me at all.

A pilot study was conducted with 31 students from a university in Nizhny Novgorod, Russia. Similar pilots are being done at universities in Shanghai, China, Mauritius and South Africa, but those results are not available yet. For this reason, I merely provide descriptive statistics of the first pilot, only reporting on the mean, and in the process evaluating the questions in the questionnaire. It has already led to the adaptation of the questionnaire – changing some, leaving out others and adding new questions. As such, the pilot served its purpose. Even so, it already provided some interesting insights about learning readiness, even though it is not yet generalizable due to the small sample.

The questions were grouped according to the rubrics along the Golden Spiral.

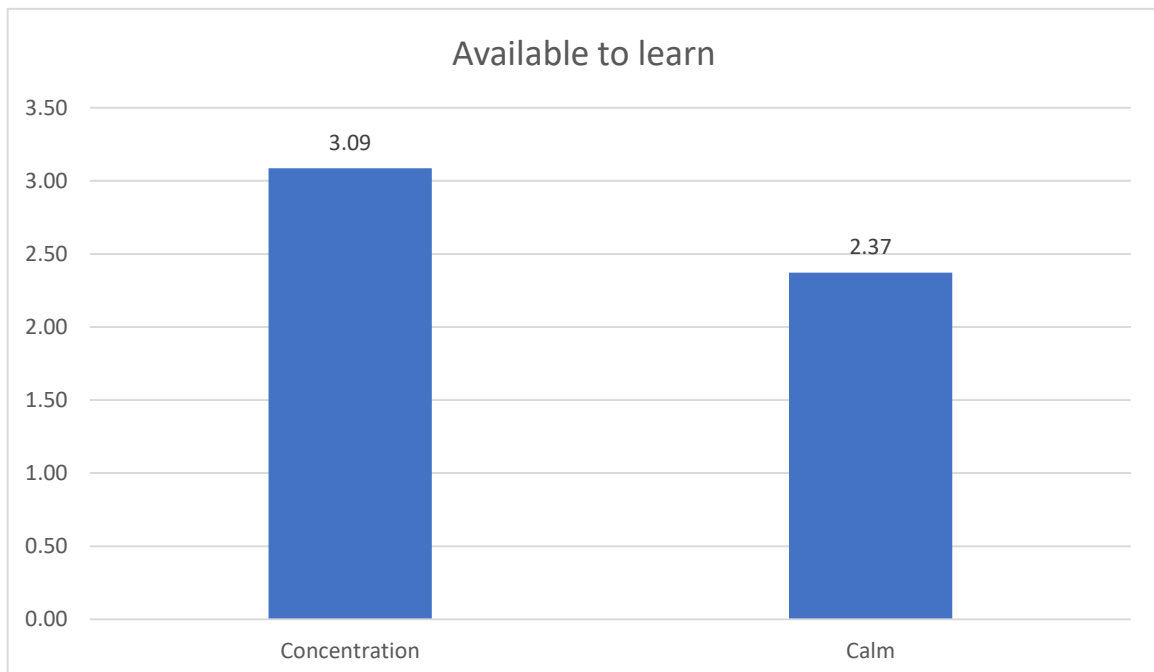
1. *“On your Marks ... Get set ...”. Plan to get going, scouting of the track*

This aspect evaluates the holistic planning of the student’s learning activities – from long term planning of reaching a life goal, to the planning of the session at hand. It also includes aspects about the student him/herself.



**Table 1**

The first four questions are about the learner: past academic performance is a good predictor of future performance, as is academic self-image. Emotions are equally important – negative emotions such as stress hinders performance, while positive emotions such as experiencing learning as meaningful and relevant supports effective learning.



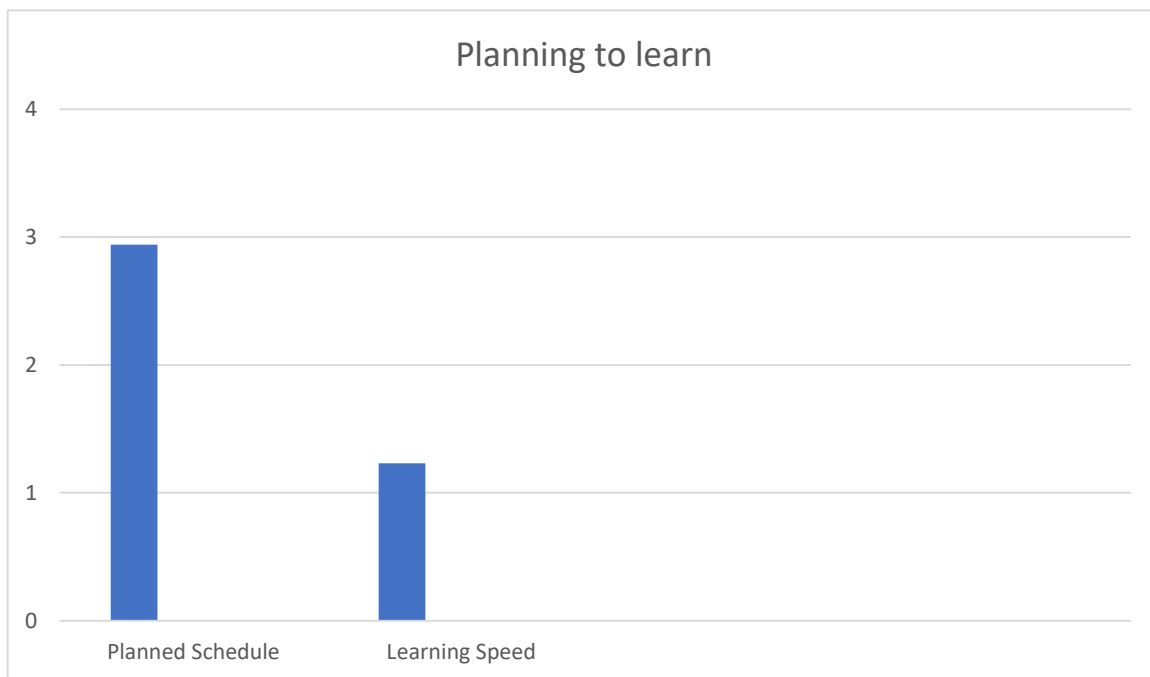
**Table 2**



The students indicated they performed well, although the question needs to be reformulated to refer to specific test results or year results. Even so, they did not deem themselves as particularly intelligent, they stressed while studying, but did not experience what they had to study as meaningful. The results do show that learners can perform well under less than optimal circumstances, probably by sheer willpower or guts. It also makes one wonder what can happen when they learn to view themselves more positively, manage their stress levels, and when educators make sure the meaningfulness of work is attended to.

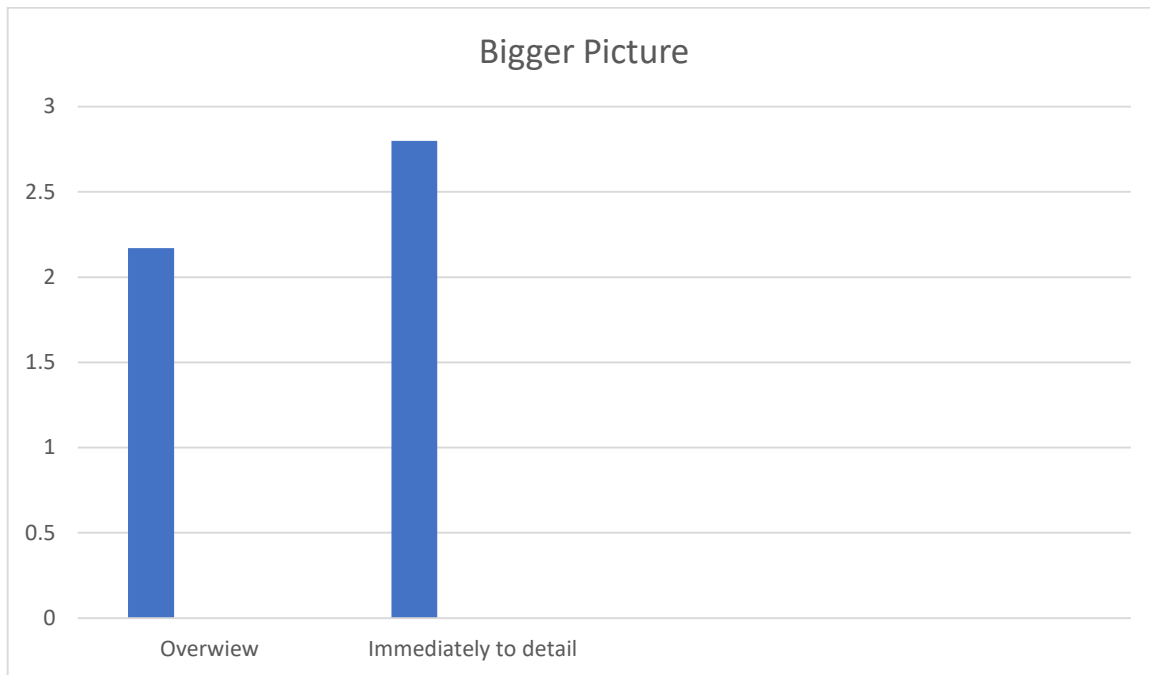
The next six questions are about the onset of learning. Questions 5 and 7 is about being focused and available to learn. Questions 6 and 9 is about being able to plan realistically when and how much to study. Questions 8 and 10 is about enquires about how learners actually start learning – do they start by getting an overview first, or do they dive right in into the details?

Learners report that they worry about matters unrelated to study, and that spills over into their study sessions. In similar vein, they struggle to calm down and become available to learn. Once again, it points to the need that students need to be taught how to self-regulate for the sake of more effective learning.



**Table 3**

Learning according to a schedule could prevent cramming, and knowing one’s reading speed is necessary to be able to plan realistically. In both these instances, the learners do not perform well.



**Table 4**

Learning is about schema building and creating knowledge structures. Immediately diving into the details has the danger of not knowing where to fit the newly acquired information. It seems that these learners do not attend to the bigger picture first.

What were your average marks in your most recent qualification or course?	Predictor of future success
I am a very intelligent person	Self-image as learner. Mindset: Carol Dweck
I stress quite a lot when I have to learn something new or difficult.	Stress and learning. Emotion: Immordino-Yang
I feel that the subjects I am learning is meaningful and relevant to me	Immordino-Yang: we only think deeply about things we care about
There are so many things in my life I worry about that I find it difficult to concentrate	Focus. Daniel Goleman: Inner focus, Outer focus, Other focus
I study according to a well-planned schedule	Planning Gous 2015
Before I begin to study, I take time to become calm and focused.	Focus Goleman
When I study, I begin by first getting an overview of the chapter and the work.	From overview to details Gous 2015



I know my reading speed.	Reading proficiency Gous 2015
I start studying by immediately attending to detail information.	From overview to details Gous 2015

**Table 5: The questions, and the research it is based upon**

### Steep learning curve

This aspect is about learning strategies, as identified and categorized by researchers. It enquires about whether learners know about the strategies, and whether or not they use ineffective or effective strategies. Effective learning strategies, according to the research cited above, are the following:

- Practice testing
- Varied repetition
- Application oriented
- Integration (self-explanation)
- Mnemonic strategies (e.g. Memory Palace)
- Sharing and teaching
- Mindfulness
- Focus without multitasking
- Interleaved, spaced.

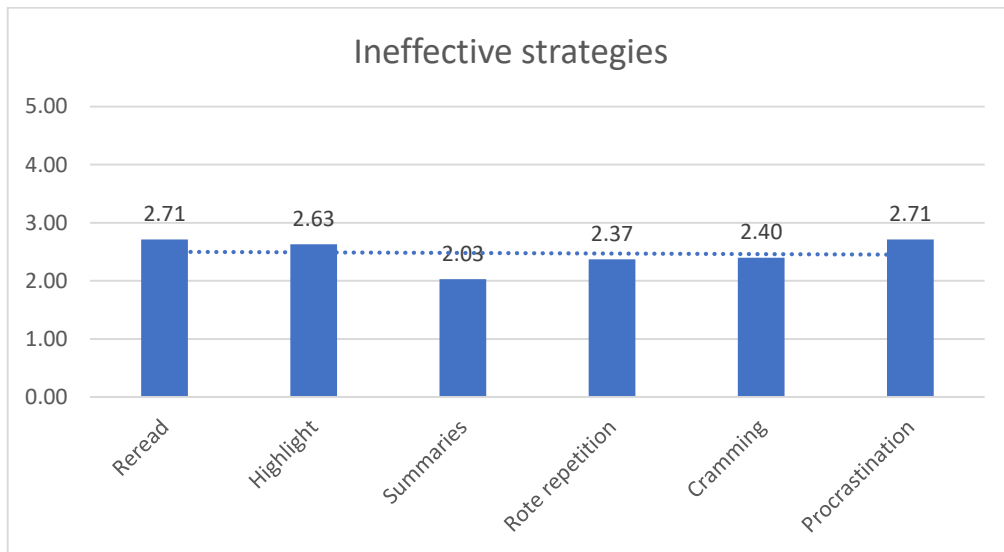
Strategies with moderate utility includes:

- Write concepts out
- Old papers and memoranda

Ineffective strategies include the following:

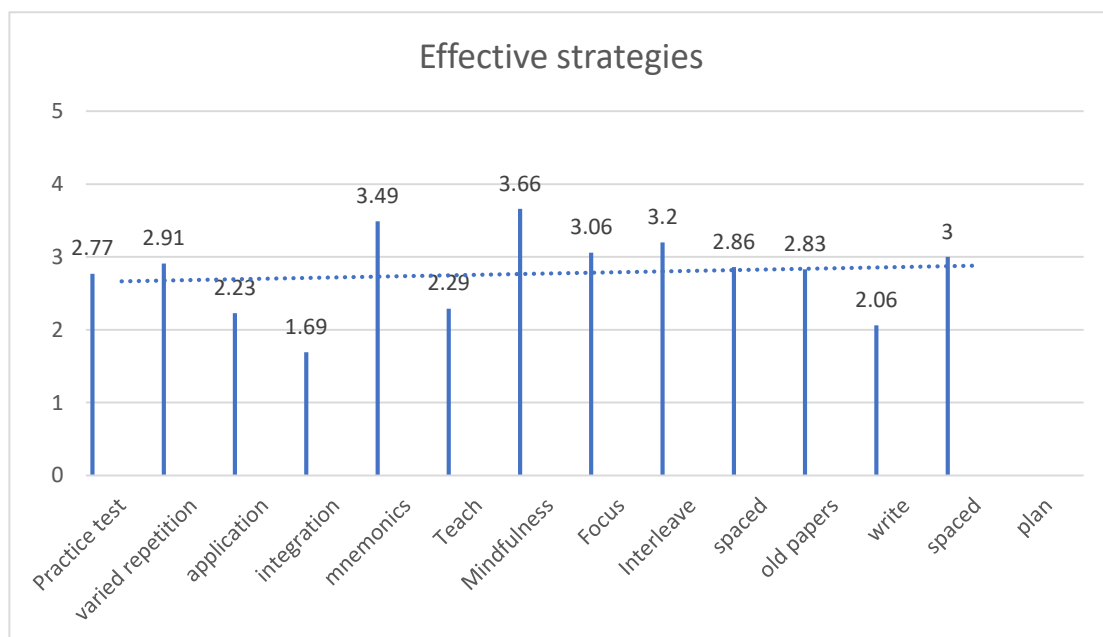
- Read and re-read
- Highlighting and underlining
- Summaries
- Cramming

Question 11 is a general question about whether students have been exposed to some kind of study method course. All of these students indicated they had training. It might be that the question was open for misunderstanding, and therefore needs to be reformulated to distinguish between how intensive these courses were – just some remarks in a classroom, or dedicated courses about effective learning. Questions 12 to 16 and 31 are about what has been identified by research as ineffective or even harmful strategies and habits – Rereading, highlighting and underlining, summaries, mindless repetition, cramming and procrastination. It must be said that there are instances and circumstances where these strategies can be used with good effect, but research has shown that it is usually used in ways that does not support effective learning.



**Table 7**

This group of learners all used these strategies to some extent. Information that these are ineffective, has not reached or impacted on their learning behaviours. Questions 17 to 30 are about habits and strategies that has been identified as effective or moderately effective.



**Table 8**

The most effective learning strategies, namely practice testing, varied repetition and teaching, is used at almost the same mean as the ineffective strategies. As with the ineffective strategies, information about the effective strategies has also not reached or impacted upon their learning habits. The only strategies that have a mean of more than 3, are mnemonics, mindfulness, interleaving and spaced repetition. This is a good sign, but once again it should be more pronounced to be more effective. Learners seem unaware of what effective learning strategies are.



I have attended a study method course, or I have read up about how to study effectively	
When I study, I read, re-read, and re-read the work again and again	g and rereading: et al 2014 et al 2013 ky, et al. 2013.
I highlight and underline large portions of the work that I read and study	hting and underlining et al 2014 et al 2013 ky, et al. 2013.
I summarise my work, or I use other people's summaries	ries et al 2014 et al 2013 ky, et al. 2013.
I learn by repeating, repeating, repeating	on et al 2014 et al 2013 ky, et al. 2013.
I cram the day or two before a test or exam	ng et al 2014 et al 2013 ky, et al. 2013.
When I read something, I immediately repeat to myself to see how much I can remember	e testing et al 2014 et al 2013 ky, et al. 2013.
I repeat what I learn in different and varied ways	repetition et al 2014 et al 2013 ky, et al. 2013.
I think how to apply what I learn to real life situations and issues	tion oriented et al 2014 et al 2013 ky, et al. 2013.
When I study, I explain the work to myself, often in my own words	g by Teaching et al 2014 et al 2013 ky, et al. 2013.
I make use of structured memory strategies (mnemonic strategies), such as the Method of Loci, or others	nic strategies et al 2014 et al 2013 ky, et al. 2013.





I repeat out loud, tell or teach someone what I have learnt	g by teaching et al 2014 et al 2013 ky, et al. 2013.
Before I start studying, I make use of specific strategies to become calm, focused and available to learn	nd mindfulness et al 2014 et al 2013 ky, et al. 2013.
I create situations without distractions while I am learning, for example I put my mobile phone away	nd multitasking et al 2014 et al 2013 ky, et al. 2013.
I learn several subjects at the same time	ving et al 2014 et al 2013 ky, et al. 2013.
I spread my learning over several days and sessions, repeating the same work over time	repetition et al 2014 et al 2013 ky, et al. 2013.
I work through old papers and memoranda	et al 2014 et al 2013 ky, et al. 2013.
I write concepts out in order to remember them	nsory et al 2014 et al 2013 ky, et al. 2013.
I manage to study my work several times before a test or exam	repetition et al 2014 et al 2013 ky, et al. 2013.
I make use of a specific time plan when I study, and I keep to the schedule	g et al 2014 et al 2013 ky, et al. 2013.
I find it difficult to start to learn, and I procrastinate	tination et al 2014 et al 2013 ky, et al. 2013.

**Table 8: The questions, and the research it is based upon**



1. “No ...” Wrong turns, mistakes

Mistakes and failures are part of learning, and should be seen as learning opportunities. However, there are categories of mistakes, and learners should be able to identify and understand their mistakes, in order to prevent them for making the same mistakes repeatedly.

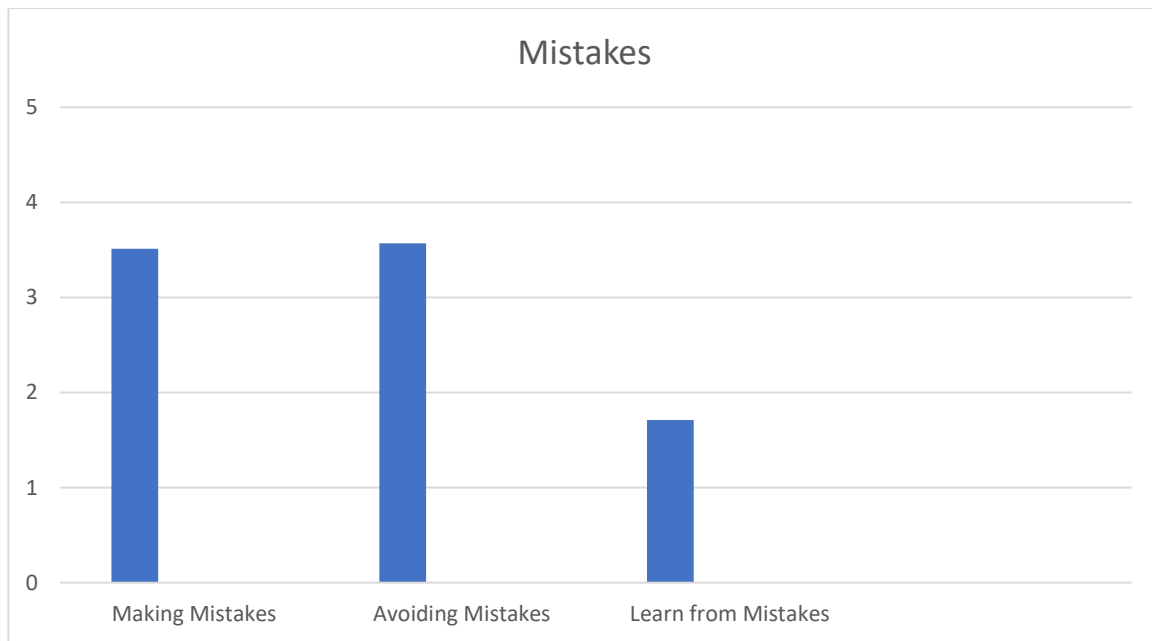


Table 9

Questions:

I often make mistakes while I learn, and get easily confused	Carelessness
I believe making mistakes while learning are to be avoided at all costs	Mistake avoidance
I believe making mistakes are providing opportunities to learn and understand	Learning from mistakes

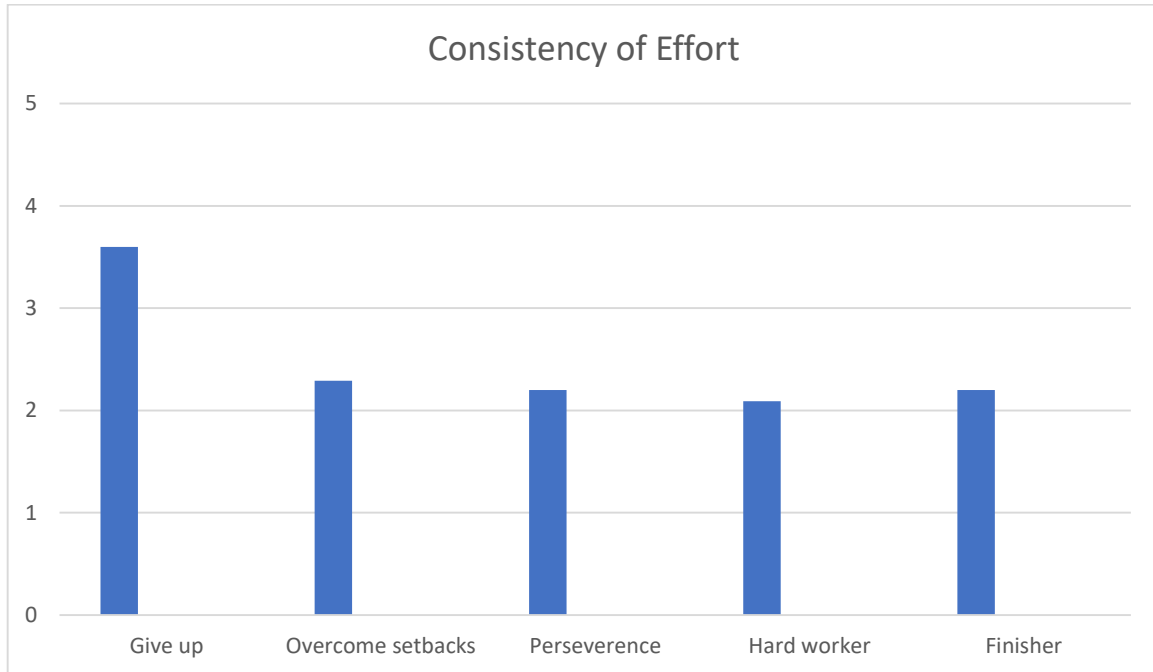
It seems learners make mistakes, try to avoid them, but do not (know how to) learn from them. There is much written about productive mistakes, mistake-friendly teaching and –classrooms and how to make mistakes. Once again, it seems as if these research results have not yet reached or impacted upon the learners.

2. “I need some help ...” Impasse, Dead ends, confusion, Give up

All learners need help and support. Some learners, however, request help as a way of getting someone else to do their work on their behalf. Learning is effortful, and help should be requested after a learner already attempted to do the learning, knowing what kind of impasse has been reached. Help come from different



sources, such as educators, peers, authoritative sources, etc. Learners should also be able to evaluate help critically.



**Table 10**

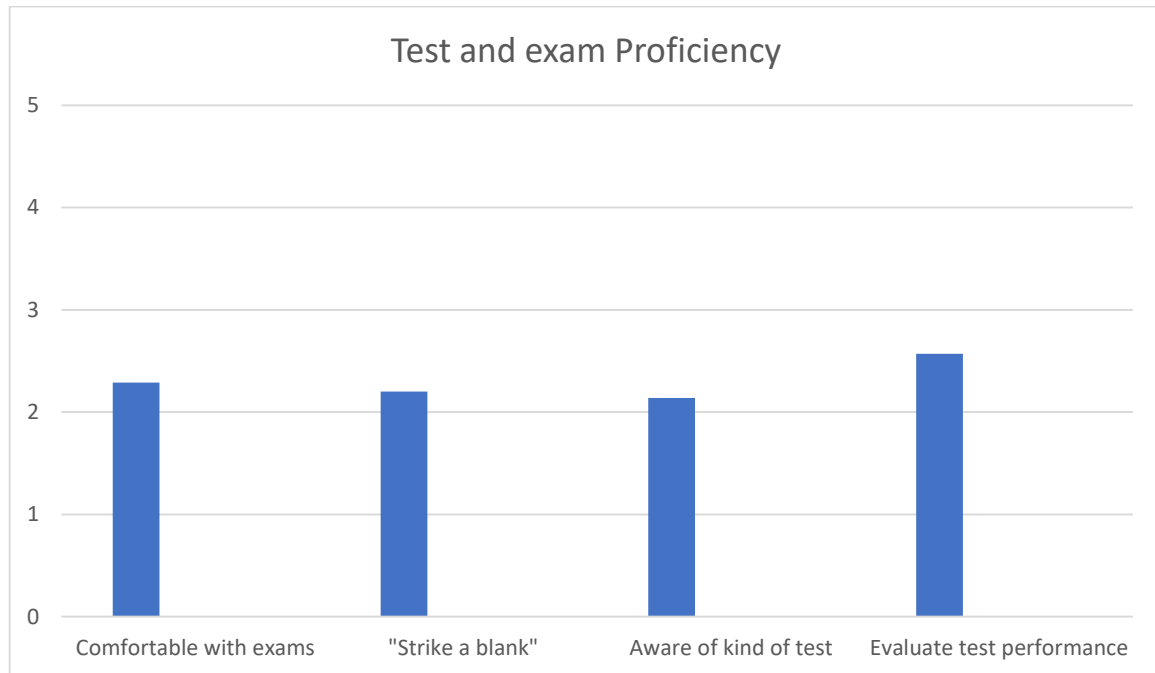
Duckworth’s research on grit has two focal points, one being consistency of effort, which is being evaluated here. It seems the learners do not do well in this regard, giving up fairly easily, and do not overcome setbacks, persevere, work hard and finish what they started. These habits can be learned, and therefore it should be modeled and taught.

**Questions:**

When I struggle with mastering a difficult part of my work, I give up fairly quickly.	Grit: Consistency of Effort (Duckworth)
Setbacks do not discourage me.	Grit: Consistency of Effort (Duckworth)
When I struggle with mastering a difficult part of my work, I persevere until I figure it out.	Grit: Consistency of Effort (Duckworth)
I am a hard worker.	Grit: Consistency of Effort (Duckworth)
I finish whatever I begin	Grit: Consistency of Effort (Duckworth)

**3. “Test and Assess” Taking stock, Fitting it in**

Testing is more than writing tests and exams. It is a continuous process of evaluating one’s own progress, and that should take place throughout the learning trajectory.



**Table 11**

Students need to provide proof of learning, and traditionally the method of choice to do that is by means of tests and exams. Students therefore need to know how to show what they know in these ways. The results indicate they are not very comfortable with writing exams. They also do not always make sure they know what kinds of questions are going to be asked – which is a prerequisite for proper preparation for exams. Equally, they do not think back about their exam writing performance. “Striking a blank”, which is an indicator of exam anxiety, is however, also on the lower side.

These results point to the fact that exam writing skills are not taught sufficiently, and could and should be included in teaching content, without degenerating into exam coaching.

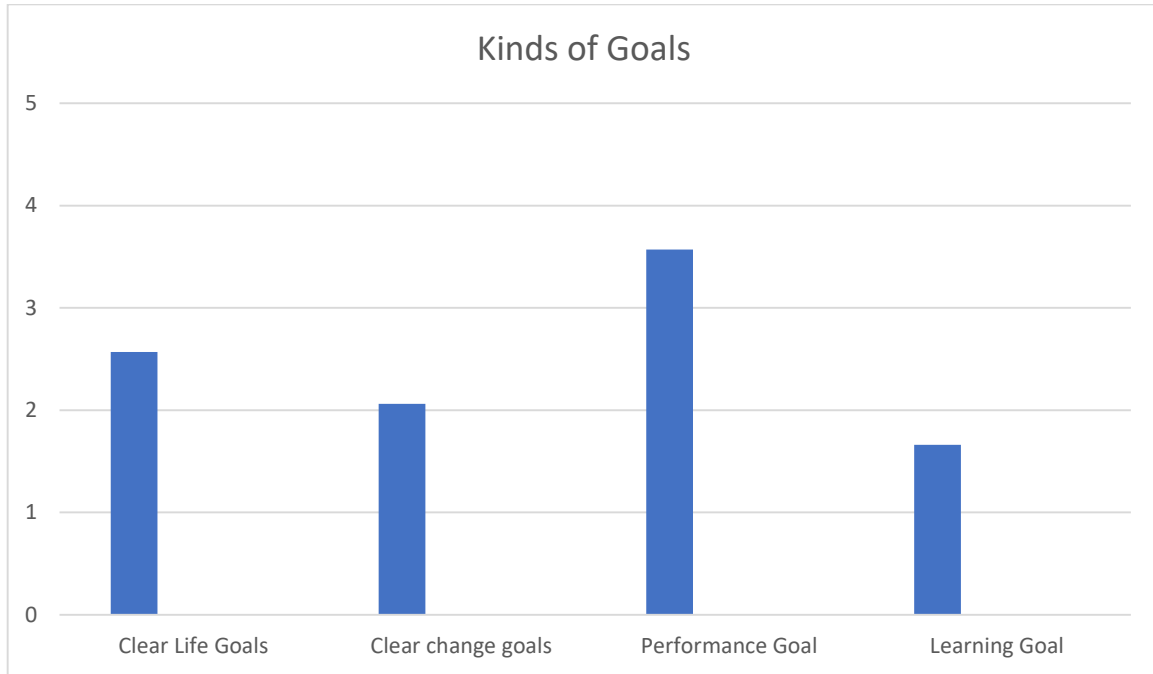
**Questions:**

I am comfortable in my abilities to write tests and exams	Exam proficiency Gous 2015
I sometimes “strike a blank” in a test or exam	Exam stress Immordino-Yang
I find out what kinds of questions will be asked in a test and exam	Testing awareness Gous 2015
After I have written a test or exam, I think about my performance and try to understand where I did well and where I had difficulty answering the questions.	Metacognition Gous 2015

4. *“Yes: Done and Dusted!” Goal reached*



A goal is something that pulls someone towards it. Therefore, a learner should start by formulating personally meaningful goals, and then start the planning and the steps to reach it. Reaching a goal is at once the starting point of following goals.



**Table 12**

The experience of the meaningfulness and relevance of what is being learnt, is crucial for being motivated to learn and having an internal locus of control. In this sense, long term life goals are important. The results indicate that learners are not doing well in these regards. They do not report a strong view of long-term life goals, nor a clear *raison d'être* being the most important reason or purpose for someone or something's existence. This then reflects that they focus on performance goals, namely making a good grade, more than having learning goals and mastering the information for the sake of knowing and applying.

Once again, this is a reflection of how educators teach and what they model to the learners as being important.

**Questions:**

I have a clear goal regarding my future, and where I want to go in life.	Goal Planning Gous 2015
I have a clear passion about what I want to change for the better in my life and the world	Backward planning McTighe 2003, and Meaningful learning Wiggins 2005
My most important goal in learning is to attain a certain mark or percentage in a test or exam	(Performance goal) Gous 2015



My most important learning goal is to master a subject area, and the marks will be good because of that.	(Learning goal) Gous 2015
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5. "How did I do?" Evaluation and Metacognition

Metacognition is crucial for effective learning. Understanding each aspect along the trajectory causes insightful use of each aspect.

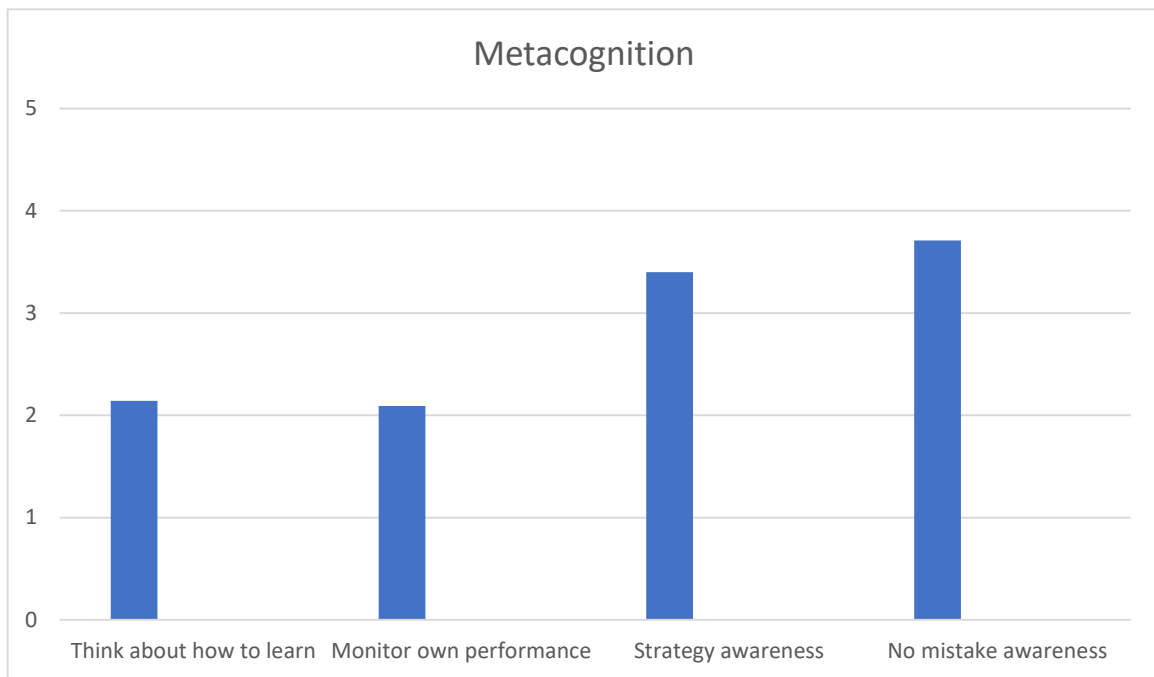


Table 13

Metacognition and understanding the processes of learning is crucial for effective learning. The results indicate that learners underperform in this area. They do seem to be aware of different strategies of learning, but struggle to understand and interpret why they made mistakes or why they underperformed. These aspects could and should be taught as an imbedded part of content teaching, and therefore it once again reflects back on the way educators teach and the way learners see their learning tasks.

Questions:

I regularly think about HOW I learn, not only WHAT I have to learn	Metacognition Gous 2015
I usually can predict accurately how well or how bad I performed in a test or an exam	Metacognition: Monitor Gous 2015
I know many different learning strategies, and I know when to use which in order to learn effectively	Hattie & Donoghue Plan: Select strategies
I struggle to see what I did wrong and how to do things differently in future	Metacognition Evaluate Gous 2015



## **Preliminary Results**

A pilot test has been done on students from the Higher School of Economics in Nizhny Novgorod, Russia. Further studies are underway with more students in Russia, but also in Mauritius, China and South Africa, with more countries and universities about to join the project.

The pilot was a small sample of only 32 students, and therefore the results are not yet generalizable.

Reporting on results when a larger sample and results are available, will be reported on in 8 segments, focussing on each of the subsections identified along the spiral, as well as an overarching summary of all the aspects.

Reporting only on the mean of a small sample, the primary goal of the pilot study was to test the feasibility of the questionnaire, and to see whether the questions are well understood and clear to answer. For most of the questions, it seems to be the case, with a few questions that need to be changed.

Even though the sample is small and the results not generalizable, it does point in a direction that learners are not well versed in knowledge about effective learning strategies and habits. Learning can take place and learners can do well in the mastery of their subjects even by using ineffective habits and strategies, but the process can be much less cumbersome and much more effective and enjoyable if learners learn in ways that will make the process less cumbersome. However, this needs to be modelled and taught by educators, and then embraced and used by learners.

This questionnaire can serve the function to indicate which areas a student needs to focus on in order to learn and study more effectively.

Learning is a universal human activity. Learning effectively for the mastery of specific knowledge and skills mastery needs specific, particular and individualised teaching, coaching and modelling for learners to master the art of learning.

## **Future Research**

The questionnaire is in the process of being used with students from diverse countries and cultures, with a much larger sample. This will enable us to triangulate results, and also to point to generalizable trends, but also particular instances.

## **Conclusion – Damascus-at-a-Distance versus a Damascus-a-Day**

Effective learning goals, habits and strategies are crucial for student success. Learning is a life-long endeavor, crucial for people to be skilled, re-skilled and up-skilled during their entire lifetime. The reality, however, is often that learners are not taught how to learn, but only coached how to pass. They may perform reasonably or even exceptionally well at school, but then struggle at tertiary level, in online or in workplace learning. Added to this, there are several tenacious neuromyths doing the rounds, promoting strategies that are actually doing more harm than good.



The Sciences of Learning have identified learning goals, habits and strategies that are based on reputable neuroscientific, cognitive psychology and pedagogical research. These research results do not always find their way into the classroom, neither do they change the ways in which learners actually learn. Reasons for this are many, some being that teachers, lecturers, learners and students are not informed about it, nor are they modelled to use them.

In order to measure the learning readiness of students, as well as the modeling readiness of lecturers, a questionnaire was developed. This questionnaire is based on a scaffolding framework developed by Prof Ignatius Gous from the University of South Africa, called the Golden Spiral of Life-Long Learning. Grounded in Gestalt Theory as well as Mental Schema Theory, it depicts learning as a trajectory, with pertinent milestones along the way. The milestones are important aspects of learning – namely 1) life and learning goals, 2) preparing and planning for the learning journey, 3) actual learning strategies, 4) learning from mistakes, 5) learning help and support, and 5) progress management. An overarching aspect of reflecting on each of these aspects are also important – being metacognition - encouraging students to think about their thinking and learning.

The questionnaire was completed by staff and students from several universities, namely the Higher School of Economics in Nizhny Novgorod in Russia, the Open University of Mauritius, Shanghai Open University in China, and the University of South Africa. Only the results of the students of HSE in Russia were reported here.

The paper discussed the development of the questionnaire and the research it is based upon, as well as the preliminary results obtained. The preliminary results point to the fact that students have differing levels of learning readiness, but in overall terms, they need teaching and modelling of learning strategies as part of their online curricula. These results added a goal to the use of the questionnaire. It is not merely to measure learning readiness. It is also a tool to give feedback to staff and students, enabling them to reflect on their readiness and to embark on a journey to become skilled in the art of lifelong learning.

In order to be a true educator, both content and the ability to master the content needs to be provided to students. The realisation that this is what I actually need to do was my Distance Education Damascus Experience. Teaching students to become effective life-long learners might have them experience a Damascus-a-day Experience – which in essence boils down to effective and life-changing life-long learning in action.

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## The Effects and Benefits of Asynchronous Fora: A Student Perspective

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### Abstract

The use of online asynchronous fora is becoming common in formal distance education. These fora usually form part of the Learning Management System (LMS) and students use them to communicate with each other (and tutors) in a closed environment. If we take the assertion of John Seely Brown (2007) in his OpenLearn conference speech that learning “is socially constructed”, then it becomes clear that in distance education, where students are unable to communicate with each other as they would on a face to face course, the institution must facilitate discussion so that their students can reach an understanding of the course material (Verenikina, et al., 2017). My perspective on the use of fora is informed by my experiences as a distance-learning Masters student. My first distance-learning Masters degree (MA Classical Studies) was conducted without online enhancements, whilst my current experience (MA in Online and Distance Education) is both studying and embedded in online tools including fora. The introduction to the study experience of online asynchronous fora is a transformative online pedagogy for the distance learner, elevating their experience by allowing access to a study group of their peers (and also tutors) and offering up a platform to enable discussion. Online fora can form the study group that Brown (2007) identified as one of the critical factors relating to student success (replicated specifically in relation to participation in online fora in Gao et al. (2013) and Schaefer et al. (2018)). With more students today moving to online or blended study for further degrees or additional qualifications, the online asynchronous forum has become “one of the most important spaces for knowledge construction” (Olesova et al., 2016). It can even provide distance learning students with a community of practice through their interactions and shared purpose in this closed space. This paper synthesises some of the recent work on online asynchronous discussion fora examining advantages, disadvantages and features such as their asynchronicity, design, impact on student performance, the participation, collaboration and identity of learners and the role of tutors in fora. The paper concludes that they are not a magic bullet that will ensure student success simply by their presence but should be strategically incorporated into the overall learning experience. In this learner’s (and other’s) experiences, they provided welcome opportunities for collaboration, community and deeper understanding that distance learners would otherwise miss.

**Keywords:** Fora, Asynchronous, Online Education, Forum, Participation



## Introduction

The use of online asynchronous fora is becoming common in distance higher education, such as in the modules that I have recently studied with the Open University (in contrast to my previous experiences with Masters level study at the Open University where I had a paper reader and my only option to converse with other students was during the infrequent (possibly annual) face to face tutorials that I was unable to attend). Recent developments in MOOCs are also now providing learners with message boards and therefore a space for them to interact.

These fora usually form part of the Learning Management System and students are able to use them in order to communicate with other students on their course in a closed environment about the learning material. Olesaya et al. (2016, p.35) defines fora as “one of the most important spaces for knowledge construction”. In Brown’s conference speech (2007) he discusses social learning – “we participate therefore we are”. Brown’s central argument is that in order for us to have a true understanding of anything we need to be interacting with other people. He points out studies have consistently demonstrated the best indicator of academic success in a course is whether individuals participate in study groups. For distance learners today we can posit that online asynchronous fora can go some way in replicating the learning discussions that other students in face to face situations may experience in their studies (Verenikina, et al., 2017). Brown (2007) also suggests that there is a benefit to observation – one student being critiqued by a tutor will benefit all students listening. In a distance-learning environment we may be able to substitute the practice of lurking (reading but not contributing) on fora (see Chen & Chang, 2011 paper on lurking in fora) although Parks-Stamm et al. (2017) citing Palmer et al. (2008) study disputes this by linking academic outcomes to the number of posts a user made. It was the introduction of fora into my Masters learning experience that marked the key differentiator for me between this and my previous study experiences as a distance learner and has encouraged me to examine them in this paper. This paper will synthesise some of the key debates around the use of, advantages and disadvantages of fora: their role in conversation, engagement and participation, the influence of tutors and the nature of how they can contribute to individual and collaborative work at post-graduate level. It concludes with some recommendations as to their use.

## Learning Conversations

By providing students with a space to come together and discuss the course and materials, fora facilitate collaborative learning (Brown et al., 1989, p.40). Schaefer et al. (2018, p.12) says that these forum-based conversations between students “are equally as important as the offered course content”. Gao et al. (2013, p.472) and Olesova et al., (2016, p.35) both explain that for learners to construct knowledge, they need to be able to communicate with each other, exchanging experiences and views in order to develop a richer understanding. The advantage of fora for online students is that they “allow students to actively engage in the learning process” (Parks-Stamm et al., 2017, p.1250), which can be difficult outside of a traditional classroom setting.

In my experience I have certainly found that interaction with others in my tutorial group in both fora and tutorials has deepened my understanding of the material. On my first module online, for an activity 1 (on Brown’s speech), in week two of the course had 90 posts in the forum. Hornby (2018) summarises in her post



saying “you can gain knowledge from individual work” but “an understanding is socially constructed”, meaning you can deepen your individual understanding if you explain or discuss it with someone else. Such conversations (Griffin, 2018) help students to engage more deeply with the materials and develop critical thinking behaviours as students are challenged on their ideas or find themselves comparing their experiences with those of others and discovering connections which they had not previously seen. The whole thread in the module forum has posts agreeing that discussion and collaboration with other students facilitates engaging in critical thinking and thus deepens our learning and understanding. Going back to Brown’s claims for success, it would be interesting to see if participation or tutorial attendance has had an effect on student outcomes on the courses I studied, but this data is unavailable to me.

Fora (and live tutorials) allow students to interact with another and this allows learning design and the associated pedagogy to include elements of discussion and reflection more easily than distance-learning without such aspects. Gao et al. (2013) sees the benefits of online fora, allowing students to interact and use learning practices based on the ideas of dialogue and conversation (citing in support Gerosa et al., 2010; Kayler & Weller, 2007). By allowing students to interact with each other, levels of critical thinking and reflection can be achieved that students may struggle to reach on their own (Parks-Stamm et al. 2017). These assertions are also considered by Olesova et al. (2016) and Schaefer et al. (2018) whose studies involved coding forum posts against collaborative learning models.

Research on MOOCs as a new form of pedagogy is summarised in Ferguson et al. (2016), which highlights the use of conversational learning (found in FutureLearn as opposed to the instructional approach seen in Coursera (although Coursera appears to be moving to a similar structure)) and encourages course authors to make space for learners to share stories or problems in order to collaborate in problem-solving. The use of fora in such online learning courses can also nurture a feeling of community (Schaefer, 2018) amongst students who may otherwise feel isolated in their studies, lacking a face to face or physical campus-based element. Gao et al. (2013, p.469) cites DeWert et al. (2006) and Yang, et al. (2010) in their assertions that by facilitating the asynchronous asking of questions and providing answers, fora can help build such communities by these interactions. Such communities of practice as well as helping to bring the benefits of belongingness (one of the psychological aspects of ownership) are also known to enhance and deepen learning.

Sfard’s (1998, p.5) paper on metaphors for learning explains the participation metaphor as the “process of becoming a member of a certain community...(entailing)...the ability to communicate in the language of this community”. Sfard explains that in this context a student moves from being “a lone entrepreneur...into an integral part of a team”. Activities that allow for establishing social presence at the beginning of the course (such as providing time for students to introduce themselves, explain their reasons for studying and what they hope to get out of the course) can be critical to establishing a sense of the group and forming a community. Schaefer et al., (2018, p.2) talks about the importance of establishing social presence so that students can relate as a group. Beginning talking about what they wanted to get from the course (p.12), participants were able to show their personalities and background which helps them to establish common links and relate to each other. With fora in courses, students are provided with a network (or community) of learners with similar aspirations and objectives to whom they can reach out to and easily communicate with. This was missing from my previous distance-learning study, leaving me feeling isolated in my studies with no



way to connect with my fellow learners and not just discuss course material, but also form a sense of community with.

### **Asynchronicity**

The use of fora differs from tutorials and classroom discussions by the fact that these fora are asynchronous. One of the advantages of such a technology is that we do not have to be physically present at the same time to be able to participate in the conversation; we leave our message and reply to others from wherever and whenever we happen to be, thus freeing us up in terms of both space (though so do online tutorials or phone-calls) and time. Both Parks-Stamm et al. (2017, p.1250) and Gao et al. (2013, p.469) highlight the benefits student participation in freeing up the constraints of time and location, making study more flexible. Parks-Stamm et al. then goes further, explaining this means people can continue to discuss a topic for as long as there is interest and no matter how many people have already responded. In a face to face conversation (or via live online conferencing tools) there can often be a forward momentum in conversation and if your thoughts on the topic coalesce after other participants have moved on, it can be hard to steer conversation back to the previous topic in order for you to voice your opinion.

Of course this also happens in forum conversations; if you are behind in a particular week you may find students have moved ahead onto the current week's discussion points and you may not get a response or you may discover that your thoughts have already been articulated by someone else and it feels too late and ineffective to respond, "I agree". However, in fora such movements tend to occur over days and weeks rather than over the course of a conversation. The forum also captures a physical record of the conversation so it remains for people to find and expand upon it (subject to restrictions of the Learning Management System (LMS)). Verenikina et al. (2017) also suggests that forums can even be a better way to deepen understanding than face to face discussions because their nature allows "time for reflection and extended opportunity for interaction", citing (Brace-Govan, 2003; Guiller, Durndell & Ross, 2008).

Face to face conversations benefit from visual and audible cues indicating how somebody feels about what you have said and adding additional information about exactly what they meant. This information is missing from fora (a disadvantage) but fora do allow people to formulate their thoughts before commenting (Gao et al., 2013, p.470) and view a history of what has been discussed. An advantage of this is that it can make conversation feel easier for introverts or people whose first language is not English (Parks-Stamm et al., 2017, p.1250) as people have time to construct their thoughts, check spelling and grammar and even references, which can remove potential barriers to participation. For students who have a disability meaning they are unable to speak or have difficulty in speaking, they can also interact in such a way that other students have no way of knowing about their disability, unless the student chooses to reveal it. Similarly, people who may have anxiety disorders or other limiting factors where face to face or live audio communication may create feelings of anxiety and create barriers to their participation, can also benefit from fora. Even in live tutorials that facilitated audio conferencing, many people also felt inclined to type their responses in the chat area, rather than by speaking. Typed and text-based communication (whether synchronous or not) also appears to be something that students can feel more at ease with. Behind your computer you can construct another identity and this can help you to feel more confident (Peachey, 2010, p.16).



## Engagement

For all their benefits, a well-known issue with the use of fora in courses can be simply a lack of engagement from students. Verenikina et al., (2017, p.3) summarises this as “limited interactions...low contribution rates”. Sadly, as Schaefer et al. (2018, p.2) points out, creating opportunities for students to share doesn’t necessarily mean that they will and making participation mandatory can result in poor quality contributions from students (Verenikina et al, 2017, p.15) with little interaction or collaboration. Dommett (2018, p.2) agrees that it can be hard to get students to engage unless this is linked specifically to assessment.

Some studies on the effectiveness of forum discussion involve the coding of forum posts and aligning this coding with learning models in order to evaluate how effective forums have been for enhancing student learning (eg. Olesova et al. (2016) looking at scripted roles and Communities of Inquiry, Schaefer et al. (2018) coding on collaboration models, Dommett (2018) conducted a small scale study not coding posts but asking students to comment on how frequently they used forums and for what purpose). Other studies (eg Parks-Stamm et al., 2017) are more concerned with participation and numbers of posts.

In my study forum there was a noticeable reduction in the numbers of posts in latter weeks (after it stopped counting towards marks) which my tutor said was the usual pattern. My other course that was not specifically on online learning, having two forums (a general one for all students and then one just for my tutor group) provided some shielding from the impact of low participation – if your tutor group was unresponsive you still had the bigger course-wide forum to draw on. But bigger is not always better; Parks-Stamm et al. (2017, p.1252) looks at some studies on the effects of class size on forum participation with conflicting findings. The paper cites Orelana (2006) who found faculty thought that a minimum of 15 students were needed, whereas Schellens et al. (2007) recommended groups of between eight and ten because a larger group would result in too much discussion/noise and could intimidate students. However much of Parks-Stamm et al. (2017) study is largely concerned with participation and post numbers with no examination of post content. Some MOOCs may have hundreds of posts on popular parts of a course (often the introduce yourself) which may overwhelm learners and can be difficult to navigate. It is likely that in such circumstances there is less discussion but rather more posting one’s own opinion (or introduction) which may not be conducive to learning discussions.

## Collaboration

To do something collaboratively is to involve more than one person in the endeavour, whereas to do something individually, is to do it alone. Usually students are set assignments which are produced individually, although there may also be group work. However, this definition is concerned with the production of artefacts and learning is of course more than just that; it is also about our understanding and ability to extrapolate and problem solve from underlying concepts. This has been the main point of difference between my two experiences (rather than the differing course content and academic discipline); previously I was doing individual learning, now there are collaborative elements and a community.

Brown et al. (1989) discussed the features of group/collaborative learning in a paper on cognitive apprenticeships through authentic activity and specifically, collaborative learning (1989, p.40). The characteristics of group learning in this context of “enculturation”, are that group discussions can “give rise



synergistically to insights and solutions that would not come about without them”. This kind of dynamic in a community can also “be efficient in drawing out, confronting and discussing both misconceptions and effective strategies”. This is exactly what was discussed in my study forum on Brown’s (2007) presentation (see Learning Discussion section) and what I have found collaborative about my learning experience on this course. Cheng et al. (2011) summarises that the opportunities for discussion provided by fora promote collaborative learning which leads to enhanced understanding of course material and concepts

If learning discussions and collaboration can lead to a richer understanding of material, then the use of fora by students could improve academic performance. Although both Parks-Stamm et al. (2017) and Gao et al. (2013) caution that supplying a forum doesn’t guarantee that learning will happen, Parks-Stamm et al., (p1251) cites studies (including Palmer et al. (2008) and replicated elsewhere) that show the “number of new posts students contributed to the forums predicted their final grades” and Dommett (2018) also cites research suggesting this. Cheng et al. (2011) own study confirms this finding and they explain that when students share their thoughts with others they get feedback from peers and this allows them to reshape their thoughts and achieve a higher level of understanding. Schaefer et al. (2018) go further, asserting that quality course materials must be supplemented with student interaction; forum discussion is as important as the course content. It is likely that context will be key and the usefulness of a forum will depend on the course activities, forum design and the learners.

### **Tutors and Design**

Fora can enable tutors to be present but studies are conflicted about their level of impact on student engagement. Parks-Stamm et al. (2017, p1251) read studies where the more the tutor posted the more students did (Jiang and Ting, 2000) but also where a tutor posting had a negative impact on the number of student postings (p.1252 citing Park et al. (2015)). Tutors can model appropriate forum behaviour which students may otherwise be unaware of (Verenikina, 2017, p.11) and encourage participation by being friendly, reassuring, acknowledging contributions and encouraging students to share in a positive environment (Schaefer et al., 2018, p.12, Parks-Stamm et al., 2017, p.1256 and Verenikina et al., 2017, p.15)). I experienced this myself when my tutor would encourage discussion when posts on a topic and dried up (but discussion had not got deep enough) and also directly imploring students to participate (which students had also tried but failed at).

A tutor’s presence can also be reassuring to students because you can feel confident that they will intervene if you get confused (Verenikina et al., 2017, p.13) or misunderstand a key concept. For me this was a key differentiator from my previous study experience where I feared that I could have continued for some time misunderstanding a key text or concept and only my tutor marked assignments would set me straight. Now as well as seeing what my peers are thinking and if we are on the same lines, I am also reassured that my tutor would step in and correct anything that was wrong or guide our thinking if we were somehow off-track.

Whilst tutors can model, encourage and if necessary correct, my own tutor was of the opinion that the forum should be about students interacting and the collaborative learning that arises from this, rather than being akin to a forum-based lecture. Engeström (2007) unpicks Lave and Wenger’s (1991) communities of practice, seeing this definition as limited; suggesting that a community of practice needs to have some sort of centre



of excellence (2007, p.42). Engeström prefers to think of collaborative communities (such as open source environments), encompassing co-configuration; which can be defined as “mutual learning from interactions between the parties involved” (2007, p.44). Effective forum discussion by students can be seen in much the same light; collaborative learning and community rather than apprenticeship with a master with tutors acting as guides on the side, rather than dictating the path of discussion from behind the keyboard.

Most LMS fora (such as those I have used in my studies) are “threaded”. In my experiences students complained that they could not “like” posts to signal agreement, or comment on a post; both exercises required adding a new post to the overall thread. Gao et al. (2013, p.469) says a common criticism of fora is that they do not “foster productive online discussions” because posts often contain multiple ideas and tangents. Recent posts (p.472) will usually be prominent, rather than those that are useful or relevant (FutureLearn allows sorting by “most liked”) and their design does not support summarising which may be why most posts are exploratory (p.473) rather than moving to a deeper understanding. Assigning roles to students such as moderator (Olesova et al., 2016, p.37) can advance learning by improving the quality of discussion and moving it forwards (even in a threaded structure). Verenikina et al., (2017, p.5) also recommends making forum tasks both clearly linked to learning outcomes and impossible to do individually (insisting on collaboration and collating different experiences), can also help to reduce these disadvantages of fora.

## Conclusion

Despite my enthusiasm for the subject, fora are not without their faults – you cannot simply build them and hope that they (students) will come, have quality conversations, maintain levels of participation and thus achieve successful course outcomes.. In a report supported by the Australian government, Verenikina et al. (2017, p.3) identifies a number of problems that can prevent student learning (which this paper has examined): “a lack of engagement; limited interactions among participants; low contribution rates and, lack of academic focus” citing other studies to support these assertions (Delahunty, Verenikina & Jones, 2014; Wang & Chen, 2008; Wen-Yu Lee, 2013; Boling et al., 2012; Kim et al., 2016). Gao et al. (2013) found many of the problems that we associate with fora such as a lack of interaction with other students and using the forum purely to present their own ideas, can be linked to the threaded forum design usually favoured by Learning Management Systems. Whilst these findings and criticisms should be noted, it is important to remember that any method of learning or teaching delivery has its drawbacks and that we should not allow such condemnations to prevent us from seeing the significant potential in fora not only to facilitate distance learning, but also to help students reach a greater level of understanding than they could whilst studying alone.

I recommend that tutors should be present in and monitor forum discussions. They can give students confidence, knowing their posts are being monitored so if they get confused they can be corrected and steered back, they can model effective participation posting in a friendly manner, thanking those that contribute, and encouraging critical dialogue by highlighting (and making) counter-arguments. However, this is a skill and tutors should receive training and support on facilitating forum discussion before being expected to do so. Knowing that participation levels can dwindle, particularly when it is not mandatory or counting towards assessment, tutors should monitor posting levels and intervene where necessary. This can be by encouraging students to post, but also by trying to “stimulate affective communication” (Schaefer et al.,





2018, p.12) within the group by linking discussions and course content to relevant and key topics and encouraging students to share their own experiences. Although staff may be concerned that “their comments might inhibit students’ ongoing discussion” (Parks-Stamm et al., 2017, p.1256), studies found that tutor intervention can get students to participate, particularly where classes are small. Sharing findings on the link between forum participation and student success could also help to motivate students.

Forum activities should allow for establishing social presence at the beginning of the course, making time and space for students to introduce themselves and their experiences to the group as this will facilitate the forming of a community. For those students who may be anxious about speaking in tutorials, or sharing their thoughts on course materials, these kinds of introductory postings, coupled with their asynchronistic nature allowing students to draft their thoughts first, can be less intimidating than other kinds of learning discussion. Several studies (Cheng et al., 2011, Parks-Stamm et al., 2017 and Dommett, 2018) have found that success in a course can be linked to the number of posts made by the user and there are mixed views on making posting to fora mandatory (for example Verenikina et al., 2017). There seems to be less research on how the students (particularly those who have experienced other types of study) involved in these courses felt about their learning experiences with fora. Chen et al. (2011) paper on lurking behaviour in fora represents an understudied aspect and the integration of learning analytics into studies previously concerned purely with the number of new posts as influencing learner outcomes.

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## Do Learners Now Have Ownership of Technology-Enhanced Learning?

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### Abstract

One of the key factors that can determine how invested an individual feels in a particular outcome or course of action is whether or not they feel they have ownership of it. Structured online learning today usually takes place in an institutional Learning Management System (LMS) that may impose restrictions on the actions that students (tutors and teachers) can take in the space, such as its look, the content and whether they can export or take it with them during or after their study. These issues have led some to speculate as to whether or not learners can be said to have ownership of their learning when it is technologically enhanced in these ways. In direct contrast to this is the debate around Open; when learners are able to access content directly via the powerful search engines on their own devices rather than having to rely on an education institution, its courses and associated library access. Does the expanding access, openness and flexibility, enabled by both Open and technology-enhanced learning, mean that learners actually have complete control and ownership of their learning and no longer require input or direction from a single institution? This paper first defines what is meant by ownership (including that of owning devices used for learning) and then uses the five dimensions of psychological ownership (Pierce et al., 2001) – responsibility, identity, accountability, self-efficacy and belongingness to examine whether learners can be said to have ownership of their technology-enhanced learning and whether it matters. Each dimension is examined through the lens of two interconnected current debates. The dimension of responsibility is examined through the topics of peer assessment and learning outcomes, belongingness through discussions on social media and participation. The dimension of identity is addressed through discussion on Personal Learning Environments (PLEs) and the use of the institutional Learning Management System (or Virtual Learning Environment). Accountability focuses on reflective journals and blogging and the final dimension of self-efficacy focuses on technology and the shifting power dynamic. This paper draws together some interesting and current debates in the technology-enabled learning space and how we can use these to determine whether learners can be thought to have ownership of their own technology-enhanced learning.

**Keywords:** Technology-Enhanced Learning, Identity, Ownership, Openness, Flexibility

### Introduction

Today's learner may carry out their studies using their smart phone and a laptop, never setting foot into their university's library. Through powerful search engines, Open Educational Resources and the possibilities for self-directed learning, some students may elect not to sign-up to an institution's programme in the first



place. Technology-enhanced learning can be said to provide learners with a greater degree of openness and flexibility in their studies, whilst expanding access for those who may otherwise be unable to engage and continue their education. This paper uses a psychological definition of ownership to examine ways in which learners of today, through technology-enhanced learning can be said to have ownership of their learning and why this is significant.

## What is Ownership?

We first need to define what 'ownership' in this context means and why this is applicable to 'technology-enhanced learning' (as opposed to another type of learning). Both Dommett (2018, p.79) and Buchen (2012, p.3) offer some alternative definitions of ownership. Ownership can be legal (owning the copyright of any artefacts produced during study; which sounds straight-forward but which can be further complicated by storing assignments on an institutional LMS (Learning Management System) or in cloud storage such as Google) or technical (owning the server or software on which or via which the learning takes place, learning analytics). However both definitions are limited, being focused on one well-defined aspect.

The emphasis of the statement on technology might lead someone to focus on ownership in regards to owning devices. The recent emphasis on mobile learning (Ping Lim & Churchill, 2016) and Mobile 2.0 (Pettit et al., 2011) could lend credence to this interpretation; by owning certain devices, you are able to carry out learning on them (I have accessed module forums, checked assignment deadlines and carried out FutureLearn studies all on my mobile phone) which can make learners feel some degree of ownership of their learning; they can take it with them rather than have to attend lectures in a physical premise or go to a library. However, Dommett and Buchen look to another interpretation of ownership; psychological. Buchen (2012, p.5) and Dommett (2018, p.79) both cite Pierce et al. (2001) and the five dimensions that constitute psychological ownership: responsibility, identity, accountability, self-efficacy and belongingness. The psychological interpretation of ownership, instead of the legal or technical (or device-oriented) seems wider, more compelling and relevant than the alternatives. Based on the arguments set out above, I will be using the psychological definition of ownership for this paper. I will be setting out the five dimensions of psychological ownership to form a structure with which to frame my exploration but there is overlap between the dimensions.

## The Five Dimensions of Psychological Ownership

Buchen (2012, p.5-6) offers definitions for each of the five dimensions of psychological ownership:

- Responsibility - an individual feeling responsible for a target or an outcome.
- Identity - how someone's self-identity is revealed through interactions and often by descriptions of themselves
- Accountability - being held to account for thoughts or beliefs, rights and responsibilities.
- Self-efficacy - beginning with efficacy; feeling able to control an environment, leading to self-efficacy, believing that you are capable of performing a task
- Belongingness - the basic desire of people to feel like they belong to something or somewhere



## Responsibility – Peer Assessment and Learning Outcomes

Students can develop a sense of responsibility for learning by contributing to a group work project but also by being involved in the assessment of fellow learner's work. Being able to critically evaluate a piece of work is a skill that can also help learners to develop their own work. Hung (2018, p.19) believes that the use of peer assessment practices amongst school children learning English as a foreign language, empowers them "to gain ownership of their learning". By instilling in the students the confidence (and skills) with which to conduct peer assessments (p.24), this extra sense of responsibility Hung believes, "could empower them to take ownership of their own learning". As well as having increased responsibility, by assessing another's work, learners also become familiar with what makes a good (in this case) oral presentation and are able to apply this learning and understanding to their own work. On a practical level, some MOOC platforms and courses make use of the large numbers of learners on a course by providing a platform to peer assess brief assignment submissions, rather than relying on staff or tutors to carry out this exercise. A learner's own assignment is not submitted for review until they have reviewed one themselves and they can feed back whether they found their peer assessor's comments useful.

This fits with the psychological definition of ownership discussed earlier, which considers responsibility as a key component of ownership. By conducting a peer assessment and thus feeling responsible for the assessment of the work of another, the students feel greater ownership of their own work. Hung (2018, p.21) explains that in the study the students themselves helped to set the criteria for the peer assessments. Hung cites Topping (2009) as suggesting that this practice can also encourage a sense of ownership. One of the strongest arguments against students having ownership of their learning, particularly when we look through the dimension of responsibility, is that usually, targets and outcomes are set by the institution.

The learner does not often get to choose them and this could be seen to mean that learners cannot therefore feel responsibility. For my Open University course, I am producing this assignment by 13<sup>th</sup> August 2018 (it is of course my own choice to rewrite and submit it for a relevant conference!). I have been able to choose which arguments, evidence and structure to use for my discussion of ownership, but essentially, I still have to write about ownership in order to get credits for and ultimately pass the course. Pettit (2014, p.24) shared student experiences of using VLEs (Virtual Learning Environment) where although students may have independently organised their own discussion groups, these could all "be traced back to the requirements of the module, and particularly the assessment".

This could be seen to be taking the dimension of responsibility away from the learner, but as Hung's (2018) study shows, there are other ways to foster responsibility in learners. Hayden (2018a) wrote in the Open University module forum for one prescribed activity "I have not answered the question...but I have made sense of the paper...and taken ownership of that!", demonstrating that although assignments and learning outcomes may be institution set, an individual can still choose how to engage with readings and activities, taking responsibility for their learning and exploring. Choosing to sign up to a programme of study can also be seen as taking responsibility and choice is a very important aspect of ownership.



## Belongingness – Social Media and Participation

Linking to the dimension of identity, social media can foster a sense of belongingness, another dimension of psychological ownership, amongst learners. Pettit (2014) in his paper, explored some of the conflict between students' use of LMSs and PLEs (Personal Learning Environments). He recalls Corrin et al. (2010), where despite 81% of undergraduates saying that they used social media daily/weekly in their normal lives, only 33% said that they used social media for academic study. If a sense of belongingness is a dimension of ownership and is something that can be found through social media; this kind of study or experience appears to suggest that students are not finding this sense of belongingness in their learning through social media. A search for the hash tag of my module code (the now defunct H800) whilst I was studying a course with the Open University on online and distance learning, on Twitter does not overwhelm you with results, but it does show some discussion and link sharing. A search for a module code relating to my module on educational leadership (not in the online and distance learning syllabus) has even less but this is likely influenced by the fact that that module (EE811) assumed no interest or background in online learning. I think what is important here is that a sense of belongingness is very personal. Just because you do not see large amounts of activity on Twitter and only 33% of students say they use social media for academic study, does not mean that learners do not feel a sense of belongingness with such a community, supported by technology.

In my own module study, myself and two other learners came together away from the forums to form a Whatsapp group to talk about the module, H800: “look at us, taking ownership of our learning and moving out of the VLE”, (Griffin, 2018a); “I KNOW!!!” (Hayden, 2018b). Whilst we have shared links and referencing advice, the main purpose of the group has been to bond (usually over deadlines) and therefore generate a sense of belongingness. This small group has continued despite our differing paths through the Masters degree as we continue to swap articles and complain about assignment deadlines and feedback. We understand each other and are united by our shared studies and experiences. Technology facilitates learner discussion via social media which can help to create a feeling of belongingness as well as giving learners control, choosing whether to engage in such practices and which tools to use. Pettit (2014, p.26) tells us about some students using social media to ‘vent’ about their studies, as well as using it as a forum for continuing academic discussion outside the LMS (which I too have experienced). However, this is not a new phenomenon: whilst social media may facilitate such discussion and make it more readily available, students have always formed study groups in person and over the phone. What technology-enhanced learning has done is provide mechanisms whereby the distance learner can experience this same sense of belongingness too.

Technology enhanced learning tools, such as forums and conferencing systems (Pettit, 2014) can also create a sense of belongingness by enabling participation from learners. Hung (2018, p.25) quotes one of the teachers in his study who explained that the peer assessment activity increased students' participation in learning, and through discussion, learners formed their own opinions. Brown (2007) sets out in his seminal speech that learning is socially constructed; “We participate, therefore we are”. Removing this element from education, risks limiting the quality of learning and understanding.



Regarding participation and discussion, Hornby (2018a) warns that there is a balance between the positives of “giving students ownership of learning through peer to peer support” and having tutor or expert guidance, which is valid and useful. University modules (even those on the subject of online learning) may experience problems with participation and tutors can be used to intervene and encourage forum participation (Parks-Stamm et al., 2017, p.1256). Significantly, I observed this on my module when participation was no longer part of the marking criteria. Participation may increase a sense of belongingness (and help further learning) but it does not always occur and there can be issues of ethics and quality (Verenikina et al, 2017, p.15) to forcing it. As well as potentially affecting learning outcomes by not facilitating a deeper level of understanding (Brown, 2007) a lack of participation may also affect learners by giving them no sense of community or group to belong to (Sfard, 1998 and Stoll, 2013); and if they choose not to reach out on social media for such an academic connection, they may feel isolated in their study and lack the belongingness dimension of psychological ownership.

### **Identity –PLE and VLE/LMS**

Identity is closely linked to belongingness and is fostered by interaction. Technology enhanced learning can use tools such as forums and live conferencing to create interactions between learners and learners and tutors. These interactions not only help to deepen learning by bringing in a social element but also help learners to identify as precisely that, learners and individuals involved in their own particular community of practice (Lave & Wenger, 1991). The concept of identity can be seen as something constructed socially (Lumby & English, 2013, p.199) which requires interaction with others in order to form and can be enhanced by feeling involved in a community (p.200).

These interactions between learners usually take place within the confines of an institution’s environment and learners will have no choice but to subscribe and use the facilities offered (some courses may make the posting of comments in forums or attendance in tutorials on the platform mandatory or assign a number of marks to participation). Pettit’s paper (2014) seeks to explore whether students can feel ownership of an environment that is situated within a VLE. Buchen (2012, p.2) describes early LMSs as being restrictive administration-focussed environments that do not support collaboration or participation. In contrast, in a student’s PLE they have control over what tools they use and how (Dommett, 2018, p.82). If interaction feels easier in a PLE where learners choose the tools (such as my and my peers move from the LMS forum to WhatsApp) does this mean that a more restrictive LMS imposed by an institution is also foster identity (and therefore ownership) in students.

Pettit’s study (2014, p.26) concluded that students felt ownership and control despite the institutional location of the tool. In fact he concludes that learners will often use tools from within and outside the VLE interchangeably. The learners actually moved the ownership conversation away from concerns regarding the location of the tool they were using to that they interact with (and whether this was a choice or imposed by the institution) to discussing the accreditation received (linking back to responsibility above). This highlights that for this group of students, despite the nature of the study, they thought the tool itself was largely irrelevant to the concept of ownership, and chose to move the conversation to what they thought was a more important aspect. Buchen’s (2012) study also blurs these traditional boundaries as the ePortfolio, an institutional tool, is successfully incorporated into student’s PLEs with positive effects on their perception



of ownership. This was not because students had control of the tool, but because they were given control of the intangible aspects (p.1) like content and data.

### **Accountability – Reflective Journals and Blogging**

Studying at the tertiary level often highlights the importance of reflection. This can be linked to the concept of accountability – by reflecting on your learning, a student is thinking about what they have learnt and how they can enact this learning in practice – accountability. Mahlanze et al. (2017) writes about a study of student nurses who are asked to write a reflective journal during their clinical placement and complete a survey about their experience. The study looked at different aspects such as professional development, personal development and clinical learning. Regarding clinical learning (p.83) 55% of students indicated that the journal experience “increased my active involvement and ownership of my own learning”. We can argue that the appearance of such a phrase in a questionnaire is rather leading the discussion (where is the groundwork for reflective practice and its link to ownership) and also the results (55%) are disappointing, but the interesting point is the fact that this statement is asked at all (alongside ones about improving other skills). Mahlanze et al. believe that students can have ownership of their learning, that this feeling of ownership can be increased by certain practices (in this case the writing of reflective journals) and that ownership has a positive effect on clinical learning. By engaging in reflective practice, students are exploring and reflecting on themselves, feeling accountable for their learning.

In my own studies I have compiled a lengthy Google doc of my notes using it as a learning journal. I chose this format because being cloud-based I can access it on whichever device I am on at the time and being in-browser, I do not have to worry about downloading, uploading and version control. However, my attic is full of folders of handwritten notes and annotated printed readers – the technology may have changed, but the purpose is the same. My module studies encouraged students to blog and tweet/micro-blog about their experiences on the course. After reading Pettit (2014), learners were asked to write a blog reflecting on the work around PLEs; using technology for reflective purposes. I wrote my own blog post, (Griffin, 2018b) where I reflected on PLEs, as per the activity. Hayden (2018c), a fellow student on my module, did this exercise but also chose to blog after submitting the second assignment, reflecting on what he had learned on the course so far and how this could be used in his work. Technology enables students to create public reflections on their practice if they so wish. This kind of activity can increase learners’ feelings of ownership through the dimension of accountability as learners create content (via blogs, social media and other web 2.0 technologies) and they explore the dimension of accountability regarding their own practice and learning. Learning is very much characterised by accountability; we have to be able to defend and argue our opinions in order to have really learned. Any reflective practice (whether technology enhanced or otherwise) can encourage learners to stop and think about their learning and practice rather than race on to the next learning outcome; this can help learners feel they have accountability for their learning – another dimension of psychological ownership.

### **Self-Efficacy – Technology and the Shifting Power Dynamic**

Self-efficacy can begin with control of an environment. We have already explored the lack of student control in LMS under the theme of identity and targets under responsibility, but self-efficacy specifically refers to





the belief that you have the ability to perform tasks. Hornby (2018b) sums up self-efficacy where she reports on a tutorial conversation regarding ownership that it is “linked to choice and control. This could be choice over when and where to study...like on a terrace in Italy”. Technology can allow learners to study in the evenings or at weekends, to take an impromptu week off (not impossible but difficult in a scheduled programme of face to face lectures) or study from a business trip to Shanghai (Griffin, 2018c). Technology is giving us self-efficacy, we know we are able to perform our tasks from where we choose, rather than being forced into a particular pattern by having to attend physically at prescribed times (although tutorials are likely to be synchronous and involve a degree of planning, this is different to weekly timetabled lectures).

Vissers et al. (2017) conducted a study on the use of technology amongst physiotherapy students in different countries. The study focused mainly on student’s use of technology such as laptops, internet access and social media. The paper states (p.2) that the use of technology can help students develop “self-directed learning”; a critical component of self-efficacy (being competent and believing you can perform tasks) a dimension in the psychological definition of ownership. The paper continues, saying that the use of technology in learning (p.2) can also play a role in shifting the power dynamic from practitioners to learners. This change of emphasis in power also allows learners to “develop a sense of agency as they take ownership and control of their learning”. Pettit (2014, p.16) cited Downes (2006) argument that learner created content would shift the power dynamic, increasing student ownership whilst decreasing institutional ownership.

This ability to both curate and search content and discuss it with other students through social media or outside institutional tools can contribute to a shifting power dynamic between learners and teachers. If students find self-efficacy through their use of technology in learning, what role then does an expert or a teacher (or even a university) have in education. As examined in belongingness and said by Hornby (2018a), an expert’s input is always valued and when student participation cannot be guaranteed, this kind of interaction (Anderson, 2003) between tutor and student becomes essential not just to learning, but to feelings of identity forged by interaction and belongingness (and thus ownership).

### **Implications for Practitioners**

Hung (2018) demonstrated how peer assessment and/or involving learners in setting assessment criteria can increase feelings of ownership. The Mahlanze et al. (2017, p.79) study showed the same for the practice of writing reflective journals. Practitioners could consider incorporating some of these techniques (perhaps enhanced by technology) in their learning design. Spaces for students to come together and discuss their studies can also encourage feelings of ownership. If practitioners choose to provide a space for students to come together and interact without being monitored by tutors, students should be told that this space is available (Pettit, 2014, p.27) and given guidance on how to use it. If practitioners want to encourage the use of twitter or other social media tools they can facilitate this by suggesting tags/hashtags, providing a closed space to share handles (so students can find other students on the external platform) and perhaps suggesting some elements of course content that might benefit from discussion.

Malamed et al. (2018) in a podcast on LMSs suggests that functionality for employees to be able to store their credentials within the LMS helps them to feel a sense of ownership over their learning by providing both a sense of responsibility and an evidence base to use for promotions or job applications. Practitioners



can consider this idea when designing an LMS, giving learners a space where they can store their own credentials and learning outcomes, rather than just those on the course they are currently enrolled in. Critical to this though is the idea of portability – if a student loses access to these records when they are no longer actively enrolled (or paying a fee) this can also affect the degree of which they feel they really have ownership of their learning. Buchen (2012, p.19) looks at the use of a tool called ePortfolio. Her study concluded that learners can feel ownership even when using an institutional tool if they feel they have control over some of the intangible aspects of it, such as the ability to make decisions about objectives, content and managing their data. The shift in power from institution to learner (Vissers et al., 2017), although not as stark as some of the dystopian narratives may have us believe, should still be considered by practitioners. Learner support and guidance is a critical factor to learning in a technology enhanced world (Anderson, 2003) and something even the most self-efficacious student cannot provide for themselves.

## Conclusion

I believe that my arguments laid out above show that it is indeed possible for students to have ownership for technology enhanced learning. However, psychology is about individuals, and so ownership too is individual. I believe it is perfectly possible for two learners on the same course sharing a similar experience to feel differently about whether or not they feel they have ownership of their learning and that crucially, each opinion is equally valid. Learning and so too ownership are both individual. One learner may feel that the dimension of responsibility is so key to their personal concept of ownership that because they do not feel they have responsibility for their targets because they did not choose them, they cannot feel they have ownership of their learning, despite the presence of other dimensions. Personally, I posted in the forum about my feelings on studying with the OU (Griffin, 2018c) and that because “I have a large degree over control of when (and where) it happens and this is the biggest constraint on education/university study in my opinion”, I believe I have ownership.

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## Distributed Co-Mentoring as a Means to Develop Culturally Inclusive Online Learning Communities

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### Abstract

Transformative online pedagogies call for innovative ways of conceptualizing the online environment and the student, teacher, and peer relationships. In this paper, we focus on how distributed co-mentoring can scaffold both social and knowledge building processes to develop culturally inclusive online learning communities. We critique traditional mentoring relationships, which have often sustained a biased class structure exclusive of diverse populations. We conceptualize co-mentoring drawing from the perspectives of two alternative mentoring theories: (1) feminist postmodern values that bring women and minorities into educational networks, and (2) mentoring mosaic where a diverse range of individuals of different ranks, ages, genders, ethnicities, skills, and experience come together in a non-hierarchical community, blurring distinctions between mentor and mentee to support each other in collaboration. Based on these two perspectives, we define co-mentoring as offering developmental assistance at various points in the growth of a collaborative online group, moving away from the traditional two-person relationship where a more experienced person offers assistance and guides a less experienced person to grow and advance. The expert/novice relationship definition of mentoring is problematic not only from a culturally inclusive point of view, but also from the perspective of the online environment where networked relationships can emerge between persons not bound by power structures, or, local or national cultures. We discuss two case studies of distributed co-mentoring: one, a cross-cultural co-mentoring program between the United States and Sri Lanka in the context of an online faculty development program implemented in Sri Lanka, and the second, a cross-border faculty development program conducted in Sri Lanka between participants from Sri Lanka, Pakistan, and Mauritius with U.S. co-mentors. Data sources included analysis of transcripts, journal entries and interviews with participants and mentors. In the first case, we found through analysis of computer transcripts six types of co-mentoring roles (social, pedagogical, managerial, technical, collaborative, and inspirational), which facilitated the construction of knowledge and transformed perspectives. In the second case, despite the challenges of cross-border communication, participants learned from fellow co-mentors. In cross-cultural settings, we encourage co-mentors to be cognizant of: (1) mentee needs and characteristics; (2) linguistic difficulties; (3) expectation of direct guidance from mentors; and (4) the importance of providing timely feedback during the initial stages of building a mentoring relationship. We conclude that successful co-mentoring partnerships can be established across cultures if there is mutual respect and willingness to learn from each other.

**Keywords:** Co-mentoring, E-mentoring, Learning Communities, Cultural Inclusivity, International Collaboration, Wisdom Communities Design Framework



## Introduction

Building relationships across cultures becomes increasingly important if we are to develop meaningful, culturally relevant online learning experiences. Martin (2019) considers relationships a key to increasing engagement in the online class and observes that without this critical component, online students report a lack of interest, produce lower quality of work and report less overall satisfaction. Therefore, innovative learning designs should focus on building relationships and interactions across cultures among diverse instructors and students, and that provide all learners an opportunity to engage, contribute and learn from one another. Culturally inclusive designs “account for learners’ diverse experiences, values and beliefs” (Gunawardena, Frechette & Layne, 2019, p. 5), and provide access, alternatives, and address the learners’ preparedness and goals. One way to build relationships in a culturally inclusive learning environment is to focus on developing mentoring relationships in online classes.

Traditionally, mentoring relationships involve an expert who guides and assists a less experienced novice. These mentoring relationships, often sustain a biased class and gender structure exclusive of diverse populations. As Mullen (2012) has noted, traditional mentoring is construed as having an underlying masculinist perspective, sustaining a biased class structure, facilitating only the benefits of mentoring for some groups by some groups. “Critics have exposed paternalism, dependency, privilege, and exclusion in mentoring contexts. Alternative theories present a breakaway mindset from defunct hierarchical systems, disempowering relationships, and exploitative arrangements” (Mullen, 2012, p. 14-15). Further, in a networked learning environment, the authority of the expert shifts to one of co-learner, contributor, facilitator, guide and mentor. This calls for a re-conceptualization of the traditional role of mentoring for the online learning environment so that mentor mentee relationships can function on a more equitable plane.

Co-mentoring, is one such approach where mentors and mentees are seen as collaborators. Bona, Rinehart, and Volbrecht (1995) define co-mentoring as follows:

“Co-mentoring gives a name to supportive assistance provided by several connected individuals.” Placing the prefix “co” before “mentoring” reconstructs the relationship as nonhierarchical; “co” makes mentoring reciprocal and mutual...Co-mentoring names a dynamic that may evolve within collaborative learning. Both co-mentoring and collaborative learning are social, active, and appreciative of differences among individuals in terms of their backgrounds, talents, and learning styles” (p. 119).

The purpose of this paper is to examine how co-mentoring distributed over networks can scaffold both social and knowledge building processes to develop culturally inclusive online learning communities. We explore two case studies of distributed co-mentoring in the context of two faculty development programs implemented in Sri Lanka to help faculty learn how to facilitate and mentor online: one, a cross-cultural online co-mentoring program between graduate students in the U.S. and Sri Lankan academics and professionals in organizations which was offered as part of the National Online Distance Education Service (NODES) in Sri Lanka, and second, a cross-border faculty development program between participants from Sri Lanka, Pakistan, and Mauritius with US and Sri Lankan co-mentors offered by the Open University of Sri Lanka.



## Research Questions:

Question 1: What co-mentoring roles emerged during the process of online knowledge construction?

Question 2: What are the challenges to cross-cultural co-mentoring?

## Theoretical and Conceptual Framework

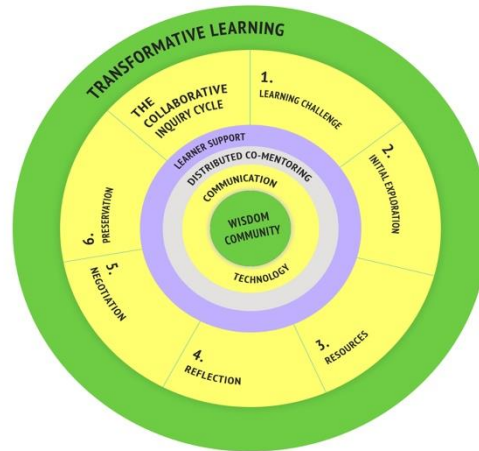
The theoretical framework for this study draws from two important foundations: The Zone of Proximal Development (ZPD), a central concept in Vygotsky's (1978) sociocultural theory, and legitimate peripheral participation, the process by which newcomers enter a community of practice (CoP) in Lave and Wenger's (1991) situated learning theory. Mentoring assists learners to develop their full potential and guides them into a specific CoP, thereby allowing learners, through legitimate peripheral participation to evolve into practitioners in a given field (Lave & Wenger, 1991).

### Distributed Co-Mentoring

We conceptualize co-mentoring drawing from the perspectives of two alternative mentoring theories: (1) feminist postmodern values that bring women and minorities into educational networks (Bona, Rinehart, & Volbrecht, 1995), and (2) mentoring mosaic (Mullen, 2012), or relationship constellation (Kram, 1985/1988), where a diverse range of individuals of different ranks, ages, genders, ethnicities, skills, and experience come together in a non-hierarchical community blurring distinctions between mentor and mentee to support each other in collaboration. Based on these two perspectives, we define co-mentoring for this study as offering developmental assistance at various points in the growth of a collaborative online group, moving away from the traditional two-person relationship where a more experienced person offers assistance and guides a less experienced person to grow and advance. Such an approach where both mentor and mentee can share each other's expertise and learn from each other has the potential to transform educational cultures. We next discuss a design framework we have developed in our earlier work that provided us a foundation for designing co-mentoring online.

### Cross-Cultural Co-Mentoring Design

The conceptual framework for the design of the cross cultural co-mentoring experiences in this study, draws from the culturally inclusive online design framework, Wisdom Communities or (WisCom) (Figure 1) developed by Gunawardena and her colleagues through several iterations of development and testing to provide guidance on how to implement co-mentoring online (Frechette, Layne, & Gunawardena, 2014; Gunawardena, Frechette, & Layne, 2019; Gunawardena, et al., 2004; Gunawardena, et al. 2006.) WisCom's emphasis on co-mentoring challenges the power structures of traditional mentor - mentee relationships by equalizing mentoring across faculty, students and community members. The more distributed, equitable nature of the online environment underscores collaborative learning and relationship networks. By eschewing inflexible mentor-mentee roles in favor of more fluid, contextual relationships, WisCom promotes cultural inclusivity and allows for the sharing of mentorship responsibilities. When co-mentoring occurs across networks, we engage in e-mentoring. While the benefits associated with e-mentoring mirror those of mentoring, research has supported two additional benefits of e-mentoring: the value of impartiality and inter-organizational connections, facilitated by the use of electronic communications (Single & Single, 2005).



**Figure 1: WisCom Design Framework in Gunawardena, C. N., Frechette, C., & Layne, L. (2019). Culturally Inclusive Instructional Design: A Framework and Guide for Building Online Wisdom Communities. New York: Routledge. Used with permission**

### Co-Mentoring Roles in Inquiry-based Learning Design

The context for the two studies reported here is a faculty development program conducted in Sri Lanka to train faculty (academics) and professionals on how to tutor and mentor online. One online module in this program demonstrated distributed co-mentoring by inviting graduate students from the University of New Mexico, USA to serve as e-mentors along with Sri Lankan mentors. In order to keep terminology clear, we refer to the U.S. mentors as e-mentors, the Sri Lankan participants in the training program as international and local mentors as “global e-mentor” or “e-mentor at large.”

The mentors and mentees engaged in an inquiry-based learning (IBL) activity in small groups (6-11 participants per group) for a period of three weeks using Moodle. The IBL activities designed based on the Collaborative Inquiry Cycle (CIC) of WisCom, engaged each group in solving a social problem in the city of Colombo using three formats: problem solving (cleaning up garbage), role-play (traffic congestion), and case-based reasoning (street children). For the mentees the goal was to learn through critical inquiry with peers and the e-mentor how to tutor, mentor, and facilitate an interactive learning format online. The goals for the e-mentors were to tutor, mentor, and facilitate an inquiry-based learning activity through the interplay of diverse cultural perspectives and problem resolution through negotiation of meaning. The groups were informed that the process of arriving at a solution was as important as the product, and the activity received a group grade.

### Research Method

A qualitative research design examined the research questions. Methods included: (a) transcript analysis of online discussions where participant groups solved a social problem interacting with mentors, (b) mentor reflections in a focus group panel discussion and email communication, (c) mentee journals and email communication, and (d) mentee evaluation of the e-mentor’s online activity in the final course evaluation.





Both these case studies used the same online module on mentoring discussed earlier. Results are discussed from the perspectives of mentors and mentees.

The first case study which was part of NODES encompasses the first three rounds of a series of over ten tutor mentor training programs begun in 2007. In the first round, for example, there was a total of 29 participants distributed in each of the IBL groups. Each group also included one U.S. e-mentor, one Sri Lankan e-mentor at large or global e-mentor and local mentors who shared the co-mentoring role. The majority of the learners in this initial round were female (74%). The second case study conducted by the Open University of Sri Lanka had 30 mentees (academics from universities in Pakistan (9), Mauritius (10) and Sri Lanka (11)), and 4 e-mentors from the USA and 3 local mentors. In this sample the majority were female (53%).

Transcript analysis was conducted employing the Interaction Analysis Model (IAM) developed by Gunawardena, Lowe, and Anderson (1997), and widely used (Buraphadeja & Dawson, 2008) for analyzing social construction of knowledge online. The IAM describes five phases of co-constructing knowledge which correlates with Vygotsky's (1978) concept of a learner's movement from lower to higher mental functions. In this correlation, the model begins with participants working within lower mental functioning (the sharing and comparing of information), moving through the phases into higher mental function (co-construction of new knowledge, testing, and application). It is at Phase III that evidence of socially constructed knowledge appears. Phase IV and V represent the testing, metacognitive statements of the social process in which the new knowledge was constructed, and the adoption of the new knowledge into the learner's framework and schema (Gunawardena et al., 1997).

## Results

Results are discussed synthesizing findings from both case studies to address the research questions on co-mentoring. We have published some of the findings from the case studies separately in previous work (Gunawardena et al. 2013; Gunawardena & Jayatilleke, 2014; Jayatilleke & Gunawardena, 2016; Jayatilleke et al., 2012; Jayatilleke, et. al., 2017.)

### *Co-Mentoring Roles that Emerged During the Process of Knowledge Construction*

Analysis of the transcripts showed that the international e-mentors demonstrated different facilitating techniques to help the protégés construct knowledge and build the learning community. These techniques were categorized into six e-mentoring roles: social, pedagogical, managerial, technical, collaborative and inspirational (Jayatilleke et al, 2012) considering the nature of the attributes. Figure 2 shows the roles that emerged in the three IBL activities. The social strategies included self-introductions, greetings, encouraging and praising the participants, that helped to build the community. The pedagogical strategies involved guidance on how to conduct IBL activities as most of the mentees were new to IBL, asking thought provoking questions, paraphrasing, summarizing, etc. The strategies related to conducting and completing the activity within the stipulated time were categorized as 'managerial' and included giving instructions, assigning roles, stipulating timelines, etc. The technical category included providing technical help, or directing to a technical expert. The strategies used for promoting group collaboration were grouped as 'collaborative'. Sometimes, there was a tendency for roles to overlap, especially the social and collaborative roles. For instance,



“encouraging team members” which was categorized under “social” also has an impact on group cohesion. The “inspirational” category emerged when the protégés clearly indicated that the interactions with the e-mentor changed their way of thinking or influenced them to change their attitudes. The “inspirational” category was inferred unlike the other categories, which could be aligned to a direct utterance from the e-mentor.

In the second case study, the “inspirational” category surfaced when an e-mentor who facilitated knowledge construction in the street children group, stated the following:

Thank you for the opportunity to work and learn with you and you students. It was an honor to participate in the learning challenges of this class. If it is possible, I would like to offer my stipend as a donation to an organization in Sri-Lanka, Pakistan or Mauritius that is helping street children. Children in crisis anywhere are a priority to me... Respectfully (Email communication - International e-mentor Female 2).

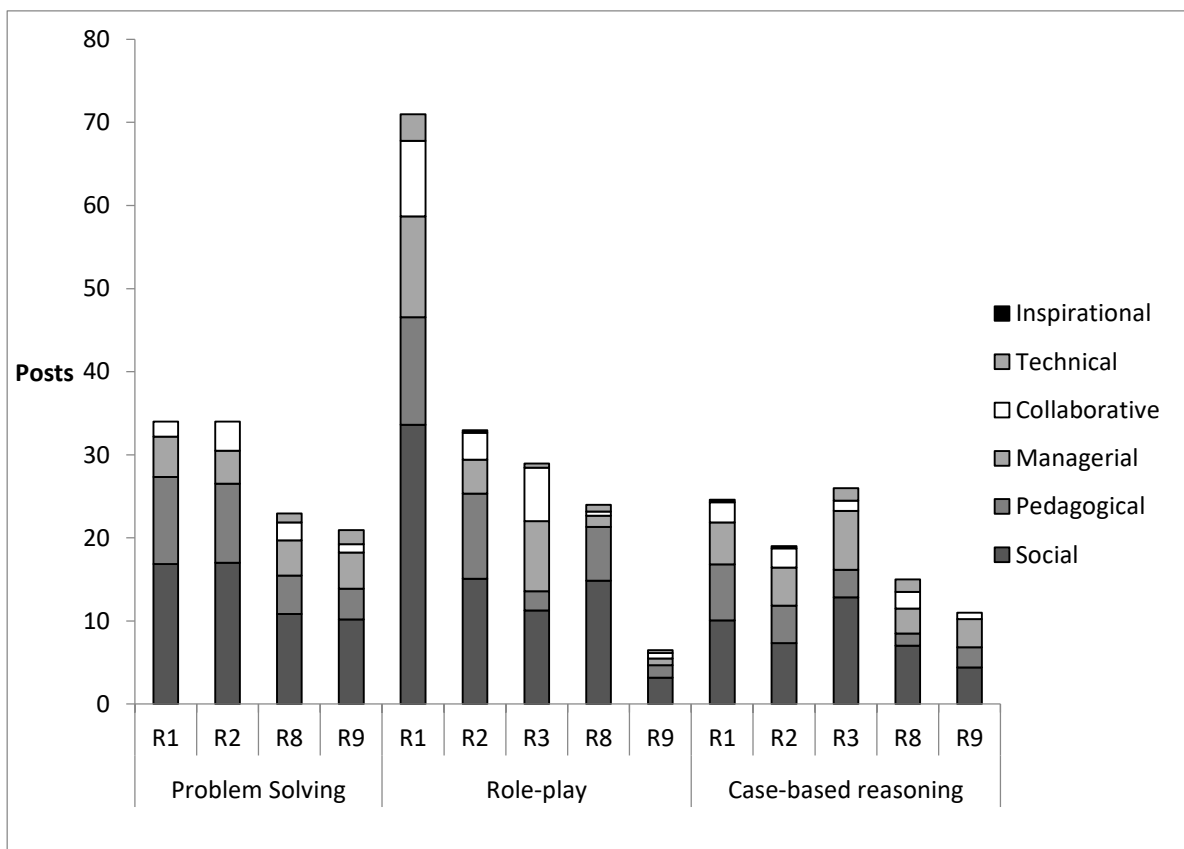


Figure 2. E-mentor roles in three inquiry-based learning activities

As observed in Figure 2, the most prominent role in both the first and second case study was the “social” role, as co-mentors developed the online learning community, followed by “pedagogical,” and “managerial.” The following quotes from a Pakistani and Sri Lankan participant in the second case study illustrate both the pedagogical and inspirational role of the mentor.



... it looked interesting for me to interact with my fellows, reading their comments and discussing on the task given to us. It gave me courage and new dimensions to think on my own expertise as a teacher and the improvements which I can bring in my teaching style (Reflective Journal Entry – Pakistani Female Participant).

The example of self-sacrifice on their part helped me to be determined that I too should be like that (Reflective Journal Entry – Sri Lankan Female Participant).

The collaborative role was exhibited by all e-mentors to a certain degree. Case study 2 offered the following collaborative co-mentoring example:

This experience also gave me much training in interacting with peers, which is quite different to a mentor/tutor role. When posting comments I had to be extremely cautious and not appear too domineering or authoritative, and at the same time urge the others to try and complete the work. So I believe this experience has enhanced my learning curve (Reflective Journal Entry – Sri Lankan Female Participant).

Earlier studies conducted with online tutors/teachers have identified similar roles (Berge, 1995; Kim, Lee, & Lim, 2010): pedagogical/ cognitive/ intellectual, social, managerial/ organizational and technical. However, our study identified two additional e-mentoring roles, “inspirational” and “collaborative.”

### Co-Mentoring Facilitating Social Construction of Knowledge

Transcript analysis according to IAM suggests that e-mentors helped facilitate social construction of knowledge amongst mentees in many ways in all three rounds as discussed following Figures 3, 4, and 5.

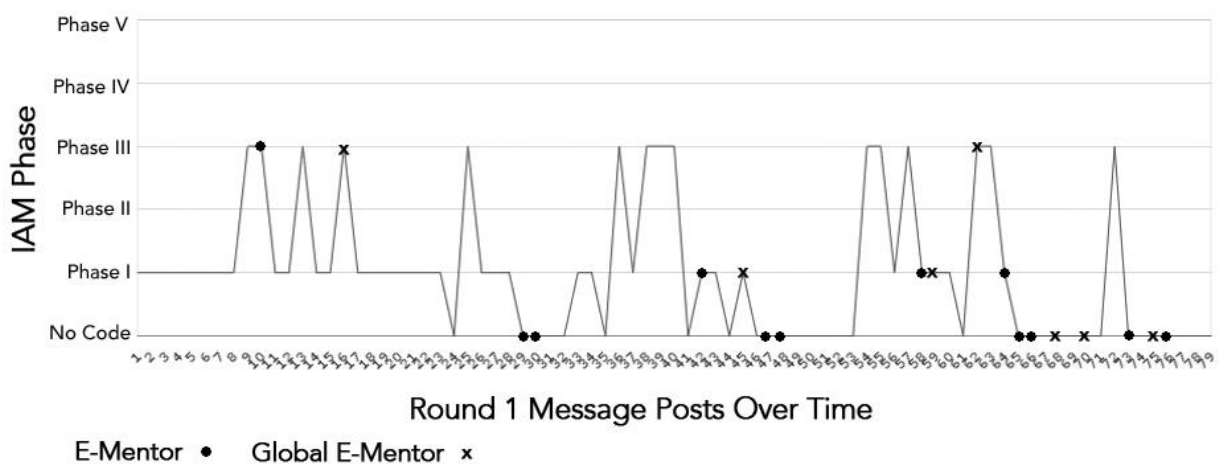


Figure 3: E-mentor participation in discussion round 1 over time

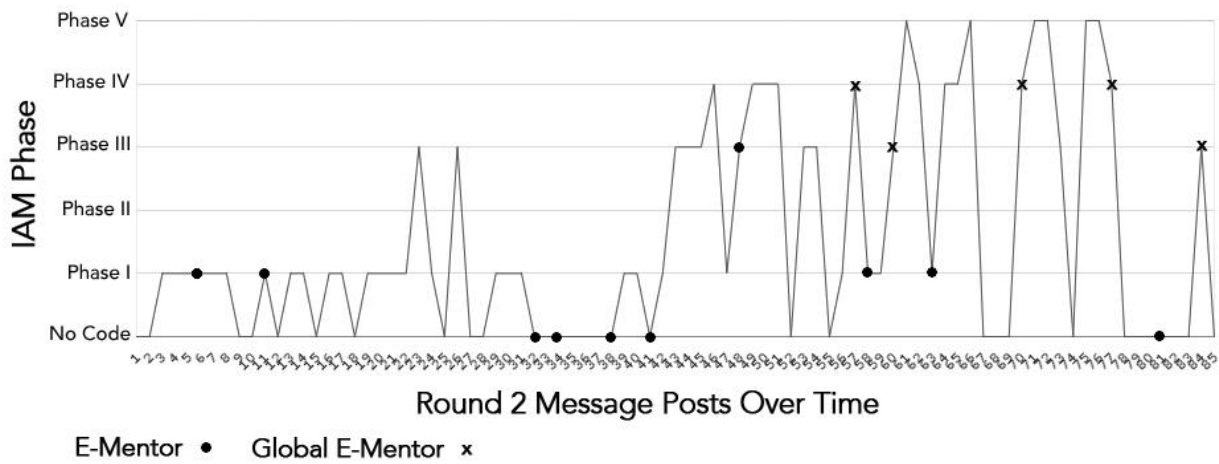


Figure 4: E-mentor participation in discussion round 2 over time

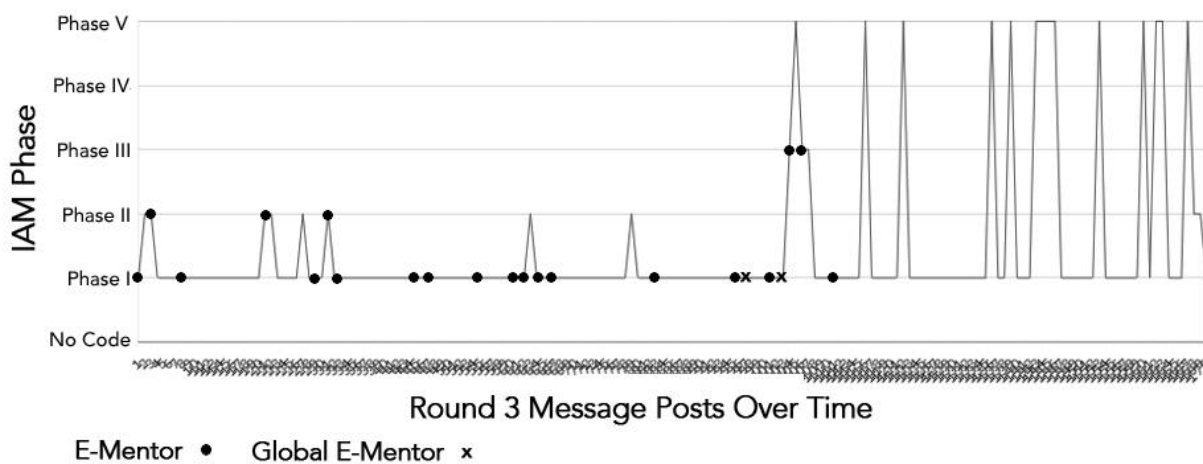


Figure 5: E-mentor participation in discussion round 3 over time

Figures 3, 4, and 5 illustrate IAM codes across each round over time. Numbers across the X-axis indicate the flow of message postings during the round, with 1 being the first post. Note that any single message may have had multiple codes assigned to it. In each figure, the highest phase code associated with the post is represented by the Y-axis. The international e-mentor participation is represented by a dot, and the global e-mentor participation is indicated by an “X”. In Round 2, e-mentors participated in 6 of the 11 clumps of interactions coded as Phase III and above. This indicates that in Round 2 e-mentors actively participated in over half of the discussions where social construction of knowledge occurred. It is also evident that in Round 2, in many instances when the e-mentor was present online, there was a flurry of activity by the participants. Similar patterns showing e-mentors actively participating in social construction of knowledge were found in the other two rounds (see Figures 4 and 5).

Figure 5 presents an interesting pattern of e-mentor and mentee activity when compared with Figures 3 and 4. In Figure 5, the e-mentor worked closely with protégés from the beginning being present online



frequently. Then, halfway through the round the e-mentor withdraws leaving the protégés to work on their own. This provides an excellent example of Vygotsky's zone of proximal development when the mentor withdraws to let the novice take a lead in performing the skills s/he was trained to do. During further analysis of how e-mentors interacted with learners during these points of social construction of knowledge, several e-mentor roles emerged, such as:

- Setting the context and expectations
- Introducing different points of view
- Providing resources
- Providing momentum
- Just in time facilitation
- Asking probing questions to get the answers from the participants
- Asking questions to help the participants to identify learning issues
- Bringing in outlier members
- Providing support and encouragement
- Promoting reflection and higher order thinking (summarizing, questioning, re-posing statements)
- Directing towards the goal by weaving each other's posts
- Relating personal experience associated with the problem
- Clarifying issues, cultural aspects in particular
- Motivating participants frequently and reminding them of deadlines
- Facilitating metacognition among participants by encouraging them to write reflections.

E-mentors prompted mentees to move beyond participation in the case and consideration of the case-based learning process by calling for reflection on their own learning process in the online environment. This also included a call to consider how e-mentors influenced the overall learning experience.

"My role as mentor and coach is to guide you through the learning process and encourage your participation and to be a fellow learner. Questions for you: What would you like to learn about yourself through this activity? What would help you to stretch as a learner? What support do you need to work at your best, from the mentor, fellow colleagues, your personal life? If you could have me be the best mentor for you what would that look like?" (E-mentor, Round 3, Group 2, Forum 1, Post 1).

Next, we discuss techniques that emerged while co-mentoring across cultures.

#### *Cross-Cultural Co-Mentoring Techniques to Facilitate Community and Knowledge Building*

In analyzing e-mentor roles further, we were able to identify culture specific e-mentoring techniques that could be grouped as social and community building, and pedagogical and knowledge building as described below:

Social and community building e-mentoring techniques include:

- greetings
- self-introductions,



- acknowledging each other, and
- polite expressions.

Pedagogical and knowledge building e-mentoring techniques are:

- direct questioning related to the issues in protégé's own country (curiosity and openness),
- explaining cultural attitudes in their own country in relation to the culture of the protégés,
- elaborating on unique culture specific terms,
- comparison with other countries on the basis of their experience,
- relating authentic examples, stories, etc., and
- simplifying and paraphrasing.

In relation to the social role, it was apparent from the postings that both the e-mentors and the protégés showed mutual respect and were culturally sensitive. One of the mentees highlights the importance of mutual respect:

...the mentor must know the 'mentee' the person's strengths and weaknesses. I also think the mentor and mentee must like each other - it can't be a purely professional relationship - there must be mutual respect, trust and appreciation (Reflective Journal Entry – Sri Lankan Female Participant).

In another example, the international e-mentor brought his US experience into the IBL activity and invited group members to discuss it in relation to their own context thereby merging two roles; pedagogical and collaborative.

... In the U.S. when a city has a traffic problem, concerned parties might make their views known to the city council, which is a group of elected officials responsible for running the city and which holds regular meetings where the citizens are invited. Does Colombo have something similar? One possibility is that we could organize an online city council meeting to give everyone a chance to make their contribution. Does anyone in the group have any thoughts about this? (e-mentor, Round 2, Group 2 Post 16).

Since there were both US e-mentors and a Sri Lankan e-mentor-at-large, we compared their facilitation styles and found differences in the way they provided guidance to their protégés. Often, indirect coaching was used by US e-mentors to get the protégés to think through the problem and come up with their own solutions. On the other hand, the Sri Lankan e-mentor provided more direct advice to solve a problem. Sri Lankan protégés often expected direct guidance as they were more accustomed to a teacher-led instructional style.

### *Challenges to Cross-Cultural Co-Mentoring*

We identified the following challenges to cross-cultural co-mentoring which should be addressed in future design of mentoring experiences.

- Identification of mentee characteristics. One strategy used by an e-mentor was to go through the profiles of the mentees before starting the interactions
- Linguistic difficulties. Proficiency in English in this instance could not be assumed prior to the task. Those with limited language proficiency were less likely to participate. Specific communication protocols that address this issue can encourage those with limited proficiency to participate. Translanguaging when both groups know two languages will allow for the full expression of a mentees' linguistic repertoire
- Expectation of direct guidance from mentees who are more accustomed to teacher-centered learning should be accommodated initially, to subsequently move them to rely on peer networks
- Providing timely feedback to mentees due to time constraints and international time zones need to be factored in.

## Conclusion

Meaningful co-mentoring partnerships can be established across cultures if there is mutual respect and willingness to learn from each other. We encourage online designers to carefully plan for co-mentoring roles that can be distributed across an online learning community considering not only mentor expertise but also peer expertise that can be channeled to support learning within a community. The results showed co-mentoring can support online knowledge construction and the development of a cohesive community. In the second case study, participants commended the design based on WisCom which provided a structured format starting with a message from the tutors giving clear instructions on e-activities and navigation, a learning challenge with the identified problem/case/issue, and online discussions for co-mentoring with peers and tutors where they felt empowered to engage. The learners who participated fully showed the gradual development of their thinking processes (Jayatilleke et al.; 2017). Issues to consider in design are mentee needs and characteristics; linguistic difficulties; expectation of direct guidance; and the commitment to providing timely feedback when co-mentoring is distributed across networks.

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## Incubators of Innovation: Building Creativity, Diversity and Engagement into the Online Learning Environment

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### Abstract

As educators are tasked with fostering a culture of diversity to support online student success, it becomes critical to the efficacy of programs to establish effective instructional design processes aligned to engagement (Shea et al., 2005). This requires practitioners, researchers and administrators to create initiatives that foster pluralistic perspectives, assessments and connections to the real world to support all learners. Accepting a mandate from the Arizona Board of Regents to increase access through online development, The University of Arizona formed the Office of Digital Learning (ODL) in 2014 as the production studio for their fully- online campus. In setting up an office of over 30 instructional designers, technologists, videographers, and project managers in support of close to 900 courses, ODL made it its mission to create a team of designers that would embed three core characteristics into all facets of the office's organizational leadership and process – creativity, diversity and engagement. In sharing the case study of the instantiation of their office, the authors will identify the effective practices for designing teams, courses and technology for online learning that were key to their success and velocity of growth without sacrificing course quality. They will share their holistic approach to the instructional design process that accounts for diversity of thought and supports critical literacies amongst students. This includes laminated applications of instructional technology to support a wide variety of learner preferences, and digital storytelling as driving forces in bringing students into an immersive, experiential online learning environment. They will underscore the importance of open praxis and sharing within and outside both the organization to promote student success across disciplines and institutions.

**Keywords:** Online Learning, Creative Literacies, Instructional Design, Experiential Learning, Narrative, Open Praxis

### Introduction

While the rote steps for designing online instruction are similar across organizations and offerings, the defining characteristics of the online design process is intrinsically wedded to the core values of the institution leading the charge. Establishing these values with intentionality is key to the success of the enterprise, in that without these guiding principles, online design endeavors are rudderless and stakeholders left siloed. In standing up, Arizona Online, the fully online campus of the University of Arizona, administrators quickly formed both a cadre of designers and faculty developers to rapidly scale the university's online offerings while still staying true to the mission of creating a quality, academically rigorous learning environment that focused on individualized student success. From the construction of teams, design processes, interpersonal connections, and assessment practices, three core values were embedded into the methods and practices of all facets of



the work of the Office of Digital Learning (ODL), the organization responsible for production and continuous improvement of the courses within Arizona Online. These values – creativity, diversity, and engagement – served a pillars to both process and the creation of a culture of innovation.

This case study highlights the process and values responsible for the growth trajectory of Arizona Online, moving from 4 designers and 75 courses in 2014, to a robust design team of over 30 personnel supporting instructional design, project management, instructional technology, videography, curriculum development, creative media, and quality assurance. ODL, as of 2019, has built and continues to manage over 900 courses at the undergraduate and graduate levels, for both credit and non-credit offerings. The efforts of the entire Arizona Online team were recognized in 2019 with the UPCEA Strategic Innovation in Online Education Award, honoring Arizona Online’s commitment to quality and student success.

### **Centering Teams and Process Around Established Values**

In 2014, The University of Arizona made the decision to elevate their online offerings with a dedicated effort to build out fully-online degree programs. To accomplish this endeavor, the first office established was a unit that would lead the course production process. This office would include more than just instructional designers, but also visual designers, videographers, instructional technologists, web developers and project managers. Connecting a diverse group of individuals into a cohesive team was a critical first task, and hiring for “culture add” as opposed to “culture fit” allowed for the establishment of a team that could handle the myriad challenges and opportunities present in building an online enterprise. As the team began their work, they collaboratively formed their instructional design process with students as the focus, and faculty as the drivers of the design process. The diversity of the team’s skillset served as an advantage in accommodating each faculty member’s unique style or method of teaching, all the while bringing a deeper understanding of online pedagogy and instructional technology into the design process. Supporting faculty in leading the design of their courses had a significant impact on not only the quality of the online courses developed, but also in the connections forged between the members of ODL and their partners across campus. With faculty in the lead, they become more engaged in the design process, gaining a sense of agency over the courses created. Additionally, in constructing a team of highly creative people from diverse backgrounds, it was imperative to create a culture where openness and transparency around personal journeys were rewarded and widely shared.

By engaging potential candidates in discussions on their distinct qualifications and experiences, one opens a doorway into their passions and the unique strengths they have to offer the team. Hallmark to the success of ODL has been the continuous growth of a team that honors individuality, and pairs team members with projects and faculty where those skills will be put to great use. There are three pillars that have guided ODL’s journey in establishing their team and process, chiefly creativity, diversity and engagement. Creativity, in particular, takes many forms, especially within educational contexts. While some inherently feel that creativity is innate, it is a skill that can be acquired and improved with practice and a growth mindset. Building a team and process that could support creative literacies amongst faculty and students meant creating unique positions that could address both the methods and technologies for employing creative practices. Such practices might be as simple as assisting learners in connecting the dots for discovery, to the complexities of solving formidable challenges through iterative and systematic problem solving. ODL



decided to invest in a position that would support these practices as a part of its Adobe Creative Campus designation.

This position oversees the related training and support of the university's investment in Adobe Creative Cloud, developing curriculum and outreach for the integration of creativity into courses and programs in the online and face to face classroom. The creation of a position for an Adobe Evangelist specifically for The University of Arizona was one of many initiatives aligned to a commitment to diversity of thought, skills and professional experience. This commitment has been essential to the success of ODL as the team works together to produce quality course content and help UA faculty become more confident in their abilities in the online environment. As the ODL team works with more departments and faculty across the campus, they lead by listening and sharing experiences back with the larger community, thereby enriching partner relationships and building trust to create more impactful learning environments.

### **Creativity and Diversity in the Instructional Design Process**

Though many of the well-recognized and utilized processes for designing instruction follow a linear path of steps through needs assessment, design, facilitation and evaluation (Branson et al., 1975; Dick & Carey, 2014; Heinich et al., 1999; Piskurich, 2015), the instructional design process is far more varied and nuanced in application. These variations stem from the unique characteristics of the people designing, as well as the tools and methods employed in creation of instruction (Miller, 2014). Within online course design, the shift in modality away from the face- to-face environment adds another layer of complexity within the task of creating experiential learning specific to discipline and learner level. Though the interplay of these design variables is complex, structuring the process for design and implementation of technology around the principles of creativity, diversity, and engagement helps to ground a seemingly unwieldy process. Ultimately, this grounding helps all stakeholders – designers, faculty developers, facilitators, and evaluators – ensure that outcomes are met and students are provided with an environment aligned to their success.

Rather than beginning with a design process with instructional technology at the helm, ODL has established methods for supporting creative design where technology enhances the meeting of established learning objectives. Instructional technology is introduced within the contextualization of the three points of interaction in online courses – student to content interaction, student to faculty interaction, and student to student interaction (Moore, 1989). ODL utilizes a variety of digital tools to facilitate the intersection of online presence, student engagement and sharing of unique experiences across a connected learning community. First, presentation tools, such as Playposit, Articulate Storyline and Rise, and Adobe Captivate move the static didactic into an immersive and adaptive instructional experience. Students communicate multimodally leveraging tools such as VoiceThread or FlipGrid, both of which help to surface diverse perspectives and provide a creative outlet for the expression of ideas.

As the community develops and students establish both their unique and collective voice, instructors provide opportunities for reflection and deeper sensemaking through interactive tools. This can include assignments where students create multimodal annotations using ThingLink<sup>6</sup>, or composing digital stories with Adobe Spark<sup>7</sup>. This progression of establishing presence, amplifying student voice, and employing reflective opportunities creates an environment where creativity is contextualized as an inherent ability present in all learners, with instructional technology as the catalyst and the conduit for this creative expression.



Supporting the alignment of design and technology to meet learning outcomes requires a diverse team of stakeholders driving the process and continually evaluating its efficacy. Interactions between designers and faculty developers start with a call to action to reimagine the online learning environment based on a discipline-specific, program-specific, and learner-specific needs analysis. This often leads to instructional designers employing a diverse set of methods, theories and applications of the design process to best support faculty in the development of their courses. Creating a team that can facilitate an agile and flexible design process also involves an intentional focus on diversity – ODL designers were specifically chosen for their rich prior work experiences. Quite often, the path to instructional design was circuitous for the members of the team, which resulted in designers with a body of skills and competencies in areas that were well suited to supporting the needs of faculty across a wide array of disciplines and fields. The instructional design team leverages the power of their diverse backgrounds into cultivating strong interpersonal connections between designers and faculty developers.

The formative construction of a foundation of mutual trust allows for instructional designers to support faculty in trying new approaches and tools, often moving them out of their comfort zone into a culture of iterative and process-driven innovation. Cultivating relationships across diverse groups of stakeholders is a practice designed to model for instructors the effective practice of creating connections amongst students in the online classroom. The practice is empathy-driven, asking faculty to consider the student experience throughout the entire design process, from creating course maps to designing assessments and activities that are hands-on and outcomes based. When designing and building courses, designers stress the importance of these relationships through the lens of instructor presence and promoting engagement. When instructors are actively present and engaged with their students, a link can be established to student success and satisfaction with the experience (Richardson et al., 2015), a baseline goal for every course that ODL helps create.

### **Engagement and Experiential Learning in the Online Environment**

Just as creativity and diversity within the online design and facilitation process centers on interpersonal connections, engagement within the design process also begins with the formation of strong relationships. Instructional technology and media, when meaningfully integrated into the learning environment, ensure that instruction is constructivist, hands-on, and collaborative. Tools that create spaces for differentiated learning are used to maintain high levels of engagement through adaptive technologies with scaffolded content and personalized feedback. This connection between diversity of needs and goals amongst students, addressed through design and technology for promoting engagement, is hallmark to the process. Instructors are asked to reimagine their discipline within the online modality, and with their design efforts, create an online learning environment that is uniquely tailored to the specific populations of learners that they are supporting.

Helping students make connections between the small scope of the online classroom and the larger outside world also serves as a critical step in ensuring engaged learning. Employing life experiences in conjunction with traditional classroom learning provides the basic framework for experiential learning (Kolb, 2014). ODL and its university partners maintain a strong commitment to the notion that experiential learning is a crucial piece of the learning process, and these efforts serve the institution's larger mission to develop experiential learning opportunities for all students, regardless of discipline and modality. The intentional application of instructional technology has helped to accelerate the meeting of this goal, and two specific use cases have emerged on how this is achieved. The first has been through the construction of activities that leverage the



unique experiences of our learners to present diverse viewpoints and experiences into the classroom for the benefit of collective meaning making and understanding. Given that Arizona Online students buck the stereotypes of online learning, and represent older, working adults with many years of life experience, conversations in the online classroom reflect this diversity of experience present in the learning environment. Giving students the agency and autonomy to share their informed perspectives also helps to contextualize the course content, thereby supporting deeper, more engaged learning.

While experiential learning consists of honoring prior experience within the classroom, the second case that has emerged has involved faculty redefining the learning space as extending beyond the traditional classroom “walls”. This has manifested itself in the form of faculty providing preliminary instruction on concepts that students must immediately apply outside of the classroom, engaging in learning in new locations, and connecting to experts locally and from afar via e-meeting tools. These engaged learning experiences are sometimes formalized as with internships and fellowships, but also appear in less traditional contexts such as site visits and field trips. While this experience of connecting online students to engagement experiences outside of the classroom is no different from the face-to-face experience, online communities have the distinct advantage of crowdsourcing findings and perspectives amongst individuals participating from around the world.

For instance, in the face to face version of an Arizona Online world religions course, students are required to visit a local religious site and complete a series of reflections on their findings at the location. For the online version, this activity was adapted to include various local religious organizations throughout the world, and in some instances, included virtual tours of sites not traditionally open to the public. Students met the learning outcomes for the assigned, but also provided empirical data on the similarities and differences of spaces and communities by geographical region. Engaging students in experiential learning and then inviting them to share their perspectives and connections from their own lived in experience are two integral components to the instruction created by ODL, and as such, are emphasized throughout the design process as instructional designers assist faculty in framing the online classroom around meaningful and measurable points of engagement.

### **Narrative and Open Praxis Across the Online Curriculum**

Digital storytelling is a method of weaving together multimodal elements into cohesive presentations of narratives (Ohler, 2013), and within the online learning environment, provides a channel for far more than the simple presentation of content. As practiced by faculty, instructors can engage students in the consideration of driving questions and formative assessments throughout the learning process, moving the process of watching a video from a passive to an active process.

Reimagining the lecture as an opportunity for creative and engaged storytelling also leads to changes in the places where video is captured and how it is produced. The practice of storytelling within engaged learning as a way to better meet learning objectives has served as a key element in ODL’s vision of success from the very beginning. Indeed, one of the first people hired on the ODL team was an Emmy award-winning videographer whose gift of visual storytelling has inspired faculty to think differently about how to deliver content in the online learning environment. ODL has since expanded to include a dedicated videography team that works closely with faculty to examine the salient content and learning objectives at the course, module and activity level. The videography team then helps to tease out the story itself, selecting methods



for filming, compositions and locations. They also create a plan for designing media content that creates space for assessments and reflections, positioning the video as part of a larger sequence of activities and points of engagement. Videos also push the boundaries of space and time, taking students to locations that might not be accessible to them otherwise, that connect them to guest lecturers and scholars from around the globe, and that present interactive simulations and multimedia of historical concepts and locations no longer found on earth. Since its inception in 2014, ODL has created content in all of these formats, producing over 2,500 videos for both Arizona Online and for its partners across the university. While video has played a tremendous role in bringing creativity and engagement into the online classroom, the application of narrative principles extends beyond the video content alone.

Faculty and instructional designers work together to link the didactic to activities, practice, and reflections that guide students to make connections and extend knowledge to other contexts. The course becomes a narrative itself, with modules as chapters and the course as a story that unfolds week after week. Additionally, students are invited to contribute their diverse perspectives and approaches to interpreting the course content in videos of their own creation. Multimedia tools recommended by the professor as well as tools of their own choosing become a part of the assessments of the course, and the sharing of the products help to emphasize the importance of learning as a collaborative process.

Within open praxis, the elements of open education are combined with research-based practice, encompassing a landscape of shared resources, methods, research, pedagogies, and literacies, focusing on the practices of communities built around openness (Paskevicius, 2017). This broad look at the open landscape and a focus on open pedagogy notes a shift in the open community, focusing more on the people and their work rather than the products they create (DeRosa & Robinson, 2017). ODL weaves open educational practices into all points of interaction with stakeholders – from instructional designers sharing methods and approaches within and across the institution, to faculty showcases and professional development that spotlight the work of instructors for the benefit of their colleagues, to connecting students to open educational resources and open research.

In all of these interactions, there is an emphasis placed on the strength that comes from communities aligning to collaborate on ubiquitous challenges. Students demonstrate creative literacies in formal and informal settings, often taking part in open training and utilizing the industry- standard software, apps and instruction provided as a part of the university's Adobe Creative Campus designation. Faculty are able to remix and reuse open content to better align the materials with the diverse approaches and perspectives that best highlight their expertise and meet the needs of their learners. This work with open educational resources is often completed with the comprehensive support of the UA Libraries, particularly under the guidance of the library's OER Coordinator. All of these open practices demonstrate the broad commitment across the university to connected and engaged scholarship via the unique affordances of digital technology and online learning environments. Access moves from an accommodation or bolt-on initiative to a universal right, as students, faculty, staff and partners of the university are engaged in open collaborations within and beyond the classroom. In line with the university's commitment to both its land grant mission and its dedication to maintaining a culture of innovation, open praxis serves as the mechanism by which ODL ensures that a spirit of creativity, diversity, and engagement is consistently embedded into all aspects of the online teaching and learning process.

## Conclusion

Though characteristics of the process for designing and facilitating online instruction may appear to be standardized across institutions and initiatives, the core values of an organization ultimately shape the ways in which groups of stakeholders create learning content and environments. The Office of Digital Learning sought to establish goals aligned to the institution's values, and in doing so, focused on intentionally weaving elements of creativity, diversity and engagement into all parts of the online course lifecycle. Dedicating personnel, resources and significant efforts towards embedding these values into the work of designers, educators, and students alike led to the formulation, implementation and assessment of these values within the context of creating a design team, an instructional design process, a plan for instructional technology, and the integration of narrative and open practices across the curriculum. As institutions begin new online learning endeavors and iterate on previously established initiatives, it is important that they align their efforts to goals that are meaningful to their stakeholders and their communities.

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## Model for Content Recommendation in Massive Open Online Courses: Motivational Actions in a Forum

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### Abstract

Recommendation functionalities have been gaining greater relevance in computational systems, especially with those heavy in user interactions in order to direct the shared content according to users' interests. Thus, it is possible to infer the suitability of this kind of feature in online forums that commonly present a large amount of information and file exchange, making it difficult to locate what is relevant if there is not any mechanism that helps in this task. This article proposes a recommendation mechanism for online forums in virtual learning environments. First, a systematic mapping was conducted to identify algorithms for recommending learning resources. It was restricted to artificial intelligence techniques, as their characteristics are more suitable to tackle this kind of problem. Among the findings of this study, content-based filtering was selected for the development of a customized forum plug-in for Moodle which is able to provide recommendations of learning materials and contacts to users based on their interaction data. A generic model is presented to describe its basic structure, where the main entities are users' logs and preferences, tagged posts and ratings attributed to them. An ontology of tags that are used to classify posts' contents is defined. Social information is also taken into consideration, as the users' feedback to the posts are computed in the recommendation generation process. The identification of expert users to be recommended according to their domain of expertise is another important feature, as it allows users to exchange ideas and ask questions to the most knowledgeable participants of the forum in areas in which they are interested. Finally, the usefulness of recommendations can be evaluated by system users, information that is also utilized to improve future recommendations. The model proposed can be replicated to other educational systems, being especially useful to massive open online courses (MOOCs) providers, as it yields an automated personalization component even for a large scale of users.

**Keywords:** Online Forums, Virtual Learning Environments, Artificial Intelligence, Content Recommendation

### Introduction

Digital resource recommendation is an essential feature for online platforms that have a large number of courses and students (Xiao, Wang & Jiang, 2018). In general, these courses do not impose restrictions on their access, and thus can be described with the acronym MOOC: Massive Online Open Courses. A big challenge for MOOCs is to choose technologies that tackle their massive characteristic, because traditional resources of online education and a small number of instructors are not enough to deal with thousands of students (Vazquez Cano, 2015). Thus, the recommendation system, an automated solution to provide





content to students, even on a large scale, is an adequate resource in this context. It can offer support by suggesting the user to access learning materials, befriend other users, follow learning paths, and other possibilities. Given these facts, we identified an opportunity of improving the courses offered by our institution, enhancing a customized forum activity with a recommending capability. We are a research group, located in a Brazilian public university, that in partnership with the Ministry of Health, offers self-instructional courses directed to health professionals, but accessible by all the population. The tool we propose, based on the model described in this article, will be useful to guide users through the content, aiming to increase their motivation and engagement in the courses, that do not have any instructors.

This article is organized as follows: after this introductory section, we present a brief theoretical explanation and literature review regarding the topics of this article. In the subsequent section, we propose a recommendation functionality for e-learning online forums. Finally, we present our conclusions and discuss possibilities for future work.

### **Theoretical Framework and Literature Review**

To build understanding of recommendation systems and online forums, we present these concepts in this section, ending with the description of the systematic mapping we have carried out.

#### *Recommendation Systems*

Recommendation systems have the function of providing suggestions of items for a given user. The first systems of this kind were used in e-commerce sites (Xiao, Wang, Jiang & Li, 2018), recommending sales items that potentially would be of the given customer's interest. When used in educational contexts, these items are generally resources like videos, texts, exercises, peers to follow, etc. There are three main approaches to implement a recommendation system:

- Content-based filtering: the characteristics of the potential recommendation items are compared to the resources in which the user already has shown a preference. Thus, the system can make recommendations without having to match the given user's interest to the others' (Rojsattarat & Soonthornphisaj, 2003).
- Collaborative filtering: also known as Social Filtering, this approach uses ratings provided by system users, and evaluate similarities among profiles of several users to determine what items to recommend (Rojsattarat & Soonthornphisaj, 2003).
- Hybrid: this approach combines the previous ones, or any of them with other techniques.

#### *E-learning Online Forums*

Online forums are an invaluable resource in virtual learning environments, as they provide a place for discussion among the course participants (Monahan, Mcardle & Bertolotto, 2008). Through such resources, learners can exchange ideas, ask questions, as well as communicate with peers and instructors. Their capabilities promote reflection and interactivity, influencing positively the learning process. (Patriarcheas & Xeno, 2010).



### Systematic Mapping

In order to survey the status of the scientific literature regarding the techniques used to build recommendation systems, we conducted a systematic mapping of the literature. This is defined as a broad review of primary studies in a specific topic area that aims to identify what evidence is available on the topic (Kitchenham, 2007).

Our aim was to answer the following question: "What are the computational techniques used in educational recommender systems?". We restricted the techniques to those using Artificial Intelligence, as this area of Computer Science has technologies proven to be adequate in providing adaptability to educational systems (Bajaj & Sharma, 2018).

The mapping was conducted in accordance to what is recommended in Kitchenham (2007), as follows: 1) define research question, 2) define inclusion/exclusion criteria, 3) select databases, 4) define search string, 5) execute the search, 6) analyze results, 7) summarize and draw conclusions.

So first, we searched articles of scientific journals, written in English, excluding the ones with paid access and duplicated. The databases used were Scopus, ScienceDirect, and ProQuest, as they have quality publications in the fields of education and technology. The terms used in the search are described in Table 1.

Term	Searched in
"recommendation" OR "recommender"	title
"e-learning" OR "education"	title, abstract or keywords
"artificial intelligence" OR "machine learning"	anywhere in the article

**Table 1: Search terms of the systematic mapping**

We obtained 217 articles in this initial search and analyzed their titles and abstracts. After this step, we selected 128 of them for a thorough reading. Finally, we identified 54 articles that fitted the requirements defined to answer our research question. Most of the works in this set were applied in the higher education context (Herath & Jayarathne (2018); Albatayneh, Ghauth, & Fang-Fang (2018); Chen & Huang (2012); Khribi, Jemni & Nasraoui (2009); Zhang, Huang, Lv, Liu & Yang (2019); Klasnji-Milicevic et al. (2018); Tarus, Niu & Kalui (2018); Zhu et al. (2018); Tarus, Niu & Yousif (2017); Wan & Niu (2016); Sengottuvelan et al. (2015); Dascalu et al. (2015); Klasnji-Milicevic et al. (2011a); Klasnji-Milicevic et al. (2011b); Abel et al. (2010); Luo et al. (2010); Huang, Cheng & Huang (2009); Li & Zaiane (2004)).

Generally, these were experiences of development of a tool in an IT-related department, implemented locally, rather widely applied in the institution. Also, many of the publications refer to tools not implemented yet, basing its initial results on benchmark datasets (Dwivedi & Bharadwaj (2013); Shu et al. (2018); Deng, Li & Huangfu (2018); Wu, Lu & Zhang (2015); Ali, Ghani & Abd Latiff (2015); Bobadilla, Serradilla & Hernando (2009)) or in data obtained from real systems (Wan & Niu (2018); Guangquan, Jiali & Siyu (2018); Bourkhouk, Elbachari & Eladnanil (2017); ELI Mabrouk, Gaou & Rtili (2017); Salehi (2014); Salehi, Kamalabadi & Ghouschi (2014); Salehi & Kamalabadi (2013); Salehi (2013)).



Regarding the approaches described earlier, as 68,5% of the selected works use either one or both of them, it is shown they are widely used, but in the majority of the cases (75%) they were not used alone, characterizing these approaches as hybrid. The most common techniques paired with the two basic approaches were:

- Clusterization (Harath & Jayarathne (2018); Dwivedi & Bharadwaj (2013); Khribi et al. (2009), Klasnji-Milicevic et al. (2018); Sengottuvelan et al. (2015));
- Association rules (Harath & Jayarathne (2018); Chen & Huang (2012); Khribi et al. (2009), Xiao et al. (2018); Salehi & Kamalabadi (2013); Klasnji-Milicevic et al. (2011b));
- Fuzzy logic (Guangquan, Jiali & Siyu (2018); Wu, Lu & Zhang (2015); Baloian, Galdames, Collazos & Guerrero (2004));
- Sequence pattern mining (Chen, Niu, Zhao & Li (2014); Tarus et al. (2018); Bourkougou et al. (2017); Salehi et al. (2014); Salehi & Kamalabadi (2013); Shen & Shen (2004));
- Neural nets (Ye, Tang, Xu & Jin (2015); Zhang, Huang, Lv, Liu & Yang (2019); Shu, Shen, Liu, Yiu & Zhang (2018); Deng et al. (2018); Baloian et al. (2004));
- Decision trees (Diao, Zeng, Duan, Lu & Zhou (2018); El Mabrouk, et al. (2017); Wu, Lu & Zhang (2015); Luo, Dong, Cao & Song (2010)).
- Other techniques, based on different approaches, were also found: artificial immune system (Wan & Niu, 2016), evolutionary prototyping (Evale, 2017), self-organization approach (Wan & Niu, 2018), ontology-based semantic analysis (Wang, Tsai, Lee & Chiu, 2007), case-based reasoning (Nasiril, Zenkert & Fathi, 2017), bayesian classifiers (Baloian et al., 2004), particle swarm algorithm (Huang, Cheng & Huang, 2009), ant colony algorithm (Yang & Wu, 2009), Apriori data mining algorithm (Lazcorreta, Botella & Fernandez-Caballero, 2008), k-means clustering (Dwivedi & Bharadwaj, 2013; Sengottuvelan et al., 2015) and sequencing rules (Shen & Shen, 2004).

### **Model of the Recommendation Functionality for Virtual Learning Forum**

In the model presented in this article, we decided to adopt a content-based filtering approach using tags. Even though the literature showed that hybrid techniques generally are more efficient, in terms of the precision of the recommendations, they demand more computational cost. The collaborative filtering algorithm presents a dramatic increase of computational complexity as the number of users increases (XIAO et al., 2018). As we could not afford such increase in computational cost, we opted for a simpler, but faster approach, in which the tags help in the representation of the knowledge in our domain, as a classification of the posts' content.

This model was intended to be used in self-instructional MOOCs, so an important requirement was to deal with a large number of users. To create our approach, the first step was the definition of the context in which the forum would be used. In our case, we chose a Moodle-based virtual learning environment (VLE) to offer massive open online courses. Moodle (Modular Object-Oriented Dynamic Learning Environment) is an open-source learning management system, widely used among educational institutions all over the world, and is available in many languages (MOODLE, 2018). Its basic installation requirements are a web server, a database, and a PHP environment, all set up according to the software requirements informed in the release of the version to be installed (MOODLE, 2019).



The Moodle platform has several types of learning activities, implemented as native modules. However, many others can be added, as the architecture of the system was designed to be extended by them in the form of plugins, provided by a large base of developers that contribute to this project. The term modular in its name refers to this characteristic. Moodle already has a native forum activity, but our research group concluded that the best alternative would be to develop a new forum plugin with some required features, including a built-in recommendation mechanism, instead of adapting the existing tool. This decision was made after an evaluation of what would be more adequate in terms of cost and effort necessary to implement the integrated recommendation functionality.

The development of the forum followed the guidelines of plugin development contained in the Moodle platform documentation, available in Moodle (2017). The programming languages used were the general-purpose scripting language PHP (The PHP GROUP, 2019), in which the Moodle system is mostly developed, SQL, a language for manipulating the database (W3SCHOOLS, 2019), and web development languages: HTML, the web's core language for creating content (W3C, 2019a), CSS, used to add style to web documents (W3C, 2019b) and JavaScript, that allows to implement complex things on web pages (Mozilla, 2019). A multidisciplinary team carried this task, including web developers, graphic designers, instructional designers, course coordinators and system managers. Figure 1 shows the basic structure of the integration of the new forum plugin with the VLE. A user has access to the customized forum through the main Moodle environment, and perform actions that are registered in the VLE log database. The actions taken into account for the forum functions are post creation, comment, attribution of like/dislike. The forum also communicates with some external libraries used to implement a part of its features.

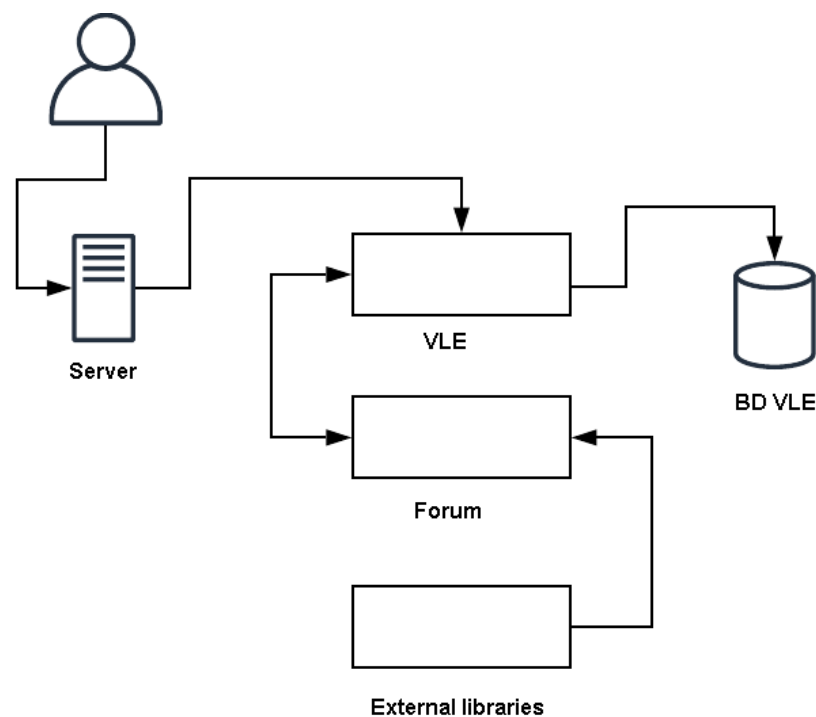


Figure 1: Integration of forum and virtual learning environment



## Forum Model

A course can contain several forum activities, which encompass posts organized in threads. The post is the main entity of the model, a unit of text attributed to a user, belonging to a discussion thread. It can have one of the following types:

- Narrative: Used to describe dissertative messages.
- Question: Used to express doubts about a given topic.
- Trigger question: It is a special type of question, with a highlighted visual style, intended to signal a discussion of greater importance in the forum. Its creation is permitted only to forum moderators.

This classification is helpful to understand the semantics of the messages, which is used to evaluate users' reputation and ranking. Tags are elements that indicate the post topic. Besides providing information to the recommendation engine about the content of the post, tagging can be considered a meta-cognitive strategy to help learners, because when they highlight the main part of a text, they can remember it better (Cao, Kovachev, Klamka, Jarke & Lau, 2015).



Figure 2. Class Diagram of the customized forum model



In our first version of the tool, they are previously configured when the forum is created. The entity Like represents the user's feedback for a post, and its type denotes if it is positive (like) or negative (dislike). One post can contain n feedbacks from any users, but the post creator. This feature was inspired by social media applications, which promote a way to engage the users, as they are able to express their preference. Figure 2 shows a class diagram that indicates the relationships between the described entities. Besides its functionalities, described earlier, some other important requirements identified for our tool were scalability, to deal with an unknown quantity of users (but certainly large), usability, as the users can come from different educational backgrounds and have distinct levels of digital literacy, and flexibility of use with different devices and conditions of Internet connection.

### Recommendation Mechanisms

The recommendation generation functions are implemented as web services, applications available via standard web protocol, designed to interact with other programs (CHRISTENSSON, 2017). This design choice was made to segment them into modules easier to manage and maintain, providing the recommending functionality to the forum tool. In our model, there are two kinds of recommendation, of didactic materials and users, described below:

- Material recommendation: When configuring the forum, materials can be added and associated with the available tags. Each time a user utilizes a tag, it is registered as a topic in which the user is interested. An equation calculates the level of interest, weighted according to the interaction in which the tag was used. Posts associated to the Question type have greater weight, because they show the user is expecting an answer in that topic.
- User recommendation: Expert users of a given topic, represented by a tag, are recommended to others with the same interest. They can be identified according to the calculus of a user reputation function, which depends on the number of Narrative posts created by a user in that topic. It is also influenced by the feedbacks received, increasing according to the number of positive feedbacks (likes) and comments, and decreasing if there are negative feedbacks (dislikes).

Recommendations are notified through email, whose frequency can be chosen by the user. They can be viewed in a specific area of the forum, as well, in which the user can give a feedback about the quality of the suggestions, to be taken into account in the next time the system makes a recommendation. There is also a configuration that limits the number of items recommended each time, to prevent an excess of suggestions.

### Conclusion

Online discussion forums are useful tools for promoting dialogue and collaboration in virtual learning environments, especially when the participants are not able to meet face-to-face. This is the case for massive online courses, which per definition, have a large number of users, who also produce an equally big amount of content, that can cause an information overload in their consumers. Recommender systems can be used to tackle this problem, offering information options that may be most useful to them, based on their preferences. In our work, these actions include create and comment posts, and give feedback through likes



and dislikes. In order to identify the most suitable computational technique for performing recommendation in educational contexts, we have carried out a systematic literature mapping. The selected articles showed that the most used techniques are the content-based filtering and collaborative filtering, generally used in combination. But for our application, for the sake of lower computational cost, we chose to use content-based filtering, in which the recommendation is generated based on the characteristics of the content (expressed by tags, in our case) similar to those with which the user interacted most.

We presented a model of a customized forum activity for a Moodle-based MOOC platform, showing how content recommendation can be used in this context. Even though we approached a specific learning management system, the model can be replicated to other technologies. This forum, besides the features of creating and commenting posts, presents the novel feature of recommendation of materials and users, as a strategy to increase the participation in this activity in an automated manner. The advantage of this approach is that the promotion of engagement can rely less on the stimulus provided by course instructors and moderators, that can be unmanageable in a massive setting. It also has an additional type of interaction through likes and dislikes, a characteristic borrowed from social media systems that allow users to give feedback in a friendly and practical way and is another important information for the calculation of the items to be recommended.

One limitation of our work is that the calculations of the relevance of the items are still based on weighted equations. We intend to research more sophisticated approaches, all the while trying to obtain the best cost-benefit between accuracy and computational cost, given our infrastructure restrictions. Another issue to overcome is to make the configuration of the application more flexible, including the possibility for the users to create their own tags, instead of the fixed possibilities, created by the course manager. We see a great potential of the tool to increase the effectiveness of online forums, increasing user participation and satisfaction, reducing information overload and turning the users' interactions more significant, as they are directed by their interests. The solution will be applied in self-instructional massive online courses, and we intend to present the effects of its use in future research.

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## Facilitating Your Online Course: Where to Focus Your Efforts When a Course is in Progress

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### Abstract

An increasing number of online instructors find themselves teaching online courses that they did not design and in which they might have little ability to edit and update. However, there are still many ways that online instructors in situations like this can influence and improve the online learning experience for students in their courses. Based on a summary of online course quality assurance frameworks, the authors of this paper have identified communications with students and instructions to students as areas that easily can be addressed when a course is in progress. In this paper, the authors provide evidence-based strategies online instructors can add to their repertoire for communications with students and instructions to students to enhance the facilitation of their in progress, online courses. While this paper is intended for instructors with limited permission to modify aspects of their courses, the information that is included will be useful for all online instructors.

**Keywords:** Online Teaching, Facilitation Strategies, Quality Assurance, Presence, Instructor Feedback, Asynchronous Course

### Introduction

As online learning continues to grow, institutions of higher education struggle with identifying the best ways to evaluate online courses to ensure quality learning experiences are provided (Lowenthal & Davidson-Shivers, 2019). In the United States alone, there are dozens of quality assurance frameworks that one can apply during the design and development process when courses are created or to evaluate existing online courses (Baldwin, Ching, & Hsu, 2018; Baldwin & Trespalacios, 2017). As institutions standardize online course development, the structure of courses become less malleable. Many online instructors find themselves teaching online courses previously designed by someone else; in many situations the online instructor might not have the ability to modify the course design (Lowenthal & White, 2009). However, even in situations like this, we contend that there are many ways that online instructors can positively influence their learning environments, adding to the somewhat static elements designed into the courses. Given this, in the following paper we describe some evidence-based practices that online instructors can use when teaching an asynchronous online course in progress in which they do not have access and/or permission to edit the design of the course.



Quality assurance frameworks, such as Quality Matters (2019) or the Online Learning Consortium’s Quality Scorecard (Online Learning Consortium, 2019), were developed to help institutions offer quality online learning experiences. These frameworks typically consist of a set of standards that identify elements (usually based on the online learning literature) that all online courses should have, and a corresponding rubric to help online instructors and course designers to not only evaluate online courses once they are developed, but also to help guide the design, development, and sometimes facilitation of online courses (Lowenthal & Davidson-Shivers, 2019).

Recently, Baldwin, Ching, and Hsu (2018) analyzed frequently cited online course evaluation instruments and identified 12 common elements across each instrument. We have grouped these elements into five categories that identify the nature or purpose of the element (e.g., instruction to students, communications) and identified when they are typically addressed (i.e., during course design and development or course facilitation) (See Table 1). Many of these elements are addressed during the design and development process for online courses, and thus often cannot be changed while a course is in progress; for instance, instructional design decisions, usability of the learning management system, and administrative mandates to meet various compliance requirements frequently cannot be changed while a course is in progress. Other elements, however, like communications and instructions to students can be addressed by the facilitating instructor while an online course is in-progress. A few other elements, though, might typically be addressed during the design and development process before a course is fully developed (e.g., providing rubrics), but they also might be addressed during facilitation by an online instructor as needed, or supplemented with additional instructions or clarifications provided to students. Attending to these practices and skills is in line with research on the practices of award winning online instructors who identified the role of facilitator as the most important role of the online instructor (Martin, Budhrani, Kumar, & Ritzhaupt, 2019).

Baldwin, Ching, & Hsu (2018) Online Course Evaluation Element	Design/Development Typically Fixed	During Facilitation	Element Category
Objectives are available	x		Instructional Design
Navigation is intuitive	x		Learning Management System
Technology is used to promote learner engagement/facilitate learning		x	Communications
Student-to-student interaction is supported		x	Communications
Communications used to build community		x	Communications
Instructor contact information provided	x		Compliance



Expectations regarding quality communication/participation are provided	x	x	Instructions to students
Rubrics provided	x	x	Instructions to students
Alignment between objectives and assessments	x		Instructional Design
Links to institutional services are provided	x		Compliance
Disability accommodations are described	x		Compliance
Course policies for behavior expectations are included	x	x	Instructions to students

**Table 1: Online Course Evaluation Elements, Categories, and Timing**

Throughout the rest of this paper, we will focus on the quality elements that an online instructor has control over in an asynchronous online course once a course is in progress. In particular, the work of several researchers (e.g., Sheridan & Kelly, 2010; Hodges & Cowan, 2012; Lowenthal & Dunlap, 2018; Martin & Bolliger, 2018; and Martin, Wang, & Sadaf, 2018) provides guidance on how communications and instructions to students can help improve any online course.

### Strategies to Improve Communications in Asynchronous Online Courses

There are many ways that online instructors can improve communication in asynchronous online courses. Baldwin, Ching, and Hsu (2018) specifically identified the following quality indicators related to the communications category:

- technology is used to promote learner engagement/facilitate learning,
- student-to-student interaction is supported, and
- communications used to build community

The first indicator, “technology is used to promote learner engagement/facilitate learning,” focuses on creatively using technology—including text, audio, video, and images—to create student centered instruction that promotes learner engagement and active learning. While there are many ways that an instructor might do this, one way is through creating digital stories (Lowenthal & Dunlap, 2010). Digital stories are short videos that use audio, video, images, and music to tell stories in a multimodal format. Digital stories can be created as a way for instructors and students to get to know each other or they can be created to introduce a given topic or even as an alternative to a traditional student presentation (Dunlap & Lowenthal, 2014).



Other strategies might include having students share meaningful music (and corresponding stories of why that music is meaningful to them; Lowenthal & Dunlap, 2010) or even having students share personal images (e.g., from Flickr or Instagram) to help establish social presence (Dunlap & Lowenthal, 2014). While there are other highly technical ways to improve communication (e.g., through asynchronous video tools like VoiceThread or FlipGrid), simple one-on-one emails or five minute phone calls to students can be very effective (Lowenthal & Mulder, 2017; Richardson & Lowenthal, 2017).

The second indicator focuses on the importance of having students interact with each other frequently and in meaningful ways. This quality indicator focuses on creating student-centered learning environments where students are regularly interacting with each other and not simply watching online lectures and completing online exams. The importance of interaction is emphasized more than ever in the United States with the federal government requiring regular and substantive interaction in online courses (Regular and Substantive Interaction, n.d.). One of the most common ways to get students interacting with each other is through participation in asynchronous online discussions. However, asynchronous online discussions are not inherently interactive and meaningful. In fact, asynchronous online discussions can often feel like busy work (Vrasidas & McIsaac, 1999) or are not seen as engaging (Martin & Bolliger, 2018). Even with a well designed discussion prompt, online discussions can often fall flat. It is beyond the scope of this article to detail all of the nuances of facilitating online discussions, but in general successful online discussions require regular monitoring and facilitating (Corry, 2004; Dennen, Aubteen Darabi, & Smith, 2007). Research also suggests that it is important to not only set expectations in terms of class discussions and participation, but also to regularly grade discussions to encourage participation (Swan, Shen, & Hiltz, 2006). Other ways to get students interacting with each other might involve peer reviewing key projects or working on group projects together (Brindley, Blaschke, & Walti, 2009).

The third and last quality indicator identified by Baldwin et al., focused on communication, involves developing a community of learners in online courses. This quality indicator is really meant to emphasize the importance of moving beyond the traditional correspondence course model, and instead focusing on developing the online courses we teach into a community of learners with open communication, trust, and collaboration. This indicator highlights the point that online courses are not by default a community of learners, rather they take intentional effort and regular facilitation, among other things, to become a community of learners. The Community of Inquiry framework argues that a community of learners involves teaching presence, social presence, and cognitive presence (Garrison, Anderson, & Archer, 2000). While part of teaching presence focuses on instructional design and direct instruction (two activities that are usually done before a course is offered), facilitating discourse is also a key component to establishing teaching presence in online courses (Anderson, Liam, Garrison, & Archer, 2001). Researchers have pointed out how monitoring and supporting interaction and participation and providing multiple ways of communication can help promote community (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000). Garrison and his colleagues contend that through actively facilitating discourse, online instructors can then help build social presence (i.e., a sense that others are real and there) in online courses (Rourke, Anderson, Garrison, & Archer, 2001); social presence is a key building block for community development in online courses. Simply put, we have found that the building blocks for community development are regular and meaningful learner-instructor and learner-learner interaction, building and maintaining social presence, and providing opportunities for collaboration.



As useful and important as these three indicators are, they fail to address two fundamental things that all online instructors should focus on: timely interaction and prompt feedback. It should be no surprise that when communicating with online learners, the timing of the response is an important factor. Research on student perceptions of online learning experiences clearly indicates that students desire a timely response during communications (Hodges, & Cowan, 2012; Martin, Wang, & Sadaf, 2018; Sheridan & Kelly, 2010). Timely interaction is not well defined, but research indicates that a 24-hour response time is acceptable to learners (i.e., Tatum, Martin, & Kemper, 2018; Zhang, Hurst, & McLean, 2016). While this type of response time may not always be possible, it is recommended that a typical instructor response time be communicated to students. In some cases, instructor response time may be mandated by the institution offering the course and employing the instructor (i.e., Walden University, 2019). Response time refers to not only responding to student inquiries via discussion forums, email notes, and the like, but also providing students feedback on their completed assignments. In fact, Quality Matters, one of the quality assurance frameworks Baldwin et al. analyzed, emphasizes the importance of setting clear expectations of when students can expect a response to questions they ask as well as when assignments will be graded.

Providing feedback has been identified as one of the key roles of an online instructor (Martin, Budhrani, Kumar, & Ritzhaupt, 2019; Magruder & Kumar, 2018). Sheridan and Kelly (2010), Hodges and Cowan (2012), and Martin, Wang, and Sadaf (2018) all found that students value prompt instructor feedback. Research also suggests that providing detailed feedback is not only valued by students but also an effective way to establish instructor social presence in online courses (Dunlap & Lowenthal, 2014; Lowenthal & Dunlap, 2018). This should not surprise educators; prompt feedback is a standard principle of instructional theories (i.e., Gagné, Briggs, & Wager, W., 1992) and learning theories (i.e., Ertmer & Newby, 1993).

Dawson, Henderson, Ryan, Mahoney, Boud, Phillips, and Malloy (2018) note that the simplicity and convenience of digital text has made it a common form of feedback to online students. New technologies and learning management system tools now make other forms of feedback possible. For example, some instructors have observed positive aspects of providing audio feedback (i.e., Ice, Curtis, Phillips, Wells, 2007; Wilson, 2009) as well as video feedback (i.e., Borup, West, & Thomas, 2015; Dunlap & Lowenthal, 2014; Lowenthal & Mulder, 2017). Research, however, continues to support email as a valuable tool for providing feedback to learners (i.e. Borup, West, & Thomas, 2015; Martin & Bolliger, 2018), and the text nature of email messages makes them much more likely to be accessible via screen readers than other possible cutting edge technologies. Just as students desire timely responses to their questions, there is a temporal expectation to feedback on their work.

Students desire prompt feedback, but what prompt means is not clear. Many feedback models recommend providing immediate feedback when possible, but Malloy and Boud (2014) point out that the timing of feedback requires some consideration because, as research suggests, immediate feedback is not always beneficial to learners (Mullet, Butler, Verdin, von Borries, & Marsh, 2014). Variables such as the complexity of a task and the emotional state of a learner, among others, should be considered (Malloy & Boud, 2014, p. 419). While there are multiple ways instructors can deliver feedback (i.e., audio, text, video), in one study, students reported that they would rather receive text-based feedback quickly rather than waiting for detailed video feedback (Lowenthal, 2014). In addition to timely response and feedback, research also has





found that online learners place a high value on clear instructions (Sheridan & Kelly, 2010; Hodges & Cowan, 2012; Martin & Bolliger, 2018). Next, we will consider strategies for providing instructions to students.

### **Strategies to Improve Instructions to Students**

Baldwin, Ching, and Hsu (2018) identified the following quality indicators related to the instructions to students category:

- expectations regarding quality communication/participation are provided,
- rubrics provided, and
- course policies for behavior expectations are included

Assignments in online courses often are predetermined and designed to meet academic program needs and standards. Thus, changing the assignments, or the instructions that come with them, is not an option for many instructors. There are still opportunities, however, for an online instructor to provide additional details or clarifications on assignments.

The first quality indicator, expectations regarding quality communication/participation, was addressed a bit earlier in this paper, which simply suggests how many of these indicators and principles of good teaching overlap. Research simply suggests that students should understand what is expected of them in terms of communicating and participating in their online courses. If students are expected to log in a certain amount of time each week, this should be clearly stated. If students are expected to both post and respond to a certain number of students in an online discussion, then this should be clearly stated (e.g., in the syllabus and/or elsewhere at the beginning of the course). Further, if students are expected to follow certain netiquette guidelines or post in certain ways (e.g., using a certain amount of words or citing the reading), these expectations should be clearly stated in a course. While this might be done in a syllabus, posting announcements, sending one-on-one emails, or sharing rubrics can help direct the students' attention to these requirements at times when assignments are made, thus reminding students of expectations.

The second indicator focuses on providing rubrics. This includes not only providing rubrics for assessing online discussions, as just mentioned, but also providing rubrics for major assignments. Rubrics help clarify expectations to students and remove any mystery about how an assignment will be graded, which can be extremely important in classes where students do not meet face-to-face and thus do not have the opportunity to pick an instructor's brain about what he or she is looking for in a certain assignment (Panadero & Jonsson, 2013; Penny & Murphy, 2009; Walvoord & Anderson, 2011). Rubrics for assignments have been shown to be useful to online students (Haight, Ahern, Ruberg, 2017; Martin & Bolliger, 2018). The construction of quality rubrics takes time and dedication (i.e. McKeown & Lenarcic Biss, 2018), and some researchers have found that in rubrics, "clarity and appropriateness of language is a central concern" (Reddy & Andrade, 2010, p. 435). An instructor can help students avoid confusion on assignments and/or their rubrics by providing students with additional details to supplement the information included with the rubric, and candid comments about how the instructor plans to interpret various aspects of the rubric. The explanations could come in the form of announcements in the learning management system, email notes to students, or by using some other form of communication that is available in the course.



The third and last indicator focused on instructions to students is clarifying any course policies regarding behavior expectations. This might not only include things such as netiquette and acting respectfully and professionally, as noted earlier in this paper, but also other policies about academic integrity, plagiarism, or meeting deadlines. While these concepts are likely stated in a course syllabus, it is good practice to reiterate them to students at the beginning of a discussion, or before students complete an exam or turn in a paper.

Reminders about these indicators, as well as a host of other things, can be sent via an email note to all students, a class announcement posted in the learning management system, and any number of new modes of communication (e.g., a short video announcement; or using a messaging app such as Slack). Martin and Bolliger (2018) specifically found that learners value regular announcements or email reminders. Millman (2018) provides several recommendations for online instructors to implement to make assignments more transparent, such as clearly communicating the due date, purpose, requirements, grading criteria, and how to submit work. These are specific examples that also follow the advice of Dunlap and Lowenthal (2018) to “be concrete and explicit with instructions for all activities, assignments, and projects” (Supporting Student Success section). Online instructors can review assignments and provide additional details or clarifications to students.

## Conclusion

Taken together, the work of many online learning researchers has established a common set of needs expressed by students and instructors regarding communication from instructors of online courses and clear assignment instructions. Both of these areas of need are included in Magruder and Kumar’s (2018) list of major teaching roles and competencies for online instructors as part of the administrative/managerial role, and both are easily applied to the situation where an online instructor has little or no control over the structure and content of his or her class.

Using a review of online course evaluation instruments, and summarizing current associated literature on the elements of an online course most open to action by an instructor while the course is in-progress, it is clear that online instructors must attend to:

1. Timely response to student questions
2. Providing clear instructions on assignments, and
3. Providing feedback on student work

This paper has outlined evidence-based practices that online instructors can use to increase communication and student engagement when teaching an asynchronous online course in which they do not have access and/or permission to edit the design of the course. Research has shown that these practices help the students stay engaged with their courses, and the tools to implement these practices are readily available through learning management systems or other institutional systems. Yet, many online instructors do not implement them regularly. A recent EDUCAUSE study (2017) of faculty and information technology found that the most common faculty uses of the LMS are to push out information to students such as a syllabus or handouts, all actions that require minimal, if any, interaction with students. This finding was consistent even

for more experienced online instructors. This is concerning since research has found that instructor-facilitated courses demonstrated a stronger sense of community than when the instructor was less engaged (i.e. Phirangee, Epp, & Huett, 2016). Therefore, while this paper is focused on strategies for instructors with limited permission to modify aspects of their courses, it should provide information that is useful for all online instructors.

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## ePortfolios: The Role of Reflection in Graduate Online Learning and Pedagogy

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### Abstract

Eportfolios create the opportunity for peer, instructor or general public feedback and commentary and can be an effective tool for reflection on practice, facilitating learning-workplace transition. While an extensive body of research exists on the uses and value of eportfolios going back over fifteen years, most notably the work of Helen Barrett (2013), little substantive research on the effectiveness for learning through e-portfolios was published until relatively recently (Scully, O'Leary, & Brown, 2018). ePortfolios in graduate-level education had received an even smaller share of research attention until they were acknowledged as a High Impact Practice (HIP) in recent years. As Eynon and Gambino acknowledge (2016), the high impact nature of eportfolios in post-secondary learning depends not only on professional development of educators in their use, and changes in pedagogical approach, but also on the cultivation of critical reflection. ePortfolios represent a major movement in the academy over the past several years, both to support students to better integrate new learning, and to design assessment that is more in keeping with constructivist and transformative teaching and learning practices. The use of an eportfolio towards the final assessment of an online graduate program, as discussed in this presentation, is a unique application of this combined pedagogical and technological approach. The research literature, however, remains sparse on the topic of how to promote the development of reflective practice among graduate students or their instructors. Critical self-reflection on learning can be a difficult facility for some students to develop.

In a well-conceived process eportfolio, as implemented in this fully online graduate program, learners create a repository of artefacts, as well as interactions they have experienced during the program-wide learning process. These artefacts are accompanied by reflections on the learning experience. In these reflections, learners document instances of learning moments and development of metacognitive processes, and keep track of goals and progress. In addition to their contribution towards eportfolio development, these reflections can be used to create resumes for job applications, notes for interviews, and also provide reminders of effective strategies to use in workplace situations, strategic planning, problem-solving and decision-making. This paper offers a report on a qualitative longitudinal action research study gathering evidence of the developmental stages of critical reflection, suggesting some processes to foster the achievement of critical self-reflection among online graduate students – and their instructors. These findings will open discussion of comparative applicability of the findings.

**Keywords:** e-portfolios, reflection, High Impact Practice (HIP), constructivist and transformative learning, Ecological Constructivism



## Introduction

e-Portfolios, also variously known as digital portfolios, web-folios or learning portfolios (Scully, O’Leary, & Brown, 2018; Zuba Prokopetz, 2019a), among several other terms, generally comprise a collection of learning or professional artefacts that are then curated and annotated, typically with a focus on reflection on the learning or impact the artefact has had on the creator/curator. For the purposes of this paper, the term e-portfolio is used. Portfolios in paper or similar form have a long history in education and job applications, particularly in creative or practical professions such as the creative arts, fashion, architecture, and teacher education. The “grandmother of ePortfolios”, Dr Helen Barrett (1998; 2013) has been working on evolving the concept of e-portfolios and the related concept of digital storytelling since 1991 and has been the major driver behind the introduction of e-portfolios into many spheres of education. From a technology perspective, an e-portfolio differs from a paper portfolio in that it can be tagged, searched, archived, syndicated, and incorporate multiple forms of media, including video, podcasts, screen shots, embedded links, and feedback facilities (both asynchronous and real time) (Hoven, 2014). This capacity for the creation of a community of learners through giving and receiving feedback from peers and on-going, iterative feedback and support from instructors sets online e-portfolios ahead of older forms of portfolios. However, there are three additional elements that contribute to the high impact of e-portfolios: the incorporation of media mentioned above, their versatility in helping learners make the transition from formal learning to the workplace, and most importantly, the element of reflection on their learning. As several authors acknowledge, e-portfolios work when they “done well”, which includes the necessity of development of critical self-reflection on learning (Eynon & Gambino, 2016; Scully et al., 2018). From a pedagogical perspective, e-portfolios are a tangible manifestation of the movement towards more constructivist (Davis & Sumara, 2003; Hoven & Palalas, 2016) and transformative (Mezirow & Associates, 2000) teaching and learning practices in online environments.

Since 2015-6 when e-portfolios were formally recognised as the eleventh High Impact Practice (HIP) in higher education (Hubert, Pickavance and Hyberger, 2015; Watson, Kuh, Rhodes, Light & Chen, 2016; Kuh, 2017), the use of e-portfolios has grown in popularity and range of implementation across North America. Principal characteristics of a HIP are that it supports students in working collaboratively, improving communication skills, and making “connections across various assignments and courses” (Hubert et al., 2015), and with the real world, including the world of paid employment. e-Portfolios allow and promote the development of all of these characteristics. Coincidentally, the Capstone e-Portfolio course in our program was granted full credit in the same year that e-portfolios were formally declared a HIP. This paper explores two research studies on the progression of implementation of e-portfolios from initial trialling in 2008, to a program-wide full-credit course in 2016, to the present, in a fully online graduate program in western Canada.

## Background to the Problem

As mentioned above, approaches to teaching and learning are changing – and the overlay of technology is both accelerating this change and expanding and enhancing the learning opportunities that can be facilitated thereby. The field of online learning has embraced technology that breaks down barriers and makes learning more accessible to learners in more places and with less disruption to their daily lives. Constructivist theories, for example, have evolved from earlier approaches that advocated collaborative learning and co-creation of





knowledge (Davis & Sumara, 2002; 2003; Proulx, 2006) to more mature approaches that recognize that not all learners can or wish to learn collaboratively, at least not all, or even most of the time. Ecological constructivism, for example (Hoven & Palalas, 2016), embraces the need of a certain proportion of the learning population to have time to think, reflect, consider on their own – to internally process what they are encountering in a learning environment and to perceive and learn from the affordances of that environment – while also acknowledging a role and place for collaborative learning. The combination of quiet, internal reflection on learning and collaborative giving and receiving feedback, together contribute to the value of e-portfolios. It is these two activities that help learners hone their metacognitive skills of planning, organising, and strategising, as well as affective skills such as empathy, creativity, self-regulation, and the social skills needed in teamwork in formal learning settings and in the workplace (Kenny, Moisey & Hoven, 2010; Farrell & Seery, 2019). Then the question arises of how to foster and develop the skill or talent of reflection, as this seems important in so many professions (Eynon & Gambino, 2016). There are two corollaries to this question: 1) how to bring learners to an understanding of the importance of reflection to enable them to take advantage of this practice and 2) whether or how to assess their learning in creating a reflective learning portfolio. The main question above and first corollary are the questions of the research presented in this paper. The literature on reflection is discussed below, leading to the definition that has guided the study and revisions to the e-portfolio capstone course in our online MEd program.

## Reflection

Before my description of the research process and findings, it is important that I first provide some discussion of how reflection is used and realized in our program and this paper. While numerous scholars over many years have written on reflection in various contexts and for various purposes, reflection remains a rather amorphously-defined concept. In addition, the distinction also needs to be made between Critical Thinking (logical reasoning) and (Critical) Reflection or critical self-reflection on learning, which is the term we now use in our program. It has also been important to emphasise with learners that the “critical” aspect does not necessarily indicate that they have to be negative in their reflections on their experiences, but rather consider the dissonance gaps that they have experienced and take a “warts and all” approach. We try to communicate to our learners that we learn from our mistakes or missteps, or misconceptions, as much, if not more than from successful experiences.

From Dewey (1933), forward to Schön (1983), and on to Moon (2001), Rose (2013), and Hoven (2018), the emphasis in descriptions of reflection has varied from focus on action, for action, expression through writing, or creativity. Anecdotally, it seems that many of us experience moments of insight or revelation – when something just “comes to us”. These moments seem to come at the oddest times – while having a shower, the time between waking and sleeping, while out for a walk, gardening, doing some craft – essentially doing some activity that ostensibly occupies our hands or bodies rather than our minds. It seems also, however, that these activities actually free up our minds to make sub-conscious connections that allow us to take intuitive leaps in understanding, insight and creativity (Rose, 2013; James & Brookfield, 2014; Hoven, 2020 - in press). To my learners I call these “aha!” and “oh no!” moments for expression and discussion in their e-portfolios. For the purposes of learners creating e-portfolios in our program and for this paper, my definition of reflection is as follows (Hoven, 2020 - in press):



Reflection is what happens in the interstices in our minds and being between stillness, cognition, movement, and affect (feelings, emotions and beliefs). It is where creativity and deep understanding emerges - including creativity of construal, thought, ideas, and insight. It is this embodied emergence of imagination and creativity that propels innovation and brings about transformation.

This definition encapsulates the conceptualization of reflection as embodied thought processes that may not always be under our conscious control or direction, but that nevertheless help us come to new insights about understanding and learning. I now turn to a description of the two studies that have been undertaken in our online MEd program on learner development of critical self-reflection through their e-portfolios.

### Structure of the Two Studies

The two studies discussed below comprise an initial exploratory mixed methods study carried out in 2008, followed by the commencement in 2014 of a longitudinal action research study, which is on-going. The first study included a survey using a five-point Likert scale, of learner perceptions of the software platform used at the time (an ELGG modification), as well as their experiences with learning how to collate and curate an e-portfolio (Kenny, Moisey & Hoven, 2010). In this survey, learners overwhelmingly indicated that the technology was too difficult either to use or to learn how to use. The survey was followed by interviews with faculty members involved in the implementation. As a result of this study, we then searched for a platform that would be more intuitive (drag and drop) for learners, to take the pressure off the technical aspects of creating the e-portfolio and allow learners to better focus on the curation and reflective elements. Unlike the proposition of Watson et al. (2016, p. 65) that e-portfolios are “platform agnostic”, I contend that that if learning the technology platform interferes with learners’ time and mental space to reflect, they do not perceive the value of an e-portfolio. This was clearly indicated in the 2008 study (Kenny et al. 2010). In addition, if a platform does not provide a transparent feedback facility, this also reduces the value of an e-portfolio (Zuba Prokopetz, 2019b).

Following the findings of the 2008 study, we created a Moodle course site to orient and prepare learners for their e-portfolio creation and from 2012-2016, e-portfolios were offered to our coursework Masters students as an alternative to doing a comprehensive examination which involved writing two 15-page papers and participating in an oral defence. On this Moodle site we emphasized that the portfolio learners were creating was a process portfolio, involving their reflections on their learning experiences, outcomes, and learning journeys. A number of resources were provided on this site, including research readings, and some preliminary definitions of reflection. We also undertook a distillation process of the competencies or learning objectives of every course in the program and produced from this a set of six competency areas across the program with a series of sub-competencies within each of these. We decided that learners should map their reflection on learning to acquisition of these competencies and sub-competencies with the proviso that they need not include every sub-competency in their e-portfolios, but that each of the six areas should be addressed somewhere.

As an important component of our online courses is learner engagement with faculty and with each other, we decided to incorporate visible feedback: both peer-to-peer and faculty-learners, to facilitate the formation of communities of learners. Mahara was selected as the platform that best met the needs of our



program and our learners. As an Open Source platform, it also complied with our university's principles of openness. Since it is a purpose-built e-portfolio platform, Mahara provides learners with ownership of their portfolios through the feature that allows them to set permissions to varying levels of openness, and a feedback feature where they can give each other comments, receive comments from instructors, and respond to these, thus forming an asynchronous conversation visible on each page. In fact, it is this feedback feature that enables the on-going refinement of learners' pages as they mature in their understanding and application of critical self-reflection and of themselves as lifelong learners. When learners had completed their e-portfolio development to the satisfaction of a faculty member, including responding to feedback given, they then participated in a synchronous presentation and discussion of their portfolio with two faculty members and other invited learners.

To gather evidence on the development of critical self-reflection and the value of e-portfolios in graduate online learning, in 2014 I then began an on-going longitudinal action research study asking to what extent e-portfolios promote:

- experiential learning
- critical self-reflection
- transition from learning to practice
- community cohesion and
- life-long and life-wide learning in an Open and Distance environment, and how these can be supported or scaffolded.

I solicited participation from ten graduates of the program who had completed their MEd by a Capstone e-portfolio in the previous two years and gained permission to interview them, as well as analyse their e-portfolio documents, the feedback they gave others, and the recordings of their final e-portfolio presentations and discussions with faculty. Interview questions were based on:

- time taken to complete the e-portfolio compared to perceived value
- resources found useful
- pros and cons of completing an e-portfolio
- their understanding of critical reflection on completion and how they feel they developed it
- how/whether they thought the e-portfolio had contributed to their development as a lifelong and life-wide learner
- how/whether it had contributed to their professional/work life
- what they would or could have done differently
- suggestions they had for learners coming into the program
- suggestions they had for refinement or changes to the process.

In the section below I describe the findings and recommendations from qualitative analysis of the e-portfolio documents, the final presentations and discussions, and the interviews with recent graduates.



## Findings and Recommendations

From an analysis, using NVivo, of the e-portfolios and the recorded discussion following final presentation, the five themes presented below emerged as frequently recurring elements:

- Reflection (doing it)
- Understandings (benefit of reflection)
- Strategies (used to document and self-elicited reflection)
- Work-related or future benefits
- Examples given.

To illustrate how these themes emerged, I now turn to a presentation of the student voices as they expressed these themes.

*On the theme of Reflection, graduates mentioned phrases such as the following:*

I think of looking back on something and thinking about either different actions I would have taken or different points I would have made ...

... putting me in the habit of reflecting and not just times reflecting while I'm on the train or waiting in line but ...

*Towards the theme of Understanding the Benefits, the following phrases emerged:*

... it's not about taking a course or learning a skill or getting some knowledge, it's about what you're doing with that skill and knowledge ...

... doing the Masters degree, yeah – I'd say that [reflection] had started in the program and then the e-portfolio kind of tied that together ... gave it a better window to view that experience with.

... made me realize that learning is a multidimensional process ...

*Some Strategies that graduates articulated included:*

I keep daily and weekly logs of what I'm doing ... as a more intentional thing, keeping logs and journals ...

... that kind of "what were you thinking" kind of thing or "could you explain that to me, why you think that way" ...[self-talk]

*In terms of Work-related or Future Benefits the following emerged:*

I've incorporated a learning journal in my work ... just to help me with that lifelong learning.



... how does that make you feel and could you have done something different, or improved, and going forward, what are you going to do next? What's your next step? [in on-going learning journal at work]

... looking back at what I've done at school ... and how I want to point my career or when I look for a job, or the things I want to work on ... ways of understanding my own interests better.

*Finally, some examples that graduates gave of On-going Benefits, both personal and professional:*

And I think with relationships, too. Again, your partner may say or do something and now I have a different not "jump to conclusions" kind of response ...

I'm definitely looking at, or reading the newspapers, ... and really look at both sides of an argument, keeping my own assumptions and biases in check ...

Taken together these findings seem to indicate that graduates who had experienced creating a reflective e-portfolio had come to a clearer understanding of their own learning, themselves as lifelong and life-wide learners, and the role reflection had played in their learning and development of a more mature approach to life and work. From participants' responses to the interview questions around on-going benefits, it also seems that they regard their e-portfolio as a training ground for on-going journalling and reflective record-keeping, as well as being a product that they can review when preparing themselves for job searches, or interviews and to show to potential employers as examples of how they are able to recover from set-backs, problem-solve, and work as a member of a group or team.

## **Recommendations**

Recommendations that came from participants can be split into two functions: some to help other, incoming students, and the other recommendations for us as faculty to use to improve the process of learner e-portfolio creation.

The primary recommendation for other learners was to start early and build up practice in reflective writing and journalling. This group of respondents also found that they had forgotten a lot of details about some artefacts (assignments and projects) that they had completed early in their program. However, this view was balanced by an alternate perspective, that a retrospective view was helpful in seeing the contribution of all artefacts to their learning as a whole. The consensus was that reflective writing and journalling should begin early in the program. This then led into the recommendations for the program and faculty, which included:

- separate process from product by adding in more journals in all courses of the program
- provide a collection of sample e-portfolios from other students and elsewhere to provide guidelines on expectations
- provide how-to videos (for the technical aspects of the recommended platform: Mahara)
- the opportunity to attend the presentations of other learners
- provide recordings of presentations made available as resources
- provide examples of how to map reflection on learning to the program competencies
- give early feedback on the first draft of one artefact reflection



- provide written and oral comments/feedback from instructors.

When we gained full-credit for an e-portfolio as the Capstone or final course in the coursework MEd, I took these recommendations and incorporated them into the course design as described below.

### **Description of the e-Portfolio Requirements and Expectations of Learners**

In response to the recommendation to include journaling and reflective writing in all courses, we undertook a curriculum mapping exercise and have since been progressively adding reflective assignments, blogs, and journals into all courses, as well as making suggestions, beginning in the first core course, of specific artefacts that learners could include in their e-portfolios. As we thought through the design of the course, we decided to break the e-portfolio creation into four assignments:

1. a skill-building activity in which learners are provided with a reflective piece into which they are asked to insert sub-competencies where appropriate. All learners receive constructive feedback on this activity before they move on to the second assignment.
2. the creation of their Introduction page, including a brief profile of who they are, their learning goals from the beginning of the program, and a listing of which courses they took in which semester. The creation of their first draft of one artefact. These two pages must be submitted online as part of their e-portfolio and include images, graphics, and other media as appropriate for the MEd in Online and Distance Learning. They then give feedback to at least two other learners and receive feedback from both the course instructor and two other learners. This is an iterative process and learners may not continue to assignment 3 until they have incorporated and responded appropriately to the feedback they have received.
3. creation of their complete e-portfolio, on the basis of the feedback they have received on the first artefact. The full e-portfolio comprises the Introduction, five artefact pages and a Conclusion page. On the Conclusion page, learners are required to return to their learning goals from the beginning of the program and reflect on the extent to which they feel they have met these, exceeded them, or they may have changed over the duration of the program. Again, at this point they give feedback to at least two other learners on their complete e-portfolios and receive feedback from both the course instructor and two other learners. When the instructor sees that they have responded appropriately and incorporated the feedback given, a presentation date is then negotiated between the learner and the instructor.
4. learners present the pages of their portfolio in a synchronous seminar which is open to all learners in the current course. After the 20-30 minute presentation, the instructor and the learner discuss points of interest and other students are invited to also ask any questions they may have for discussion. Because of the iterative feedback-response cycle embedded in the previous assignments, this presentation mainly serves as an affirmation for the learner, as well as confirmation that the learner did indeed create the e-portfolio. Many of our learners find that they can articulate some aspects of reflection in the discussion time that they were not



previously able to in their online e-portfolios. This allows for expression of different personality types and support students with certain learning disabilities such as dyslexia. Some minor additions or revisions may also be required by the instructor after presentation, though this is rather infrequent.

When structuring the learning experiences of the e-portfolio course, I then looked at the other recommendations from interview participants. The most important items were resources to be provided. Over the past several years, the following resources have been progressively built up and expanded for inclusion in the course Moodle site:

- Readings on reflection and how to learn how to do it
- Research readings on the value of e-portfolios
- Bi-weekly scheduled synchronous information and question and answer sessions – all recorded, with attendance at two made mandatory for learners over the first three weeks of the course
- Task-type questions (based on the recordings), to be completed by those learners who, for various reasons such as time zone differences, or work or family commitments, are not able to attend the synchronous sessions
- A bank of Sample e-portfolios (solicited from learners whose portfolios provide good examples or variety)
- Peer and instructor feedback (“provide constructive and substantive feedback that you would be prepared to receive – put yourself in your peers’ shoes”)
- A bank of recordings of previous students’ presentations
- A video introduction and overview by the instructor of the course
- Technical “how-to” videos on Mahara with screen shots of each step in a separate downloadable document and on a Tutorial webpage.

In addition, from time to time instructors need to schedule additional one-on-one synchronous “emergency” tutorial sessions for learners who are still struggling. These can take place by phone, Skype, Zoom, or whatever technology the learner is comfortable with.

In keeping with the recommendation by Scully et al. (2018: 23), learners in our program “own” their e-portfolios in that they choose which artefacts to include and what platform to use. We do, however, make Mahara available within the password-protected learning environment for those learners who do not have the necessary technical skills to create their own websites and pages within them. This provision is also useful for those learners who wish to keep their e-portfolio private, within the confines of the university – or their program.

### **Conclusion: Challenges and Initiatives moving forward**

In 2018, a Working Group was formed in the Faculty of Graduate Studies of our university to explore cross-campus and cross-faculty implementation of e-portfolios. Representatives from various programs and disciplines have expressed the need for differing kinds of e-portfolios. In the Health Sciences, for example, undergraduate students queried the need to create some using technical skills that are not the focus of their



program. Faculty from another Masters program mentioned the need for learners to create an e-portfolio at the mid-program point when core courses have been completed, for them to reflect on their progress and interests to date and formulate their own selection of courses to program completion. Science representatives pondered the role e-portfolios could possibly play, with the conclusion that they could be useful in collaborative activities within courses, as well as providing opportunities for external collaborations on projects and experiments.

Some challenges that are being explored include choosing the right person to be the instructor for an e-portfolio course and what appropriate professional development might look like. Some suggestions include team teaching and mentorship. Another challenge is the labour-intensive nature of providing timely and useful feedback to learners to support and scaffold their learning and their development of reflection. The scalability of this practice with large undergraduate courses remains a topic of conjecture. One productive suggestion revolves around the creation of Communities of Practice among learners themselves, based on peer-to-peer mentoring, particularly when formed across different years in a program. A hot topic both within the literature and our Working Group is grading. In our Masters program we took the decision to grade as Pass/Revise iteratively, which is not always possible or acceptable to learners who need a good grade to apply for scholarships, for example. Our decision was based on the principle that we could not, in good conscience, grade a learner's capacity for critical self-reflection – especially when we are asking them to reflect on missteps in their learning. However, as our e-portfolio course matures and different instructors are teaching it – and a number of research graduate students are also choosing aspects of the course for their research topics – we are revisiting the grading decision with a view to possibly introducing a scaled descriptive set of criteria.

We seem to be entering a brave new era looking forward, with international collaborations in research into e-portfolios beginning to gain traction. The critical elements that keep re-emerging are the value of reflection on learning (and teaching), the backwash effect that e-portfolios have on revising the curriculum and reviewing the way we teach, as well as the need for on-going research to accompany these initiatives.

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## Systematic Peer Reviewing Versus a Discussion Forum for Promoting Online Learner Success: An Evaluation of Innovative Learning Design for Postgraduate Students

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### Abstract

Designing distance learning to ensure student success is of high importance and there are well-known aspects of distance online learning that encourage retention such as regular tutor support, clear structure, student self-reflection and online discussion with peers (Doig and Hogg, 2013). A module for a new Postgraduate Certificate in Learning and Teaching in Higher Education at the University of London was recently designed using these plus innovative pedagogic features to promote student success. The design included alignment between the assessment criteria and weekly discussion forum activities. An ipsative assessment criterion indicated to students that they must demonstrate their development and progress with their learning throughout the module to encourage consistent engagement. The design also included a peer review process that was managed through the Virtual Learning Environment with student reviews that were anonymised. To identify which aspects of the design promoted success, we collected data analytics for 50 students and explored links between online discussion forum participation, peer review activities and student marks. Contrary to popular expectations, engagement with the discussion forum is not a very good predictor of completion and success. By contrast, engagement in peer review, and especially giving feedback to peers, is a good predictor of success. Furthermore, early drop out from peer review links to incomplete submission of assessments. Thus, spending time on task in the peer review links to high or moderate performance, although a few exceptions indicate that different learners might use different tools for success. This study suggests a number of avenues for tutor development in online learning to encourage retention such as using peer review activities that are time bound and well organised. Assessment could include criteria for developmental progress as well as outcomes.

**Keywords:** Design, Peer Assessment, Retention, Student Success, Ipsative Assessment

### Introduction

The University of London Worldwide has developed an innovative online Postgraduate Certificate (PgCert.) in Learning and Teaching in Higher Education with the aim of providing professional development for lecturers in the UK and worldwide. The PgCert. was designed to present good pedagogic practice and effective use of online tools. The design of the programme includes aspects of distance online learning that encourage retention such as regular tutor support, clear structure, discussion with peers, reflection, tracking of progress and digital videos (Doig and Hogg, 2013). The first of two modules also included the innovative attributes of ipsative assessment and peer review activities, with the aim of both ensuring student success



and modelling good online learning practice. Retention has long been a challenge in distance education (Simpson, 2003) and firstly we were interested to explore, how online tools influence performance and retention and enable progression to the second module of the programme. Secondly, we aimed to investigate whether or not the online data analytics are useful for enabling 'at risk' students to be identified early in the programme. Using data from the first two cohorts taking this module, we investigated the relationships between the quality of engagement with a) discussion forum activity and b) with peer review throughout the module and final overall attainment.

After briefly exploring the pedagogic rationale for the module design in more detail, this paper will outline the learning analytics and qualitative mixed methods approach and present findings which indicate that the relationship between student engagement with online tools and student success is a complex one. The paper challenges common assumption that discussion forum activity levels predict student learning and subsequent success or failure. The paper concludes that structured peer review is very valuable for professional distance learners and student giving and receiving of feedback provides a good predictor of success whereas level of participating in a discussion forum does not predict success or failure. Thus, resources should be allocated accordingly.

### **Module Design: Online Tools and Ipsative Assessment**

The initial module Supporting Learning, Teachings and Assessment was designed to support both reflection on learning and peer engagement. Learners are prompted to write about their current teaching practice and ways in which they can develop their practice in a reflective journal which they complete throughout the 22 week module. A mid-point assessment ensures that students have tutor feedback on reflective writing, as this might be a difficult concept for some. It has long been agreed that retention in online courses requires online interaction (Macdonald, 2001) and the module offers four evenly spread peer review activities, as well as opportunities for presenting and discussing ideas with peers in a weekly topic discussion forum. The assessment design includes: receipt of peer and tutor feedback, giving peer feedback and finally alignment with an ipsative assessment criterion. These will be discussed in more detail next.

#### *Feedback From a Tutor*

It has long been argued that early formative feedback helps students improve their work (Black & Wiliam, 2009) if the feedback is future-orientated, and can be applied in a subsequent assignment (Hattie & Timperley 2007). The module under investigation had an early piece of assessment that is both summative and formative and provided students with early feedback on their ability to reflect on their practice. Students also had opportunities to benefit tutor feedback in the weekly discussion forum.

#### *Peer Review*

Effective feedback is defined by Molloy and Boud (2013) as enabling students actively to compare their work with the expected standards and criteria and not passively 'receive' feedback. Peer review can provide a useful mechanism for engaging students in feedback practice and Nicol, Thomson and Breslin (2014) have argued that peer review enables students to see problems in the work of others that they might not see immediately in their own work. Thus, giving a peer feedback may be more beneficial than receiving peer feedback. Being active in a feedback dialogue with peers also helps students understand assessment criteria



and standards so that they can undertake self-review and self-critique and become less dependent on tutor feedback and instruction (Nicol and Macfarlane-Dick, 2006).

Systematic peer review workshops were presented to students four times across the module. These workshops were managed in the Virtual Learning Environment (VLE). There was an initial phase where students submit a piece of work for peer review. After a week, the system switched to peer review and students were allocated two others to review at random. There was no marking involved although that option is a possibility. After the first peer review workshop, the tutor posted some exemplars of feedback to help students who were unsure about peer review, although this was not a pre-planned intervention as part of the module design. There were also opportunities for peer discussion and feedback in the weekly discussion forum. These were linked to structured, tutor-guided activities.

#### *Final Assessment Includes Ipsative Criterion Requiring Students to Provide Evidence of Their Progress*

Assessment is key to retention, but students may not realise that they are not making sufficient progress until they received a poor mark or grade and it is too late to take action. Early intervention and feedback can help students with their learning, but for many students feedback on a poor performance can be demoralising and they do not respond appropriately (Hughes 2014). However, there is evidence that students are motivated by ipsative feedback, which informs them of the progress or personal learning gain they are making, and helps them identify areas that need attention (Hughes 2017). Such feedback could improve student attainment and help with retention and progression. However, progress in response to feedback needs to be captured and made explicit otherwise learners may not be aware that they are (or are not) making the personal learning gains that will enable them to succeed in the summative assessment (Hughes 2017).

Therefore, the module assessment design encouraged students to gather material for their assessment from the start with an emphasis on rewarding progression as well as outcomes by including an ipsative component in summative assessment. The final summative assessment – a portfolio of development and achievement in teaching theory and practice - explicitly rewarded awareness of personal learning gain by including the ipsative (learning gain) marking criterion:

- Evidence of development of own ideas, values and approaches in relation to critical analysis of effectiveness in teaching and learning including within their own discipline.

Online tools such as peer feedback workshops and discussion activity are learning gain enablers and aim to help students meet this criterion through self-critique and reflection on their own learning as well as the learning of peers.

#### **Study Methodology**

The study aimed to explore any relationship between student engagement in discussion and/or peer review and the final student outcomes (marks). Key research questions were:

1. What is the relationship between the quality of engagement with online learning tools throughout the module and final overall attainment?
2. How far does giving feedback to and receiving feedback from peers influence attainment in the two assessments?

The forum posting and the peer review workshops were captured online and were used as data sources. Assessment and feedback data was also accessible. The total number of student records analysed was 52, but 1 student repeated the module and so appears in both sets of results. Although these students were spread over two cohorts with different tutors the module design was the same for both and the pattern of tutor support and marking was comparable with the same second marker used to moderate the marks for both the cohorts.

#### *Discussion Forum Postings*

Overall learning engagement in forum posting was recorded by counting the total number of posts that were about the course content. Romero et al (2013) have suggested that participation in a content related discussion is a good predictor of student success. Posts that were about the course practicalities or technical or social matters were excluded so that the forum posting count would be an indicator of knowledge building rather than social interaction or accessibility (see Hughes 2010 for a discussion of the distinction between these functions of a discussion forum). The forum postings were categorised as over 30 messages = very good, 10-30 messages = good, below 10 = poor, 0 messages = no engagement

#### *Peer Review Workshops*

The students' engagement with the four peer review workshops was recorded by counting the total number of contributions that were made. All students were randomly assigned two other partner students, and a note was made of which students gave and received feedback to their assigned partners. It has been suggested by Nicol, Thomson and Breslin (2014, p.102) that the giving of feedback is more beneficial than the receiving of feedback as 'producing feedback reviews engages students in multiple acts of evaluative judgement'. Engagement with peer review workshops was classified as three or more workshop contributions (both giving and receiving feedback) = 'Strong'; two workshops = 'Moderate' and one workshop = 'Weak' with zero workshops = 'No Engagement'.

#### *Assessment Data*

Data recorded in the VLE was anonymised including:

- Interim assignment 1 mark
- Final portfolio assignment 2 mark
- Feedback on development of ideas in response to ipsative marking criterion 4.

This data was then matched to the individual student numbers for the other data collected on engagement. Students were divided into three categories: high achievers (both assignment marks distinctions and/or merits), moderate achievers (passes/one merit) and fails/non-completers. In the second cohort, a pass for the first minor (25% weighted) assignment and a distinction for the second main (75% weighed) assignment was counted as a high achieving student as the overall result would be at least a merit.

## Findings and Discussion on the Engagement Of High, Moderate And Low Performing Students

### High Achievers

We might expect that high performing students would engage well with all main online tools and low achieving student will not engage. However, the results indicate some complexity here. Both cohorts showed similar patterns of engagement and outcomes and so the results have been combined in the tables below.

Student number a=cohort 1 b = cohort 2	Discussion forum engagement no. of quality knowledge building posts (not social or practical arrangements or introductions)	Engagement with Peer Review Workshops	Assessment 1 submissions	Assessment 2 submissions
1a	36	Weak	distinction	distinction
2a	6	Strong	distinction	distinction
4a	4	Moderate	merit	merit
8a	11	Strong	merit	merit
9a	23	Strong	Distinction	Merit
14a	9	Strong	merit	merit
10b	1	Moderate	merit	merit
13b	4	Moderate	merit	merit
21b	3	Moderate	merit	merit
26b	8	Strong	merit	distinction
23b	9	Moderate	merit	merit
27b	45	Strong	pass	distinction
34b	9	Strong	Pass	distinction
33b	10	Strong	merit	merit
32b	55	Strong	merit	distinction

**Table 1: High achievers and engagement with the discussion forum and peer review n=15**

#### Educational discussion forum posting number of students

Very good	good	poor	No posting
3	3	9	0

#### Engagement with peer review number of students

Strong	Moderate	Weak	None
9	5	1*	0

**Table 2: Breakdown of high achievers' engagement in discussion forum and peer review n= 15**

\*student had very high discussion forum engagement

Engagement with the discussion forum did not predict outcomes for high achievers. Although students 1a and 27 b and 32 b had high posting of messages (over 30) and a further 3 students had good posting (10 or more), 9 out of the 15 students had a low posting (under 10). See Tables 1 and 2. While engagement in the discussion forum was not linked to outcomes for the students who passed while there was a clear association between engagement in peer review and outcomes. In the initial analysis of the peer review workshop data of the second cohort, seven students with strong engagement achieved either merit and / or distinction in the two assessments. Two additional students 27b and 34b who achieved a pass and a distinction were later added to the high performer category as it was felt that overall the weighting of the two assessments equated to two merit grades. Aside from the one student 1a, who had weak peer review workshop engagement, and could potentially be regarded as an outlier, 14 of the 15 students with strong or moderate engagement were classified as high performers over the two cohorts. Student 1a had an exceptionally good record of discussion forum posting and this could explain the successful outcome and might indicate that either engagement in the discussion forum or peer review leads to success.

### *Moderate Achievers*

Student number	Discussion forum posts	Engagement with Peer Review Workshops	Assessment 1	Assessment 2
11a	4	Strong	pass	merit
12a	1	Strong	pass	pass
15a	1	Strong	pass	pass
17a	12	Strong	merit	pass
19a	32	Strong	merit	pass
20a	1	Strong	pass	pass
21a	12	Strong	merit	pass
11 b	3	Strong	pass	merit
12b	2	Moderate	pass	pass
20b	14	Strong	pass	pass
7b	51 many long and detailed	Strong	pass	merit
1b	3	Moderate	Merit	pass
28b	0 but has logged in recently (1 in previous run)	Weak (strong if previous module is counted)	passed previously	merit
29b	14	Strong	pass	pass
31b	1	Weak	pass	merit
8b	20	Strong	pass	merit
15b	3	moderate	merit	pass
22b	32	Strong	pass	merit

**Table 3: Moderate achievers and engagement with the discussion forum and peer review n=18**





**Educational discussion forum posting: number of students**

Very good	good	poor	No posting
3	5	10	0

**Engagement with peer review: number of students**

Strong	Moderate	Weak	None
14	3	1**	0

**Table 4: Breakdown of moderate achievers’ engagement in discussion forum and peer review n=18**

\*\* this student also had low discussion forum engagement

With moderate achievers, the number of postings again does not predict achievement again as the majority (10 out of 18) had low numbers of posts yet still passed. See Tables 3 and 4. Regarding the moderate achievers, and peer review workshop engagement, 17 of the 18 students had either strong or moderate engagement. In both the first and second cohorts, four of the students in each group achieved a merit in one of the assessments with strong engagement. The pattern of peer review workshop engagement with overall achievement therefore seems to indicate a strong association.

There are some outliers that do not fit the overall pattern and these were further investigated which gave some explanation for why the findings were exceptional. Two students (28b and 31b) had weak engagement with both the discussion forum and the peer review workshops yet successful outcomes of a merit in the final assignment. Student 28b had attended part of the module in a previous run and had passed the first assignment and then deferred the second assignment to this run. This student engaged in peer review workshops 1 and 2 previously, but only had 1 discussion forum posting. This combined with engagement in peer review workshop 4 gives an overall profile of strong engagement in peer review but weak posting. Thus, this student is not out of line with the others. Student 31b does seem to be exceptional in that the student had weak engagement in both peer review and discussion posting, yet gained a merit in the final assignment. Further inspection of the record of this student revealed that s/he had downloaded all the course materials. This is an option especially for students who have variable internet connection, and it seems that this student was successful at self-study without peer interaction in the print distance learning tradition. The student received tutor feedback on the first assignment so had support.

All 19 non-submitters or fails had very low or no postings as expected. Five of the ten students that engaged minimally with the discussions submitted one assignment or withdrew, and these students may resubmit and pass in future. See Tables 5 and 6. Thus, low posting might provide a warning for poor outcomes, but as we can see above students with low engagement in the discussion forum can also succeed.

There are two groups of students in the non-completion/fail group. One group consisted of those who did not engage in either the discussion or the peer review workshop and these 9 non-starter students did not submit. The remainder engaged to a weak or moderate extent with the early activities of peer review and 5 students in this group submitted one assignment (students 6a, 16a, 18a, 18b and 3b) and student 13a plans to re-enrol (see Table 5). Therefore, some early weak or moderate peer review activity is associated with partial completion of the assessment. These students could possibly retake the module and complete the outstanding peer reviews or engage in discussion and/or they could retake a failed or non-submitted

assessment. Student 3a withdrew early which explains the lack of sustained engagement and may have good reasons.

*Low Achievers/Non-Completers*

Student number	Discussion engagement quality building posts or arrangements)	forum no. of knowledge (not social practical)	Engagement with Peer Review Workshops	Assessment 1	Assessment 2
3a	3		Weak	Withdrew	
5a	0		No engagement	Did not submit	Did not submit
6a	1		Moderate (early on)	Did not submit	pass
7a	0		No engagement	Did not submit	Did not submit
10a	0		No engagement	Did not submit	Did not submit
13a	0		Moderate (early on)	Did not submit	Plans to re-enrol on the module
16a	1		Moderate (early on)	pass	Did not submit
18a	6		Moderate (early on)	Did not submit	fail
22a	1		Weak (early on)	Did not submit	Did not submit
25b	1		No engagement	Did not submit	Did not submit
5b	4		Weak (early on)	Did not submit	Did not submit
6b	0		Moderate (early on)	Did not submit	Did not submit
18b	0		Weak (early on)	merit	Did not submit
30b	3		No engagement	Did not submit	Did not submit
2b	3		No engagement	Did not submit	Did not submit
3b	7		Weak (early on)	pass	Did not submit
16b	0 but has logged in		No engagement	Did not submit	Did not submit
24	0 but has not logged in since October		No engagement	Did not submit	Did not submit
19	0 Never logged in		No engagement	Did not submit	Did not submit

**Table 5 Non-completion/fail and engagement with the discussion forum and peer review n=19**

**Educational discussion forum posting: number of students**

Very good	good	poor	No posting
0	0	10	9

**Engagement with peer review: number of students**

Strong	Moderate	Weak	None
0	5 (early on)	5 (early on)	9

**Table 6 Breakdown of low achievers' engagement in discussion forum and peer review n=19**



## Conclusions and Recommendations for Distance Education Practice

### *Peer Review Predicts Learning Outcomes But Discussion Forum Posting Does Not*

The results were similar for both cohorts in that the number of educational forum postings does not correspond to successful outcomes although all the failures or non-submissions have zero or very low posting. However, the strong and moderate engagement with peer review workshops are associated with success and weak or moderate engagement early on is associated with partial submission or plans to re-enrol. Thus, peer review is much more linked to success at any level than engagement in the discussion forum. As with the discussion postings, non-engagement in peer review predicts non-submission.

Thus, it seems that some form of engagement throughout the module leads to successful learning and peer review activity is more significant than posting in the discussion forum. Nevertheless, it does not necessarily matter which particular activity or combination of activities the student spends time on when there are alternative ways of learning online available. In the study, one student (1a) was successful after high engagement with discussion but not the peer review, while another student was successful after downloading the course materials and presumably working on these offline. This is consistent with research that indicates that significant time spent on reading and writing tasks produces learning gain (Arum and Roska 2011).

### *Peer Review as a Compulsory Activity*

Many of the students on this module viewed peer review as an essential part of their learning, unlike discussion forum activity which was treated as optional, and a quote from one student in the online discussion supports this:

I felt the Peer Review Workshop helped me the most. I felt by looking at the review that others gave me and comparing it to mine, I learnt more than I learnt in any other activity (student 19a).

Although there is not much research on peer review in distance education, Madland and Richards (2016) also suggest that peer review is very beneficial. It is not clear from these findings which combinations of the stages of peer review are most helpful for learning and achievement: posting a piece of work for review, receiving peer feedback on this and reviewing another piece of work. Nicol, Thomson & Breslin (2014) argue that all three steps are beneficial in that students have to reflect on the requirements for the task and consider the assessment criteria for each step of the peer review process.

We might ask why these students treated discussion as non-compulsory, yet did not view peer review as optional. The structure of the peer review workshop into a clear submission and peer review phase, and the management of the peer review online through allocating peer reviewers and recording when these had been completed, sends out a clear message that online managed peer review is important. It is presented as being on a par with formal summative assessment rather than an optional process for formative assessment, even though marks are not allocated. Hughes (2014) proposes that having an ipsative assessment criterion motivates students, in this case to take part to gather evidence of their learning and peer engagement. All successful students performed well on this criterion.



### *Implications for Practice*

Resources for distance learning, especially tutor resources are limited. This study suggests that it might be better to put resources into peer review rather than tutor contribution to discussion forum posting for professional postgraduate learners such as these and the findings may well apply more broadly for other learners on programmes with a similar design. However, setting up peer review activities that are worthwhile and give good guidance to students may be time-consuming. In an ideal situation both are recommended to maximise learner engagement and success.

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## Openness in Assessment Practices: Reviewing Assessment in an Open Distance eLearning (ODeL) Environment

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### Abstract

The purpose of higher education is to prepare students for intellectual autonomy. Determining how much and in what way students learn (assessment) is the 'DNA' of the learning experience. Assessment practices must be fully integrated into teaching and learning practices to support and enhance learning. In the present, rapidly changing learning environment, assessment in an open distance e-learning (ODeL) environment must include student engagement to promote lifelong learning. Assessment should aim to promote individual transformation and extended knowledge experiences that match the complexities of contemporary life. The focus of assessment should shift to autonomous integrated assessment practices, aimed at preparing graduates to engage actively in a knowledge-driven global economy. Aligned to post-apartheid demands like decolonisation and Africanisation, assessment practices in an ODeL environment must provide flexibility and transformation. The objectives that inform the research paper are based on the key trends and challenges experienced in creating open assessment practices in an ODeL environment. These objectives are explored through an instrumental case study design, unique to a modular context at an ODeL institution. The findings of the paper indicate that integrated assessment is imperative, with closer collaboration required between academics and students to expand the scope of assessment practices. To embrace openness in education, assessment practices should be based on a more heutagogical and connectivist approach. Students should become part of the learning process and continuous assessment activities should be used to appraise learning within real-life contexts. Feedback and feed-forward practices are crucial to support a more open approach to assessment. Alternative assessment possibilities, such as e-portfolios, digital diaries, collaborative writing, podcasts and video projects may contribute to students becoming active participants in the assessment process. This will promote self-directed, self-determined learning opportunities to encourage independent thinking and lifelong learning.

**Keywords:** Open Assessment, Online Distance eLearning, Autonomous Learning, Assessment, Technology, Heutagogy

### Introduction

Determining whether, how much and what people have learned is the 'DNA' of the learning experience (Boud, 1995, p.13). Chalmers and Fuller (1996, p.41) explain that although there are many factors influencing the depth and quality of learning, the most powerful influence, is assessment. Assessment is intertwined with both learning and teaching (Beets, 2009, p.184) and aims to promote knowledge, skills and competency



development. Merckel and Van der Merwe (2010, p.103) see assessment as the practice of designing formal tasks that students should complete and making inferences from these to estimate the worth of their performances.

Within an open distance e-learning (ODeL) environment, assessment is seen as the systematic evaluation of students' abilities to demonstrate the achievement of intended curricular learning goals (Unisa Assessment Policy, 2015, p.1). Since ODeL is multi-dimensional, aimed at promoting the objectives of online learning to overcome barriers of distance, time and space (Manyike, 2017, p.2), openness is required to provide opportunities for students to engage with the lecturer, other students and more knowledgeable others to enhance their learning opportunities. This openness is important to provide students from diverse educational and socio-economic backgrounds with opportunities to engage in further and lifelong learning (Hug, 2016, p.287). In an ODeL environment, this requires the use of technology to create teaching and learning opportunities to develop independent, self-directed and reflective students (Van Rooy & Madioppe, 2012, p.159).

Openness in assessment should focus on improving the quality of students' learning experiences; enhancing the ability to transfer knowledge to new / specific contexts; provide accurate estimates of the competence of students in relation to desired outcomes; and to make judgements about competence and progression towards a qualification. However, Oliver (2015, p.2) purports that several challenges exist in introducing openness to ODeL assessment. These include clashes between different modes of assessment where inconsistencies exist between formative and summative assessment practices. Conflict also exists between assessment practices that move from a lecturer-centred to a student-centred approach that incorporates Africanisation, including ubuntuism (humaneness) and ukama (interdependent relations) (Singh, 2015, p.6). Further challenges are feedback and feed-forward to assist students to expand their knowledge constructs to add complexity to ODeL assessment (Mafenya, 2016, p.58). These challenges and potential solutions to enhance openness in ODeL assessment practices are explored through the analysis of a learning module case study.

## **Theoretical Framework**

Williamson and Johanson (2013, p.174) state that theories are important 'p priori' as an explanatory lens to interpret patterns of events. This is supported by Grant and Osanloo (2014, p.13) who explain that the theoretical framework provides a grounding base for the literature review and methods of analysis. In the educational environment, a variety of theories may be considered when exploring improved openness in assessment practices. Within the context of an ODeL environment, learning theories such as heutagogy and connectivism may be considered.

Blaschke and Hase (2016, p.27) describe heutagogy as 'a self-determined learning theory that applies a holistic approach to developing learner capabilities, with learning as an active and proactive process'. Heutagogy offers students the opportunity to create their own learning environment by expanding the role of the student as the major agent in his/her own learning. The student and educator work in partnership to negotiate what the student will learn and how this learning will occur. Heutagogy recognises the need for flexible learning to cater for unique student needs. The student, instead of the educator or the curriculum,



becomes the centre of the learning process, with assessment as part of the learning experience (Blaschke, 2012). Heutagogy encourages students to look beyond traditional resources of information to extend their learning.

It is precisely this competency that encourages the use of connectivism as theory to improve openness in assessment. Downes (2012, p.85) explains that 'connectivism is the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and transverse those networks'. Being part of a network can assist students to see connections between fields, ideas and concepts. In the complex information society, this is a core skill (Brooks, 2015, p.28).

Like heutagogy, connectivism requires that educators acknowledge the ability of students to take responsibility for their own learning and to connect to networks for self-exploration. This may modify beliefs, viewpoints or insights and encourage students to delve even deeper to obtain more insight and understanding about topics of interest. Within an ODeL environment, heutagogy and connectivism are of special interest as this mode of delivery shares certain key attributes with these learning theories. Similarities include the need for student-autonomy, flexible learning in terms of time and place of learning, and the selection and use of information resources and networks that vary in scope and type (Hase & Kenyon, 2001).

### **Research and Contextual Framework**

Fraenkel, Wallen and Hyun (2012, p.434) explain that the aim of a case study design is to investigate a case within a larger context. The instrumental case study design is particularly well-suited in this research, since assessment is essentially fused with learning and cannot be separated from the context in which it is implemented and used (Shanks & Bekmamedova, 2013, p.174). Knowledge of assessment challenges and trends within an existing modular context may provide insights into the improvement of assessment practices towards enhancing openness of ODeL assessment practices.

In relation to the instrumental case study design, the assessment process followed within the Appraisal and Disposal of Records module at an ODeL institution in South Africa is used. In an ODeL institution, assessment should overcome the distance component, where students are separated from the learning institution, the lecturers and other students. Student learning should be promoted through remote electronic technologies to cater for the fluidity of learning (Chetty, 2014). Linked to the above contextualisation, the following key questions will receive brief attention:

- What are the key challenges and trends experienced in assessment practices within an ODeL environment, related to a given case study?
- What recommendations can be made to improve openness of assessment practices in an ODeL context?

### **The case: Appraisal and Disposal of Records**

The case relates to a second-year module offered as part of the bachelor's degree with specialisation in appraisal and disposal of archival records. The module explores different appraisal techniques and the



influence of legislation and regulations on appraisal decisions. It aims to equip students with the ability to identify records of enduring value and appraise these in such a way as to ensure their easy retrieval. Various activities are included in the learning material, aimed at promoting continuous self-assessment. These activities encourage students to examine appraisal practices specifically related to compiling file plans, disposal schedules and destruction certificates.

In addition, students are required to complete several formative and a summative assessment. Feedback on the formative assessments is provided via the learning management system, where students are encouraged to engage in discussion to expand the feedback. Students are required to present viewpoints based on own learning and to comment on the views of others. The role of the lecturer is to monitor these discussions and to intervene to enhance understanding of the module content. One summative assessment concludes the assessment practice of the module. In comparing the current assessment practices to the principles of heutagogy and connectivism, several issues of non-compliance could be identified. Detail on these areas and possible solutions, make up the content this research paper.

### **Trends and Challenges Related to Openness in Assessment**

The environment and context of higher education have changed considerably due to factors such as changing policy directives, internationalisation, enrolment demands, democratic transitions, technological advancements and budget constraints (Frick & Kapp, 2009, p.255). These changes also impact on assessment. In response to the changes, the South African Qualifications Authority (SAQA) (2005, p.3) proposes that an integrated assessment system be applied to address imperatives such as performance ability, accountability, and a stronger alignment between learning outcomes and assessment methods. Wallace (2009) argues that such assessment should be investigated within the unique environment of individual higher education institutions. Within the ODeL context the use of technology, assessment as learning, student-centredness and feedback to support openness in assessment practices towards learning require further exploration.

### **Using Technology in ODeL Assessment**

Assessment opportunities should be expanded so that students can submit, test, collaborate and obtain feedback on their assessment attempts. This is important, because it will increase opportunities for students and lecturers to interact with each other to share ideas, deliberate, review and reflect (Purvis, Aspden, Bannister and Helm, 2011, p.92). The opportunity to communicate at any time from any place could be available to encourage engagement with assessment activities. To achieve engagement, Balfour, Van der Walt and Tshivhase (2015, p.9) assert that assessment in an ODeL environment can only be successful if it is a planned and integral part of a course. Pombo, Loureiro and Moreira (2010, p.219) recommend that digital technologies such as blogs, e-Portfolios and web-based problem-solving software be applied. This view supports research by Vaughan (2014, p.259) that new technologies allow more frequent and varied assessment practices in various higher education contexts.

This creates challenges, since lecturers should consider the computer supported infrastructure, their own competencies and available technologies to ensure fairness (equal opportunities to succeed in completing assessments) and flexibility (provision of various levels of online access) when designing online collaborative





assessment spaces (Nel & Wilkinson, 2008, p.158). Lecturers, who are often seen as technologically challenged (Singh, 2015, p.5) must become competent in the design and use of, for example, online face-to-face or group discussions, quizzes, flipped classrooms and gamification to use software to develop interactive assessment engagements (Pokorny & Warren, 2016, p.95). In addition, Lafuente, Remesal and Valdivia (2014, p.443) suggest that educators should be highly trained in the use of semiotic devices (to use tools such as Kahoot) to construct assessments that will foster knowledge creation. According to Singh (2015, p.5), the challenge is that newer versions of technology become available so regularly that it is often impossible for lecturers to keep up.

Furthermore, the computer literacy competencies and internet access of students should be considered. Colbert, Miles, Wilson and Weeks (2007, p.75) state that assessment practices based on the use of technology tools may create risks for those students without access to the technology. It is important that online assessments are appropriate to students' access and competency levels to encourage engagement. Internet access remains a barrier, because many students do not have the financial means to purchase the required data bundles. Lecturers must be mindful of this barrier when making decisions about selecting software and technology tools to expand assessment opportunities.

### **Assessment as Learning**

Wanner and Palmer (2018, p.2) believe that due to friction between formative and summative assessments, alternative assessment practices should be considered. These are known as continuous, integrated and multi-dimensional assessment practices that shift from assessment of learning (summative) towards a stronger emphasis on assessment for learning and more importantly, assessment as learning. Geysler (2004, p.101) explains that assessment as learning requires a cyclical assessment process where students are encouraged to create a holistic understanding of the module content. Assessment practices must evolve from written assignments and examinations (assessment for and assessment of learning) to assessments as learning, inclusive of performance-based assessments, portfolios, self-assessment, peer-assessment, cooperative group assessment, reflective journal writing and scaffolded essays.

Omoroguiwa (2012) explains that within an ODeL environment, assessment as learning can be enhanced by using technology tools such as wikis, social networking activities such as blogs, podcasting, e-portfolios, and mobile technologies such as SMS, Skype and Whatsapp. Oliver (2015, p.53) mentions additional examples such as Wikispaces, Weebly, Diigo, Twitter, Coggle and Youtube, all aim at creating assessment as learning opportunities. Mafenya (2016, p.67) reiterates that the use of technologies to promote assessment as learning must be driven by the intention to support a high-quality learning experience.

Achieving such an assessment as learning context in an ODeL environment is particularly complex (McNamara 2013, p.184). Arinto (2016) refers to this as the 'trojan mouse' that may impact both positively and negatively on assessment practices. While technology tools can be used to create a continuous assessment context for assessment as learning, the over or incorrect use of tools can dissuade students from engaging with the learning content, especially if students are unfamiliar with tools, and instructions are not clearly formulated.



## Student-Centred Assessment

This challenge refers to creating an assessment as learning environment, with the focus on shifting the responsibility of learning to the student, instead of the lecturer. To encourage this, a paradigm shift to student-centredness is required (Biggs & Tang, 2012, p.25). Students need to determine what to learn, monitor their learning and to evaluate the results to develop a deeper understanding of the knowledge construct. Harrington, Sinfield and Burns (2015, p.111) postulate that to achieve this, components of consultation, involvement and partnerships with students are required. Within the South African context this necessitates a drive towards Africanisation, where lived experiences based on communalism inform assessment practices. Lecturers should become the 'meddler-in-the-middle' where they encourage students through critical questioning and guidance to explore assessment topics for themselves (Letseka & Pitsoe, 2013, p.200). Msila and Setlhako (2012, p.141) suggest that within ODeL, this can be achieved by providing students with opportunities to refocus the emphasis of their assessments on areas that interest them. However, to achieve this, students must have reached a certain level of maturity, which can only be attained if students are nurtured to become self-directed, self-determined learners.

## Feedback and Feed-Forward

The pressure is on higher education to develop knowledge, skills and competencies to prepare students for the world of work. This requires detailed feedback and feed-forward to encourage students to engage in assessment activities towards lifelong learning (Evans, 2013, p.72). Feedback should assist students in forming accurate perceptions of their ability to achieve module outcomes (Msila & Setlhako, 2012, p.136). Feedback helps students become aware of gaps between their knowledge and desired learning outcomes and guides them through the necessary actions to enhance learning to achieve outcomes (Beets & le Grange, 2005, p.1202). Feed-forward refers to 'timely and constructed feedback' to prepare students for the next assessment. Feed-forward is to be used as part of assessment for/as learning to prepare students sufficiently to engage in continuous assessments activities (Wimshurst & Manning, 2013, p.451). Feed-forward should link module outcomes to be achieved with assessment activities, so that students can understand the purpose and scope of engaging in different assessment activities (Lafuente, Remesal & Valdivia, 2014, p.443). For feedback/feed-forward to be effective, it must be timely, relevant to future assessment activities, practical so as to promote efficient learning and flexible to promote individual student learning.

To promote feedback and feed-forward practices, self- and peer-assessment may be employed. Such practices might encourage students to engage in the learning process by not only evaluating their own learning progress against pre-determined criteria that they helped to identify, but to provide feedback to each other on how to achieve learning outcomes. Self- and peer-assessment should focus on making judgements about additional opportunities to promote learning (Mafenya, 2016, p.30). Beets and le Grange (2005, p.1205) postulate that the principles of ubuntu and ukama should be embedded in the process to achieve successful self and peer feedback practices. Through ukama, students may develop interdependent relations, not just with the lecturer but also with each other to strengthen their knowledge construct, whilst the principles of ubuntu may be applied to promote sharing, compassion and respect.



## Towards Improved Open Assessment Practices

As part of this report, key trends, challenges and principles of good assessment were identified. Assessments relevant to the module Appraisal and Disposal of Records were used to determine the extent to which the assessment plan and instruments support learning. Contextualised within an instrumental case study design, the focus of this section is to provide recommendations that can improve open assessment practices in an ODeL context.

The first key recommendation is that within an ODeL context, more attention be paid to the use of technology tools to create assessment opportunities. The learning management system does provide access to some technology tools such as a blog, a Dropbox for content storage and online discussion. However, Mafenya (2016, p.146) states that these are not enough. More assessment opportunities to engage with the learning content must be made available through other tools such as eportfolios, Wikispaces, podcasts, Twitter, Youtube, SMS, Skype and Whatsapp. A collective team effort is required to achieve this, where thorough planning is conducted, and technical support is obtained to create assessment opportunities to promote learning. Often the lack of the use of technology tools to develop additional assessment opportunities can be attributed to the workload of lecturers (Wanner & Palmer, 2018, p.3). Following a more collaborative team approach, lecturers can work together and with technical support to decide on the type and extent of technology tools to be used. This may divert the focus of lecturers from attempting to improve the assessment opportunities in isolation and support them to develop assessments for the common goal of creating more integrated learning opportunities. Also, alternative options should be explored to enhance student's access to technology tools. Since the purchasing of data bundles are perceived to be too expensive for students, the ODeL institution entered into agreements with cell phone service providers to provide free access for students if they log on and utilise technology tools via the institution's learning management system.

As a second recommendation, collaboration when designing assessment opportunities by using various technologies may lead to an integrated assessment process, where assessments in various modules contribute towards achieving programme outcomes. The current assessment practices linked to mainly formative and summative assessment should be revised. This must be conducted collectively, to ensure that assessment practices within various modules support the goal of improving learning opportunities and to move away from assessment to judge students' abilities. A stronger emphasis on assessment as learning is important, with the focus on continuous assessment (Singh, 2015, p.5). Assessment activities are to be used to appraise the learning that occurs and to provide students with the opportunity to identify areas where further learning may be required. Alternative assessment opportunities, such as eportfolios, digital diaries, collaborative writing, podcasts and video projects should be explored. The advantage of implementing such alternative assessment instruments may be that it can provide students with the opportunity to engage with and create their own assessments, based on areas within the module context that they are interested in (Msila & Setlhako, 2012, p.141). This will encourage students to become independent thinkers.

In addition, opportunities should be created to assist students to mature as learners. Thompson (2004) refers to this as 'learning maturity', which indicates the extent to which students have developed capacity to engage in assessment activities to achieve set outcomes repeatedly and reliably. The maturity of students refers to



the ways in which they can engage with the learning content to display knowledge, understanding and application of set learning outcomes. Clemments and Cord (2013, p.123) propose that such maturity can be achieved through the promotion of peer- and self-assessment practices. Though some form of self-assessment is included in the case study module, it is not enough. Therefore, it is important to explore additional ways in which assessments can encompass peer- and self-assessment. This relates closely to the principles of ubuntu (humaneness) and ukama (interdependent relations) (Oliver, 2015, p.2). Through peer and self-assessment, students should be provided with the opportunities to share and relate to others; show compassion and respect different views. Within the context of the case study module, limited peer engagement opportunities are available. Students are rarely provided with the opportunity to engage with one another to share knowledge and support learning. Linked to the first recommendation, technology may provide opportunities for this to be improved. Through synchronous and asynchronous discussions, development of wikis or collaboration to complete eportfolios, students can be encouraged to work in teams to achieve learning outcomes.

The key recommendation that can be derived from the case study is that there should be a paradigm shift from a lecturer-centred to a student-centred approach. Lecturers must encourage students to not only become active participants in the learning process, but to take responsibility for their own learning. Harrington, Sinfield and Burns (2015, p.111) recommend that this be achieved through consultation, involvement and partnerships. Typical to an ODeL institution, there is a disconnect in learning where lecturers dictate, and students only engage in as far as it is required of them for grading purposes. Dixon (2010, p.1) declares that this phenomenon can be transformed through creating online learning spaces. The author explains that in an online environment, opportunities exist for greater student-to-student and student-to-lecturer interaction. Collaboration can be achieved through virtual teams, games and problem-based case studies that students must solve via collaborative spaces such as wikis, blogs and eportfolios. More emphasis should be placed on synchronous discussions via, for example Skype or Teams where students can engage with and learn from peers. As suggested by Mafenya (2016, p.30), lecturers must encourage students to take ownership for their own learning. An ODeL framework provides an environment that can support this, where flexibility of learning, by using varied technology tools, may lead to enhanced access to learning opportunities.

## Conclusion

Assessments should assist students to improve the quality of their learning, provide an estimate of their competence towards lifelong learning and contribute towards the development of knowledge, skills and competencies to prepare them for the world of work. However, Boud (2000, p.151) argues that using assessments towards learning, and especially lifelong learning often does not achieve this. It is therefore imperative that assessment practices be investigated, compared and analysed, so that excellence can be identified and duplicated, and areas of improvement ascertained. Within the parameters of this report, assessment practices relevant to appraisal and disposal of records were reviewed. From the findings, challenges were identified in the use of technology, student-centredness, alternative assessment opportunities and feedback and feed-forward. Solving these challenges will require the provision of open continuous assessment opportunities to encourage students to become active participants in the learning process.

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## Students' Engagement in Their Own and Other Students' Process of Inquiry

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### Abstract

This study aims to explore to what extent upper secondary school students support their own and other students' process of inquiry while engaging in an online discussion in mathematics. The online discussion analyzed in the study took place in a system called TalkMath (<https://talkmath.org>). TalkMath is an open tool enabling both asynchronous and synchronous communication for virtual classes, study groups and online tutoring. The important parts of the tool are the chat area and a digital whiteboard that can be used collaboratively. The data collection consists of transcripts from TalkMath. The data was coded using the Relationship of Inquiry framework, an adaption of the Community of Inquiry framework to an online tutoring environment. The framework contains the four elements of Cognitive, Social, Emotional, and Teaching presence with categories that reflect different aspects of the element. Teaching presence comprises the categories of Design and organization, Facilitating discourse, and Direct instructions. These categories were used to study students' support of their own and other students' process of inquiry. The transcripts were collected during the two weeks' period in May 2018 when the national tests in mathematics in Sweden were conducted. During those weeks, five tutors were active in the virtual rooms and more than 50 students joined the conversation at some point during the period. A total of 662 messages were sent and later collected and analyzed using the Relationship of Inquiry framework. Of the total 662 messages, 334 messages were from tutors and 328 from students. The messages from students coded as teaching presence consisted of 70 messages for Design and organization, 2 messages for Facilitating discourse, and 14 messages for Direct instructions. The results indicated that the students did support both their own and other students' process of inquiry. While their own processes of inquiry were mostly supported by design and organizations, for example asking for someone's help and expressing what they needed, direct instructions dominated the support towards other students, for example by giving solutions. In some cases, a student switched between solving their own problems and supporting other students by tutoring them. This was especially the case when no one with the formal tutor role was present in the virtual room. An interesting observation worth noting was that students were more likely to aid each other in the process of inquiry when communicating synchronously, as compared with asynchronous communication.

**Key Words:** Students' teaching presence, Relationship of Inquiry, Community of Inquiry, Online math tutoring.





## Introduction and background

In the digital era, where any digital platform or system can serve as an environment for learning it has become clear that students play an important part when it comes to designing and supporting their own and other students' learning. Two aspects of this phenomena are self-regulation and peer-learning, which in the study presented here have been studied in a setting of an online tool used for communication of mathematics.

Self-regulation refers to students' ability to understand and control their learning environment (Schunk & Zimmerman, 1998). This construct includes students' cognition, metacognition, and motivation, meaning that in order to support your own learning there is a need to have the skills to perform the cognitive processes, understand and monitor these processes, and to be equipped with the beliefs and attitudes that affect the skills (Schraw, Crippen & Hartley, 2006). Schraw (2007) made the conclusion that technology helps students to self-regulate their learning but that little is known about how to use technology in an optimal fashion.

Peer-learning refers to "the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions" (Topping, 2005, p. 631). It has been recognized that there are positive relationships between students' engagement in supporting other students' learning processes and their conceptual understanding of a topic. Paus, Werner, and Jucks (2012) explored 160 dyads engaging in written online learning discourses. The result was a structural equation with a positive interaction between the dyadic conceptual elaboration and the individual conceptual understanding. Furthermore, Raymond, Jacob, Jacob, and Lyons (2016) reported that online peer-learning "acts as a potentially unique learning space and helps to model an alternative learning approach to facilitate and improve student experience and learning online" (p. 169).

A sound theoretical foundation for online interaction can be found in Garrison, Anderson, and Archer's (2000, 2001) framework Community of Inquiry (CoI). In this framework, the elements of Teaching, Cognitive, and Social presence were originally conceptualized to capture the process of learning in a text-based environment. Garrison and Akoyl (2011, 2013) have furthered explored CoI by assessing the role of metacognition. They describe the metacognitive construct as self and co-regulation of cognition. Their empirical data consisted of online discussion forums and a shared metacognition survey where students' perception of self-regulation and co-regulation was detected. CoI is, however, designed to measure presences within a group while not considering the fact that groups are built up by several relationships.

## Relationship of Inquiry

The Relationship of Inquiry (RoI) framework, is an adapted version of the CoI framework (Stenbom, Hrastinski & Cleveland-Innes, 2012). While the CoI framework was conceptualized for analyzing the learning process within a group of students and teachers, RoI was developed for studying learning environments with one student and one teacher/tutor. From the original CoI framework, the RoI framework has adapted the three elements of Cognitive, Teaching, and Social presence. Furthermore, the element of Emotional presence as conceptualized by Cleveland-Innes and Campbell (2012) has been added to reflect emotions related to the process of inquiry, its outcome and directed affectiveness (Stenbom, Cleveland-Innes & Hrastinski, 2016).



Teaching presence has in CoI been defined as “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Anderson, Rourke, Garrison, & Archer, 2001, p. 5). Teaching presence can be expressed by anyone in the community, instructors as well as students, and considered important for student satisfaction, perceived learning, and sense of community (Garrison & Arbaugh, 2007). Teaching presence consists of three categories: Design and organization, Facilitation discourse, and Direct instructions (Andersson et al., 2001).

Cognitive presence has its ground in research such as Dewey (1933), on cognitive-thinking, inquiry, and problem-solving procedure, and is in the CoI defined as “the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse” (Garrison, D. R., Anderson, T., & Archer, W., 2001, p.11). Cognitive presence has the following four categories: Triggering event, Exploration, Integration, and Resolution. Even though the phases are presented as though following the logical sequences of inquiry, in reality, the phases may not always follow that order (Garrison et al., 2001).

Social presence is determined necessary for the development of higher order thinking and collaboration. It was initially defined as the individual’s ability to project their personalities into the community both socially and affectively (Garrison et al., 2000). This has later been redefined to “the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities” (Garrison, 2009, p. 352). The three categories for social presence in CoI are: Affective, Open communication, and Group cohesion. In RoI, the Affective category has been extracted to form Emotional presence. The two remaining categories for social presence in RoI are: Open communication and Relationship cohesion.

Emotional presence is “the outward expression of emotion, affect, and feeling in a relationship of inquiry” (Stenbom, Cleveland-Innes et al., 2016, p. 11). The three categories that structure the element are: Activity emotion, Outcome emotion, and Directed affectiveness. Activity emotions are emotions connected to the process of inquiry while outcome emotions relate to the result of an inquiry process. Directed affectiveness involves emotions directed towards the other participants of the discourse.

In the CoI framework, two methods for analyzing data are widely used, transcript coding and a standardized survey. The transcript coding procedure has been transferred to the one-to-one context in Stenbom, Jansson, and Hulkko (2016). In this method, transcripts from an educational interaction (such as chat logs) are analyzed using a unit of analysis and a coding template. The unit of analysis is the amount of data given a certain code or codes while the coding template is used to support the person carrying out a coding process. The coding template of the Relationship of Inquiry is in Appendix A.

### **Purpose and Research questions**

To build on the research about inquiry models in online environments, this paper considers student’s expression of self-regulation and metacognition. This is valuable as previous studies using the RoI framework have considered the student as someone performing the educational activity while the tutor provides the guidance. Following this, the element of teaching presence has previously been restricted to only the tutor in studies using the RoI framework.



The purpose of this study is to explore to what extent upper secondary school students support their own and other students' process of inquiry while engaging in an online discussion in mathematics. This is done using the RoI transcript coding procedure with an additional coding step where student's messages are analyzed in order to capture potential support of their own or other students' process of inquiry. The rationale for using RoI instead of CoI is to both capture individual relationships and not only the community and to also take into account that the participant in the analyzed setting do not build a long-term community but rather search for short term support.

The study is guided by the following research questions.

1. What types of interaction occur during online mathematics inquiry?
2. To what extent did students' design, organize, facilitate, and direct their own process of inquiry?
3. To what extent did students' design, organize, facilitate, and direct other students' during the process of inquiry?

## Method

### *Research setting*

The research setting for this study is an educational system named TalkMath (<https://talkmath.org>) designed for one-to-one and group tutoring in mathematics. A screenshot of the system, showing a so-called room for conversation about mathematics, taken at the time of this study, is shown in illustration 1. TalkMath is currently under development within the setting of a research project at KTH Royal Institute of Technology. It is an open system that anyone can use to create different rooms. Each room is configured to include group conversations and individual conversations (as shown in the left part of illustration 1). For each conversation, the system provides a chat area and a whiteboard area. In the chat area, participants can communicate using text, emojis, and mathematical formulas. It is also possible to send files via the chat area. The whiteboard area can be used collaboratively with possibilities for freehand drawing, import of pictures and the use of geometrical figures, as well as creating multiple pages. The material created in the group conversations is automatically saved, so it is possible for any visitor of the room to go back and look at what has been done previously. Hence, it is possible for students to communicate synchronously as well as asynchronously. However, material created in private one-to-one conversations is erased after the participants exit the room, but is saved for research purposes.

### *Participants and procedure*

The empirical data used in this study was collected during two weeks in May 2018. This timing of the data collection is of importance as the national tests started during the weeks of the study. As this system was new to the participants, they were invited via a link from the more recognized system Math Coach (<https://mattecoach.se>).

During the data collection period, a total of five K-12 teacher students were available in TalkMath for group and individual tutoring. The tutors had previous experience with tutoring mathematics online via Math Coach. They participated voluntarily when they had time to do so. This led to that there was times/day when students were active without any tutor present. Hence, in order to get help, they needed to help one another.



In this study, the room in TalkMath was primarily for students in upper secondary school, between the ages of 16-19 years. Over 50 students actively posted a message in a group or one-to-one conversation during the period of this study. There were also students that visited the room without posting any chat messages.

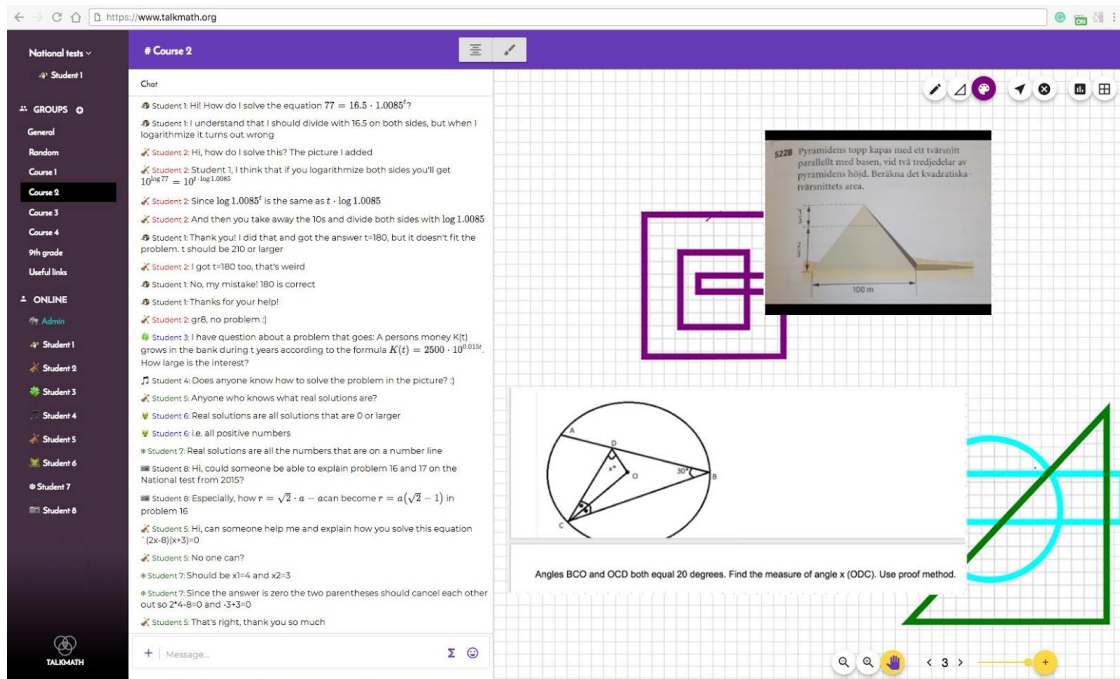


Figure 1: Screenshot of a room with an ongoing group conversation in the TalkMath system

### Data collection and analysis

All messages in the chats were saved and downloaded for analysis. The data included participants name, chat messages (text, emojis, and mathematical formulas), and the date and time of the message. Participants accepted that their conversations were going to be used for research, via a button where they acknowledged their consent, when starting a session. Participants with the status of student choose what name they want to log in with, while the tutors used their real name. Therefore, all tutors' names were replaced with the name Tutor and a serial number during the collection.

A total of 762 messages were posted in the room. Out of these 571 messages were posted in group conversations while 191 messages were posted in one-to-one conversations. Then, messages that were not related to the mathematics discourse were removed. Examples of removed messages that were written: to oneself in the private "workspace" (by mistake, for testing mathematical formulas, as test), bug messages, between tutors only (internal communication), and the automatic post that started each conversation ("Welcome to your new group ..."). Altogether, 662 messages went through for analysis, 334 from tutors and 328 from students.

The Rol coding template, displayed in Appendix A, was used for the analysis of the data using a message as the unit of analysis. The coding template was complemented with a coding scheme for Teaching presence from the student perspective as this was not a part of the original template. The addition to the coding template is presented in Table 1. The Rol framework consists of four elements with, in total, twelve



categories, where each category represents an aspect of the element. Therefore, the codings were made on category level and then aggregated to form the elements. For each message, the categories and the corresponding elements were considered and coded as either present or not present. Following this procedure, a message could be coded with more than one category. The majority of the messages, 501, had one coding, 136 messages had two codings, 23 messages had three codings, 1 message had four codings, and 1 message had five codings.

Category	Indicators (examples only)	Examples
Design & organization	Establishing interactions	"I'm having some trouble understanding the linear equation. Could someone explain?"
	Setting parameters for the inquiry	"However, I'm a little worried that this isn't a higher level of reasoning, or what do you think?" "By the way, could you tell me later how I make the symbol for 'to the power of' on the computer?"
Facilitating discourse	Engaging in discussion	"I would insert the points and perhaps try and see what you get, since it's parallel it has the same K-value, then you can look at the m-value from the point you have."
Direct instruction	Assessing process	"Hope you understand what I mean!"
	Providing steps for solution	"Since the answer is zero the parentheses will cancel each other out, $2 \cdot 4 - 8 = 0$ and $-3 + 3 = 0$ "
	Summarizing the discussion	"If the term under the radical sign can't be solved, it's not a real number."
	Providing solution	"should be $x_1 = 4$ and $x_2 = -3$ "

**Table 1: Coding scheme for Teaching presence expressed by students**

The reliability of the coding procedure was tested by having two coders involved in the process. First, all messages were coded by one person. Then, a second person was introduced to the coding template and performed test coding that was compared and discussed with the first coder. Finally, 70 messages (~10%) were coded by both persons in order to calculate the reliability.

## Results

### *Reliability*

For transcript analysis using the inquiry approach frameworks, percent agreement is a recognized method for reliability calculations (De Wever et al., 2006). Percent agreement is calculated as a ratio between codes that are identical for the two coders and the total number of codes. In this study, reliability calculations were



made on the 70 messages that were coded by two persons. The results of the calculations are an agreement at the category level of 0.77 and at element level on 0.90. This indicates acceptable agreement of the coding.

### *Cognitive presence*

Table 2 reports on the total number of messages that were coded for each category and element. Cognitive presence by the students was reported 208 times. According to the coding scheme, the element of Cognitive presence does only consider the learning of students and not tutors. Noteworthy is that the category Integration is at a lower level compared with the other categories. It is also of interest that Resolution is at a similar level as the other categories.

Elements and Categories	Tutor	Student	All
Teaching presence	299	86	385
Design & organization	81	70	151
Facilitating discourse	94	2	96
Direct instruction	131	14	145
Cognitive presence	0	208	208
Triggering event	0	64	64
Exploration	0	54	54
Integration	0	37	37
Resolution	0	53	53
Social presence	58	77	135
Open communication	16	26	42
Relationship cohesion	43	51	94
Emotional presence	50	60	110
Activity emotion	22	29	51
Outcome emotion	0	2	2
Directed affectiveness	31	31	62
<b>Total</b>	<b>334</b>	<b>328</b>	<b>662</b>

**Table 2: Total number of messages for each category and element.**

### *Social presence*

Social presence is shared between both students and tutors. The data in table 2 inform that 135 messages contained Social presence. Within the element, both students and tutors focus on the category of Relationship cohesion while Open communication had fewer instances.

### *Emotional presence*

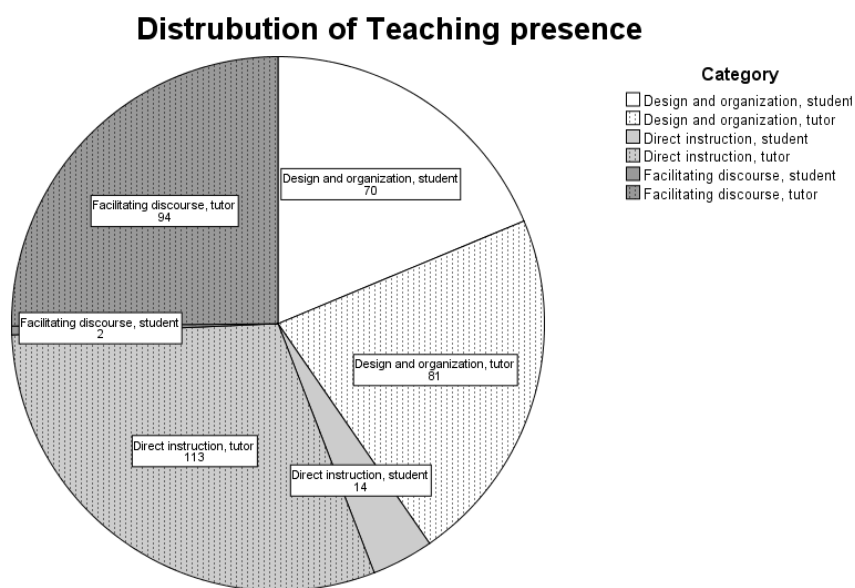
A total of 110 messages contained Emotional presence, according to table 2. The emotional presence element contained Directed affectiveness (emotions towards other persons) and Activity emotion (emotions regarding the process of inquiry). The category of Outcome emotion that involve emotions regarding the consequences of a successful or failed inquiry was, however, almost absent.



### Teaching presence

As reported in table, in total 385 messages were coded with Teaching presence with 299 messages from tutors and 86 messages from students. The distribution is found in illustration 2.

Valuable information is the lack of balance towards direct instruction by the tutors and towards design and organization by the students. Examples of student messages coded with Teaching presence is presented in table 1. The majority of the messages sent by students that are coded as Design and organization were meant to design and organize the students own learning, while all Direct instructions were directed toward another student.



**Figure 2: Distribution of Teaching presence.**

### Discussion

The purpose of this study is to explore to what extent upper secondary school students support their own and other students' process of inquiry while engaging in an online discussion in mathematics. The research questions that guide the paper is 1) What types of interaction occur during online mathematics inquiry?, 2) To what extent did students' design, organize, facilitate, and direct their own process of inquiry?, and 3) To what extent did students' design, organize, facilitate, and direct other students' during the process of inquiry?

The first research question is addressed with the coding procedure where the RoI framework with the transcript coding procedure was used to code 662 messages from TalkMath. All categories of RoI were coded. The second and third research questions were investigated with the element of Teaching presence posted by students.

### *The interaction according to RoI*

Noteworthy results for Cognitive presence are the distribution between the four categories. A common structure is that Exploration is rated highest, followed by (in order), Triggering event, Integration, and Resolution (e.g. Garrison et al. 2001, Kovanović et al., 2016, Stenbom, Jansson et al., 2016) while in this case



the rank is in decreasing order Triggering event, Resolution, Exploration, and Integration. The prominent position of Triggering event can be explained by the asynchronous approach where students can pose a question but if no one else is in the room the conversation stalls. The most surprising result is the increase from Integration to Resolution as it in other studies are often rated lower. Examples of messages coded as resolution include conversations where the student pose a question in the chat area and follow up with a message that they have solved it by themselves. Hence, the exploration and integration phase are not shared by the students in the chat. Another interesting example is that students did analyze their own solution. This was especially the case when students were tutoring one another. In sum, the distribution of Cognitive presence could be explained by that students to a large extent share the initial and final part of the inquiry while, for example, they do not share their calculations as often.

Within Social presence, both students and tutors show Open communication and Relationship cohesion. As in other similar cases, tutors put more emphasis on Relationship cohesion compared to students (Stenbom, Jansson et al., 2016). All students in the dataset are polite and kind towards others. There was only one occurrence where a student disturbed an ongoing conversation, by drawing on a picture in the digital whiteboard that another student was working on. The filler words of Open communication (such as “okay”, “hm”, and “aa”) are less prominent in comparison with the sister project Math Coach. This may be explained by that the conversations vary in intensity in this case of TalkMath and there are more persons present in the room than two.

For Emotional presence, the noticeable result is the absence of Outcome emotion. This is especially interesting since the learning situation analyzed was designed for students that were preparing for national tests. For this reason, emotions regarding how the present problem solving might influence the test result were expected. Considering the almost absent result, it might be considered whether the category of outcome emotion should stay a category in Emotional presence or not.

Teaching presence by tutors had in this data set a quite common distribution with a majority for Direct instruction followed by Facilitating discourse and Design and organization. The empirical data consisted of several cases where students requested tutoring to understand mathematical areas and not only how to solve problems. This contributed to a higher level of Direct instructions because more lecturing was necessary.

#### *Students' effort to support their own and others process of inquiry*

Teaching presence by students is the empirical data used to address the second and third research question. The data set for this study consisted of in total 662 messages. Out of these were 86 messages coded for Teaching presence posted by students. The distribution was that 70 messages were coded for Design and organization, 14 for Direct instruction and 2 for Facilitating discourse, as shown in Figure 2. The transcript coding indicates that students play an important role in designing, organizing, facilitating, and direct their own learning. The majority of the students' messages that were coded as Design and organization were aimed at their own learning. When starting the conversation, it was common that the students described the problem that they were trying to solve, what they had tried to do by themselves, where they got stuck, and what they needed help with. Along with this, the students asked if anyone had the time and the necessary skills to help them. This indicates that students established the interaction and designed the content of the





conversation and by that took responsibility for their own learning and the process of solving the issue (Schraw et al., 2006; Schunk & Zimmerman, 1998). This occurred both when students discussed with a tutor as well as with another student. A reason for student's prompt organization to support their own learning could be that since they are users of the Math Coach system they are familiar with the tutoring procedure and that they are expected to share their previous work at the beginning of a session.

Students were also involved in supporting other peer-students learning. These messages were mostly attached to the category of Direct instruction. The most common way the students supported peers' problem solving was by providing suggestions towards the solution or by sharing a complete solution. This was expected as one can assume that the students had no experience of tutoring. Therefore, their focus was not on helping the other students understand the issue but only to find the correct solution together. An interesting observation is, however, that the students often helped one another by providing a longer solution and not just responding with only the answer. Mazzolini and Maddison (2002, 2007) have shown that when teachers participate in discussion forums students may play a more reserved role with shorter and fewer contributions as compared to when teachers are not present. In this study, the students were more active when tutors were offline. When a tutor was available and responded, other students did not support their peers unless they themselves had questions in the same area. Another interesting observation worth noting was that students were more likely to aid each other in the process of inquiry when communicating synchronously, as compared with asynchronous communication.

## Conclusion

The analyzed conversations support that students' design, organize, facilitate, and direct their own process of inquiry, but also to be of help to other students in their process. I.e. students could change their role from being the one asking for help to also be the one coaching another student in their inquiry. Indications were also found that the students communicated less with each other when a coach was available. But, the presence of a coach is probably still necessary in this setting since then the students know that there is a more knowledgeable person around, if their presence is needed. The coach could, for example, be scheduled in the room at specific times. TalkMath enables both asynchronous and synchronous communication. The study shows that the latter contributed to increase the intensity of the discussion, since the students did not seem to wait for an answer. The whiteboard also proved to be an important part of the communication, even though that use could not be fully analysed as the students removed their material from there.

The results of this paper aligns with the importance of students' ability to understand and control their learning environment and the positive aspect of peer learning for the individuals own inquiry (Paus, Werner, & Jucks, 2012; Raymond et al., 2016; Schunk & Zimmerman, 1998). This paper also contributes to the work regarding metacognition and student's tendency to take on the role of the tutor. The paper adds on to the work by Garrison and Akoyl (2011, 2013) regarding metacognition and the work regarding teaching presence that is shared with students (e.g. Anderson et al., 2001). The addition is to use the transcript coding procedure to assess students' self and co-regulation of cognition using the Teaching presence element.

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### Appendix A: The Relationship of Inquiry coding template

Element	Category	Indicators (examples only)	Examples
Cognitive presence	Triggering event	Stating a problem, changing direction.	"Here's the problem: ..." "I have another issue."
	Exploration	Brainstorming, broad search for insights, information exchange.	"Perhaps I could use..." "Am I thinking right here?" "What is a square root?"
	Integration	Connecting ideas, computations.	"I can combine ... with ..." " $7/12 - x = 1/4$ "
	Resolution	Achieve solution, analysis of solution, implementation.	"The answer is 3!" "I made a mistake with..." "Then the apple is cheaper..."
Teaching presence	Design and organization	Establishing interaction, setting parameters for the inquiry.	"What can I help you with?" "You can type in the textbox or draw on the whiteboard."
	Facilitating discourse	Stimulating constructive inquiry, assessing process.	"Do you have an idea?" "What answer did you get?"
	Direct instruction	Providing steps to solution, summarizing the discussion.	"You should multiply with 10." " $1/3 + 1/4 = 4/12 + 3/12$ "
Social presence	Open communication	Acknowledging, trivial expressions.	"Okay!", "Perfect." "I can't see the figure."
	Relationship cohesion	Greetings, vocatives, building links.	"Hello.", "Good luck." "What should we do now?"
Emotional presence	Activity emotion	Emotion about the inquiry.	"We solved it!! :-)"
	Outcome emotion	Emotion about the consequence of the inquiry.	"Gah! I have a test on Monday that I will fail if I don't get this."
	Directed affectiveness	Emotion towards the other person.	"Thank you for helping me!" ";-)", ":-(", ":-P"



## Online Teacher Education: A Way to Create a More Diverse Teacher Workforce

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### Abstract

More than 25 years ago at the University of Iceland, distance programmes became an option in teacher education. The lack of teachers, especially in rural areas, prompted the introduction of these programmes. Today, compulsory–school student teachers can enrol either on–campus or online (i.e. from a distance). The groups in distance and on-campus programmes are approximately the same size. In teacher education, distance programmes are typically offered to reach a greater variety of demographic groups, which is especially important when nations confront a shortage of teachers. In Iceland, for instance, we face a shortage of compulsory–school teachers and, as in other Nordic countries (except Finland), high dropout rates, slow progress and too few student teachers graduating from teacher education, which are all serious concerns. This study attempts to shed light on whether distance students at the University of Iceland are indeed from diverse social groups compared to on-campus students. The research questions are: What are the characteristics of distance student teachers compared to traditional on–campus student teachers at the University of Iceland? How does the distance programme help in creating a more diverse teacher workforce? Pursuant to these, an online questionnaire was administered in the fall of 2018 to student teachers in their first year of a five–year programme preparing for compulsory–school teaching (N = 65). Participants were asked if they were traditional on–campus students or distance students, this was followed by questions about their social backgrounds, their parents' education, their employment status and how many hours and what type of work they were doing. We also asked about factors they thought would adversely affect their studies, such as workload, family obligation or anxiety. Of all the participants, 38% planned to study as distance students, 57% as on-campus students and 5% as both distance and on-campus students. It was discovered that, on the whole, on–campus students were younger, worked much less, were less likely to work already as teachers, and had a much higher likelihood of having highly educated parents, whereas distance students were older, worked much more, were likely to already work as teachers, and had less educated parents. The results also highlight the need for the University to adapt and meet the needs of more diverse group of students.

**Keywords:** Teacher Education, Distance Students, Teacher Diversity, Online Learning

### Introduction

A lack of qualified teachers plagues education systems around the world (Schwille & Dembélé, 2007). Governments worldwide are also concerned with the diversity of the teaching force, which should reflect the demography of the respective country regarding social background, social class, ethnic origin, gender,



disability, etc. Heinz and Keane (2018) argue that diverse teacher staff is an important prerequisite for successful evolution towards more inclusive education, which is an accepted educational policy, at least among the OECD countries.

In addressing these problems, alternative routes for recruiting teachers have been explored. Open and distance learning (ODL), an umbrella concept for unconventional and more flexible modes of teacher education, has been used when there is a need to enrol more student teachers, recruit from a greater variety of social groups or bring certain groups into teacher–education programmes, such as women in sparsely populated regions (Schwille & Dembélé, 2007). This was the case in Iceland when the Iceland University of Education (now the School of Education at the University of Iceland) met a lack of teachers in sparsely populated rural regions by launching a full B.Ed teacher–education distance programme in 1993 (Jóhannsdóttir, 2013). Websites were used to organize teaching and communication online and student teachers were supposed to attend face-to-face sessions on campus two times per semester.

Distance programmes bring new and different entrants into the teaching profession as well as improve access to teacher education for rural inhabitants (Schwille & Dembélé, 2007). Students often choose distance studies to adapt their studies to their circumstances, which may not allow them to attend traditional courses offered at specific times and places. The development of information and communication technology opens various possibilities to accommodate the needs of students and reduces hindrances for non-traditional groups to enter universities.

The aim of this study is to explore the characteristics of student teachers choosing to enrol in distance teacher–education programmes in contrast to those preferring traditional campus–based studies. Since the University of Iceland has over 25 years of experience in offering a blend of online and face-to-face teacher education, beside the conventional campus–based mode, we think it is timely to explore the difference between the two groups. The research questions are: What are the characteristics of distance student teachers compared to traditional on–campus student teachers in University of Iceland? How does the distance programme help in creating more diverse teacher workforce?

### **Teacher Education – Problems Recruiting Teachers and the Need for More Teacher Diversity**

In Iceland, five years of university education is required to qualify as a compulsory school teacher, i.e. three years of undergraduate studies for a B.Ed degree followed by two years of a Master’s programme for an M.Ed degree. Most Icelandic teachers graduate from the five–year education programme that is offered at the University of Iceland in Reykjavík and at the University of Akureyri, which is situated in North Iceland. In both universities, student teachers can choose between campus–based attendance and distance studies with required, periodic face-to-face sessions. At the University of Iceland, distance education has been an option for more than a quarter of a century and, in the last 15–20 years, half or more of the student teachers were enrolled as distance students. Since 2010, the distance and on–campus programmes have been merged, and both student groups are enrolled in the same courses. Both groups use common online course management systems for accessing course materials and for communication. While on–campus students attend weekly lessons in the university buildings, the distance students conduct their studies online but are required to attend two face-to-face sessions on campus each semester. It is a common practice that the two student groups meet and collaborate during the on–campus sessions. Practice teaching is organised in partnership with local schools near student teachers’ homes.



In Iceland and the other Nordic countries (except Finland), a shortage of compulsory–school teachers is a problem. High dropout rates, slow progress and the low number of student teachers that graduate from teacher–education programmes are serious concerns in Iceland (Rasmussen & Dorf, 2010), making recruitment of more student teachers a pressing issue. Universities all over the world have increasingly offered distance teacher–education programmes to reach new students (Robinson & Latchem, 2003). Most countries with large populations make extensive use of distance education, providing large–scale programmes to educate teachers. In sparsely populated countries, distance education has also been used to recruit potential teachers who, had they needed to move from their homes, would not have entered the programmes. This alternative has been used to get more women into teaching, for example, since globally the situation of women makes them more likely to choose a career that enables them to stay with their families (Robinson & Latchem, 2003). Such was the situation in the Icelandic countryside when the first cohort started its teacher education in the Iceland University of Education new distance programme in 1993. The programme was initiated as a special effort to enable universities to enrol more student teachers (Stefánsdóttir & Mýrdal, 1993). In the beginning, access was restricted to teachers who were teaching in rural schools without formal qualifications. Most of the distance students who enrolled were women who, because of their family conditions, such as their husbands’ work, would not have been able to move from home to study at the university in Reykjavík (Jóhannsdóttir, 2013). As a result of opening access for a wider group of applicants in the distance programme the percentage of uncertified teachers decreased in rural areas (Jóhannsdóttir and Björnsdóttir, 2018).

In Europe, the issue of age in the teaching profession (e.g. 30% of teachers are older than 50 in some countries) compels authorities to make teaching an attractive career choice, both for young people and people considering a career change (Commission of the European Communities, 2007, p. 10). The same worries apply in Iceland where the mean age of compulsory–school teachers has risen from 43.7 in 1998 to 48 in 2018 (Statistics Iceland, 2019a). One indication of the risk of a teacher shortage is the number of teachers without certification, which in 2015 started to increase once again, from 4% on average from 2011 to 2014 to 9% in 2017 (Jóhannsdóttir and Björnsdóttir, 2018). In a recent study, Eyjólfsson and Jónsson (2017) predicted that in the next 15–20 years the number of compulsory teachers will decrease due to both increasing age and low recruitment. They argue that the number of certified teachers needs to triple over the next nine years. Their claim indicates how urgent it is to increase the number of student teachers to ensure that compulsory schools are staffed with qualified teachers.

The slow progression and low rate of graduation from compulsory–school teacher education also causes concern (Jóhannsdóttir and Björnsdóttir, 2018). Too many students only finish three–year studies (B.Ed) and do not enter a Master’s programme which is required for certification. There are various indications that the progress of distance students is slower than on–campus students (Árnason, Eiríksdóttir, & Kjartansdóttir, 2019). Our former research (Jóhannsdóttir & Björnsdóttir, 2018) explored whether there were differences between distance and on–campus student teachers at the University of Iceland. That study looked at a sample of students in all five years of the program, and its results indicated that distance students tend to work long hours in paid jobs and have parents with less formal education. This finding awakened our interest in further studying the difference between these two groups, and it was the start of a five–year longitudinal study of student teachers. In the first phase of the study presented in this paper, we look at the difference between the groups regarding social background and circumstances. In a future study, we will look at how those factors influence their progress and graduation rate.



## Method

The participants were student teachers at the University of Iceland in their first year of a five-year programme preparing for teaching in compulsory schools (N = 65). Males were 15 (23%) and females 50 (77%). About 57% (N = 37) planned to be on campus students, 38% (N = 25) planned to be distance students and 5% (N = 3) planned to be both on-campus and distance students.

An online questionnaire was administered to the participants in the fall of 2018 when they were starting their studies. Participants were asked if they were traditional on-campus students or distance students, which was followed by questions about their social backgrounds, their parents' education, their employment status and how many hours and what type of work they were doing. We also asked about factors they thought would adversely affect their studies, such as workload, family obligation or anxiety.

## Results

About 80% of males and 53% of females chose to be in the on-campus program. 82% of the distance students said it was rather influential or very influential for the selection of a teacher-education programme that it was possible to study as a distance student.

Of the distance students, only 38% lived in the Reykjavík area, while 75% of the on-campus students lived there. A similar proportion of students in distance and on-campus programmes had finished secondary school in the capital area, however: 71% of distance students and 66% of on-campus students. As seen in Figure 1, the on-campus students were younger: 73% of them were 25 years of age or younger in contrast to 28% of the distance students. Of the distance students, 24% were over the age of 35 while only 6% of the on-campus students were.

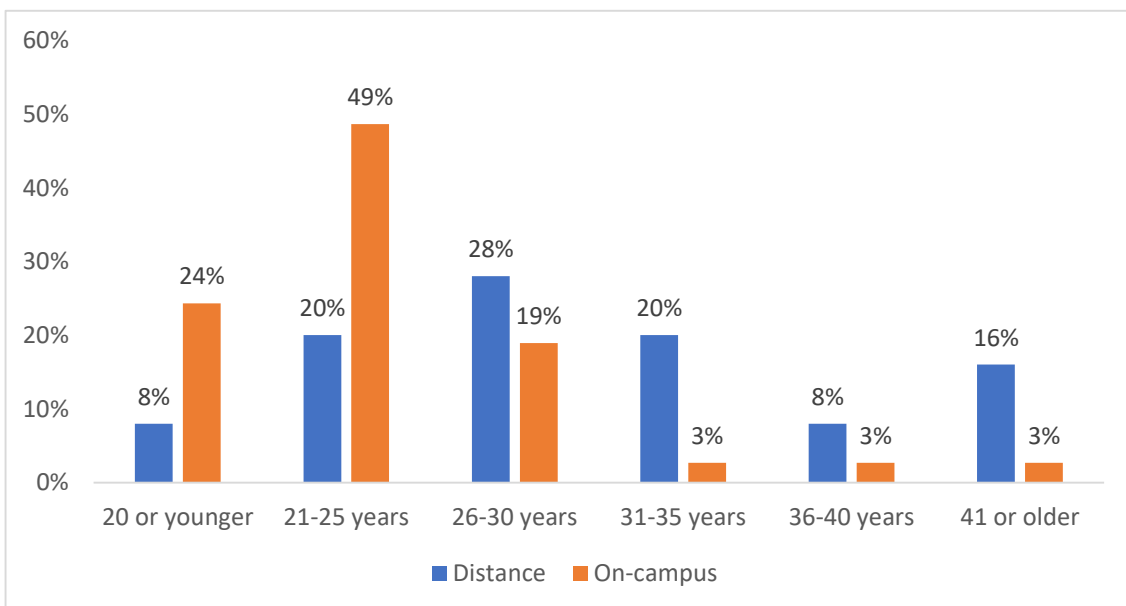
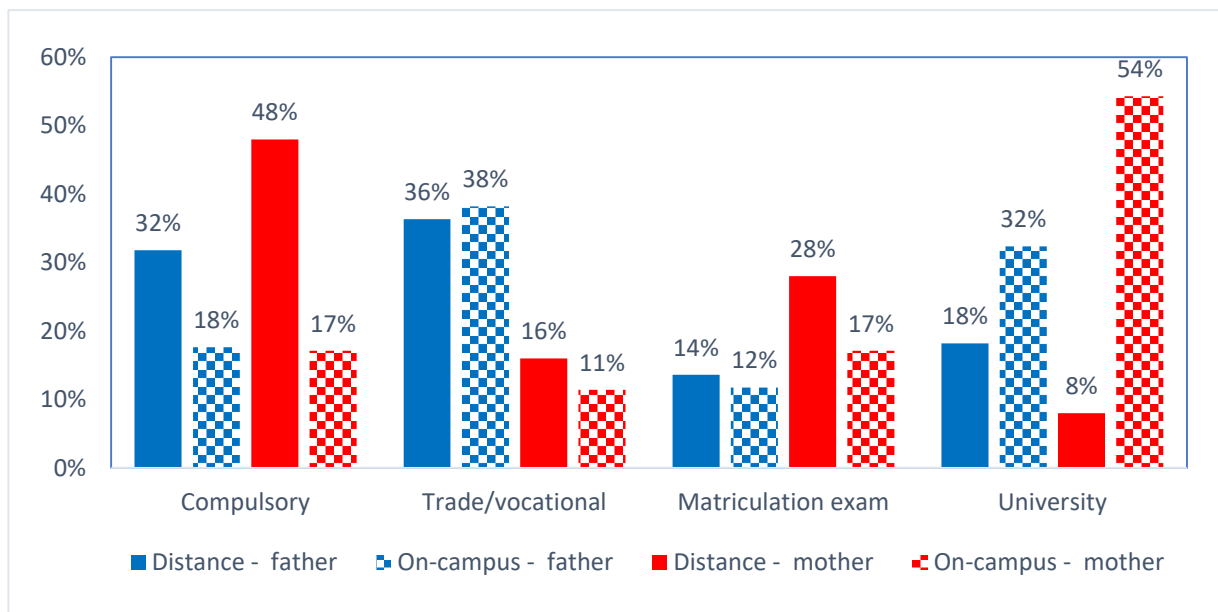


Figure 1: Age of students



Only one of the participants said that Icelandic was not their first language. Only 8% (N = 5) said that they had a parent or parents that were not native Icelandic speakers and, of those, four were on-campus students. All the on-campus students and 80% of the distance students had finished their matriculation exam, the formal admission requirement for university. More than half of the on-campus students had a mother with university education, but only 8% of the distance students said the same. Of on-campus students, only 18% had a father with only compulsory education, whereas around third of the distance students did. See also Figure 2.

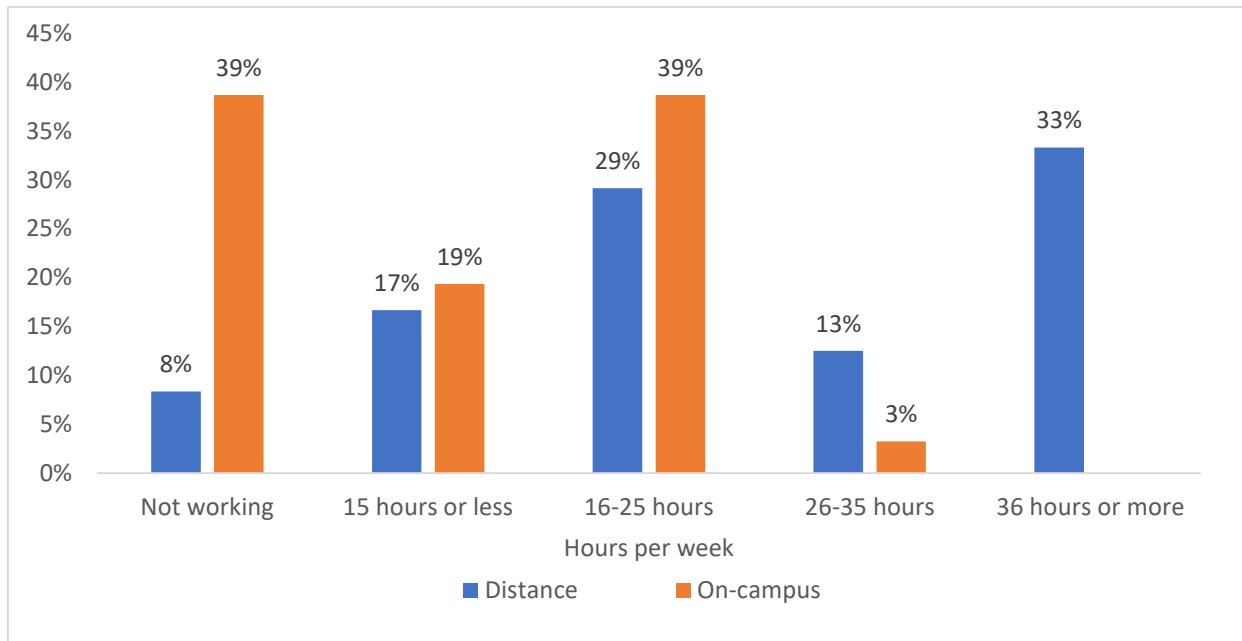


**Figure 2: Parents' education**

Distance students were more likely than on-campus students to live with a partner: 76% of them were either married or living with a partner while only 24% of on-campus students were. More than half (54%) of on-campus students lived with their parents, but only 12% of the distance students did. Distance students were also more likely than on-campus students to be responsible for children under the age of 18: about a third of them had three or more children living in their home. Only 29% of them were childless. In contrast, 87% of on-campus students were childless.

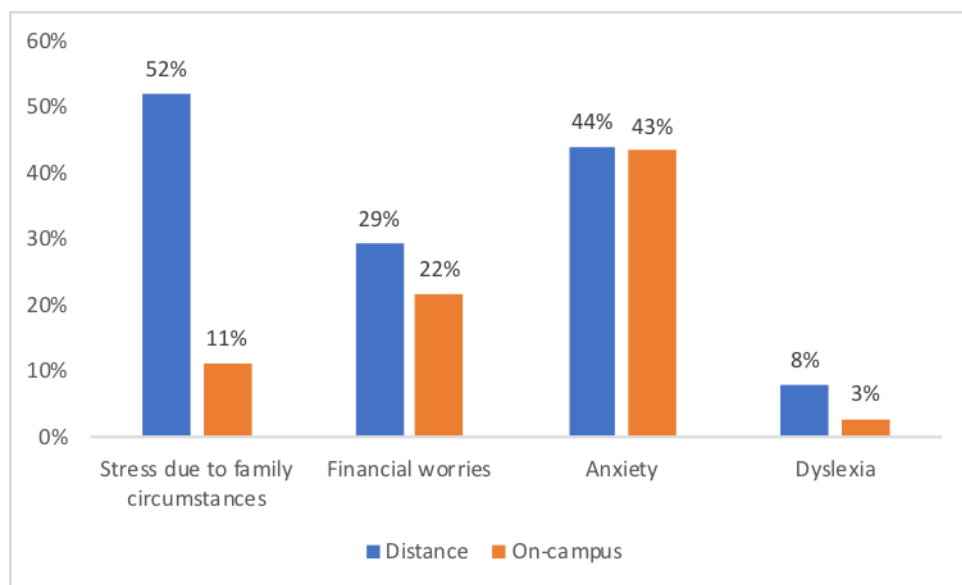
As can be seen in Figure 3, 92% of distance students planned to work while 61% of the on-campus students did. Even of those who planned to work, the distance students planned to work more hours per week than their on-campus counterparts, with a third of them planning to work at least 36 hours per week. None of the on-campus students planned to work that much. Finally, more than half (52%) of the distance students were going to be working as teacher in a compulsory school in contrast to only 5% of the on-campus students.





**Figure 3: Hours of salary work per week**

When asked about things students thought would adversely affect their studies, 52% of distance students and 11% of on-campus students were concerned about family obligations. Fewer students had financial worries, but more than 40% of both distance and on-campus students said anxiety would be inimical to their studies.



**Figure 4: Things that students think will have an adverse impact on their studies.**



## Discussion

Clear differences emerged between the group of students that chose distance education in contrast to on-campus education, leading us to tentatively conclude that the distance programme is creating a more diverse teacher workforce. It is important to remark that eight out of 10 student teachers selected teacher education at least partly because it was available as a distance programme. When a nation faces a serious shortage of teachers, as Iceland does, our study suggests that using distance education to attract non-traditional, older candidates, perhaps even with families and jobs, should be considered. Furthermore, our study may vindicate the University's decision to extend eligibility to students living in cities. Originally, (Robinson & Latchem, 2003) the distance programme at the University of Iceland was intended for students living in the countryside (Stefánsdóttir & Mýrdal, 1993) but later started to accept students regardless of. In our study, more on-campus students lived in the Reykjavík area than distance students, but a similar proportion of students in both the distance and on-campus programmes had finished secondary school in the capital area—around 70%. This possibly indicates that most students, both on-campus and distance, have roots in the capital area. Extending the distance programme to urban populations appears, then, to have been validated by our research, since more than half of the distance students we studied were both originally educated in the city and were already working as teachers.

However, our study did not ultimately demonstrate that distance programmes are a silver bullet. Although we found the distance students to indeed be older, which is a well-known characteristic of distance students worldwide (Schwille & Dembélé, 2007), distance programmes in general have failed to recruit students with immigrant backgrounds. Foreign nationals are now 10.9% of the population in Iceland, a number that has increased from only 2.6% in the year 2000 and 15% of people living in Iceland in the year 2018 are born outside of the country (Statistics Iceland 2019b). The student composition in compulsory-school teacher education at the University of Iceland does not reflect the developing multicultural society in Iceland, which is important, as Heinz and Keane (2018) argue, to enhance inclusive education policy. Historically, teacher education has been a way for student teachers with lower socio-economic status to enter the middle class (Heinz and Keane, 2018), and distance education is meant to widen that access even more (Lee, 2017). For instance, the University of Iceland offers exemption from taking the matriculation exam, which is normally required, for those who have reached the age of 25 and who have completed certain courses in upper secondary school. All the students who qualify for this exemption are in the distance program. In our study, we found that the distance students had different social backgrounds than the on-campus students, including a smaller likelihood of having parents with a university education and a greater likelihood of having parents with only compulsory education. The distance students are also more likely to have families and to be responsible for children. The program indeed appears, then, to be reaching new groups of students as Robinson and Latchem (2003) said was frequently the purpose of distance programs.

All these advantages notwithstanding, Árnason et al. (2019) have reported that the distance students seem to progress more slowly through their education compared to the on-campus students. This finding should not come as a surprise, given the long hours many of them planned to work in our study. Indeed, the combination of work and study some of the students planned to pursue must be overwhelming. Non-traditional students are more likely to feel anxiety and stress juggling all their different responsibilities (Trenz et al., 2015) and, even when just starting their studies, more than half of distance students participating in this study felt that family obligation would adversely influence their studies. We can [echo the warnings](#) of



Lee (2017) that providing access to university education is not enough; educational institutions have to consider the circumstances of the students and work with them to make the most of their experience and support their progress through their studies.

The many roles of student teachers, i.e. familial and job responsibilities, are especially problematic for those in distance programmes. Research has also shown that non-traditional students are more likely to feel anxiety and stress (Trenz, Ecklund-Flores, & Kimberlay, 2015), which can lead to higher university dropout rates. Research on the development of the distance teacher education programme in Iceland University of Education (Jóhannsdóttir, 2015) revealed that changed student population in the distance programme and changed approach in learning and teaching when the platform for studying is online, called for changed practice of learning and teaching. In the emerging practice both students and teacher educators had re-assessed their roles, respectively. Students had learned to be autonomous as well as being part of a community, contributing and appreciating their fellow students' contributions on the online platform. For the emerging new model to function well the teachers needed to bear in mind the agency of student teachers and weaken their control. At the same time, they needed to be responsive to student teachers needs for support and take their different situations into account. Jóhannsdóttir concludes that when teacher education is offered in a distance programme there is a need to consider the circumstances of the distance students as well as the effect of online communication and strive to develop responsive practices. This result is consistent with Levin (2007) who pointed out that providing access to university education not only entails admitting students with non-traditional backgrounds but also an institutional willingness and ability to consider their circumstances. In the same way Lee (2017) argues that authentic accessibility of university education is to give opportunities to unconventional student groups and to accommodate their conditions and special needs.

## Conclusion

The results of our study are based on one cohort of students at the University of Iceland training to be compulsory–school teachers. The group only comprised 65 students, so we can expect some variability in results between cohorts. The results, however, are remarkably consistent with results from a previous study by Jóhannsdóttir and Björnsdóttir (2018), validating the results of the present study and its conclusion that distance education for student teachers at the University of Iceland opens the university to a more diverse group of students. With new groups come new challenges, and it is not only the responsibility of the students to adapt to the university but also the responsibility of the university to meet the needs of its increasingly diverse student body.

## Acknowledgements

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## Virtual Writing Groups: Collegial Support in Developing Academic Writing Capacity

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### Abstract

It is expected that academic staff at research intensive higher education institutions are capable and competent academic writers. Yet, where and how do early career academics develop this writing capacity outside of their doctoral or postdoctoral writing experiences? Various forms of workshops and mentorships can be implemented. They can involve formal or informal gatherings of people committed to achieving writing goals within a specific period of time (Badenhorst et al., 2016). For academic writing, Olszewska and Lock (2016) identified two models - "Structured and Guided Process" (p. 136) and "Open Forum with Retreat" (p. 137). Further, what role can a virtual writing group play in developing academic writing capacity? The authors developed and implemented three iterations of a virtual writing group series. Initially, the pilot study of the writing group began with a senior and early career academic located in Canada and Australia. In the additional iterations, the senior academic, along with a group of early career academics, engaged in the virtual writing group experience. Personal writing goals were identified prior to commencement of each eight-week series. Members met weekly for 30-minute synchronous meetings wherein they talked about their writing. Meeting topics were generative in nature to support the needs of the participants. During the week, each member was committed to personal writing time (e.g., up to two hours). An integral component of the writing group was peer editing. Together, the virtual writing group initiative was strategic to support prioritizing writing. For each iteration, a research study was conducted to gain insight into the participants' experiences, and to learn of personal academic writing development. The findings resulted in five major themes: 1) Attributes that impact success; 2) Supportive characteristics; 3) Supportive processes; 4) Challenges; and 5) Benefits. The findings from the study suggest that it is possible for early career researchers to continue their writing development through accessible online means, while having the flexibility to allocate their own personal writing time. From the study focus on the practical application of a virtual writing group. It is recommended that future study explore how different forms of technology supports community development within the group, as well as members' influence on the replication of virtual writing group models with their own students.

**Keywords:** Writing Groups, Online, Online Collaboration, Early Career Researcher Development, Community Through Technology



## Introduction

Knowledge mobilization is a major priority for university researchers. There are expectations that all academic staff (e.g., faculty) members at research intensive higher education institutions are capable and competent academic writers. However, not all early career academics (ECA) are prepared for their writing commitments outside of their doctoral or postdoctoral writing experiences. Various forms of workshops and mentorships can support this transition. However, how are these experiences accessed and personalized to meet their individual writing needs as early career academics? Further, what role can a virtual writing group play in developing academic writing capacity?

Doctoral students during their graduate programs have the opportunity to receive mentorship from their supervisors and classmates in developing writing capacity. Depending on the nature of the experience, they may develop some degree of writing synergy within these communities where they engage in various writing activities (e.g., papers, conference presentations, reports) during their graduate programs. However, when they leave the graduate program and begin their academic careers, are they able to continue this support or have other writing support within a community of practice at their new institution? While facing the opportunities and challenges that come with early career academics (EAC) appointments and consequential relocations, the continuance of such a group through virtual means (e.g., online video conferencing) may be a supportive, yet unrealized mechanism.

The purpose of this paper is to share the research based on the authors' development and implementation of three iterations of a virtual writing group. Initially, a pilot study of the writing group began with a senior and an ECA located in Canada and Australia. The next two iterations included additional early career academics. From the case study research, we will share key findings to support and inform virtual writing groups for ECAs, as well as implications for practice.

## Writing Support for Early Career Academics

For early career academics (ECAs), there are many demands on their time as they are establishing their research program, beginning to teach in a higher education context, and serving on various committees. According to Laudel and Gläser (2008), ECAs are developing three concurrent careers which require alignment among each stream:

- 1) Cognitive career - development of a person's research program;
- 2) Organisational career - expectations and performance within the higher educational institution;
- and
- 3) Community career - contribution of the individual in larger academic communities.

This area of work is further complicated by the need to establish and maintain a publishing track record. It is essential for ECAs' research to be communicated using various strategies as part of knowledge mobilization.



Peer review is a critical element of the publication process. Manuscripts are sent by editors to experts in the field to provide critique on the work and to make a recommendation. Pinto da Costa, Oliveira, and Abdulmalik (2018) argue that often ECRs do not receive training or support in developing the knowledge and skills required to peer review. If there is no formal training opportunities during their graduate programs, where within the time of ECRs can they learn to develop such a skill set. Within a writing group, this can be an outcome where participants have the opportunity to learn and practice such a skill.

Writing groups use various approaches. They can involve formal or informal gatherings of people committed to achieving writing goals within a specific period of time (Badenhorst et al., 2016). Olszewska and Lock (2016) identified two academic writing models:

- Structured and Guided Process - A guided process where participants had an opportunity over a set number of weeks to work on their writing projects. This process provides a model for creating a culture of collaboration. “The group’s impact on community building was predicated on supportive, critical, and reflexive engagement of participants whose goal was successful publication” (p. 136).
- Open Forum with Retreat - This model combines “an opportunity for an intense period of writing that supported the work occurring during the weekly writing-group meetings” (p. 136). In this model, they also invited ‘writing elders’ who are “well-established and widely published senior scholars whose work is recognized as seminal in their respective areas” (p. 136). These individuals can provide strategies, feedback and insights on the art of academic writing and publishing.

Such models can provide a supportive structure to help guide the academic writing experience.

### **Context of the Virtual Writing Group**

Drawing on the literature and the experience of the senior academic member, the authors developed and implemented three iterations of a virtual writing group series. Initially, the pilot study of the writing group began with a senior and early career academic located into Canada and Australia (Johnson & Lock, 2018). For this paper, we are reporting on the data from the next two iterations. In the subsequent iterations, the senior academic, along with a group of early career academics, engaged in the virtual writing group experience.

To be part of the writing group, each person identified personal writing goals prior to commencement of each eight-week series. Members met weekly for a regularly scheduled 30-minute synchronous meeting wherein they talked about their writing. Meeting topics were generative in nature to support the needs of the participants. Notes were recorded from the meeting to help set direction for next steps. During the week, each member was committed to personal writing time (e.g., up to two hours). An integral component of the writing group was peer review. Partial or full manuscripts were shared at least once over the eight-weeks period. Discussion occurred before with regard to peer reviewing process, individuals could ask for specific feedback when they shared their work and each participant received feedback on their work. Together, the virtual writing group initiative was strategic to support prioritizing writing as indicated by the goals recorded at the start.



## Research Methods

With each of three iterations of the virtual writing group, a research study was conducted to gain insight into the participants' experiences, and to learn of personal academic writing development. A case study methodology (Merriam, 1998; Yin, 2014) was implemented through mixed method design to explore the perceptions of a virtual writing group for new academics guided by the following research questions: 1) To what extent can a virtual writing group assist publication output during transitions to a ECA?; 2) What factors are integral for the effectiveness of a virtual writing group for ECAs; and 3) What challenges and opportunities arise within such groups?

For this paper, we are reporting on data from the last two writing groups which included four members in the first group and four members in the second group. The senior academic has over 15 years of experience in the academy. One assistant professor who participated in both cohorts has recently completed two years in the academy. The other members only participated in one of the cohorts and they included one assistant professor working in university settings, two recent postgraduates who have not secured academic positions and one postgraduate nearing program completion.

Two data sources were used for the study. First, data were collected through an online survey that included multiple choice and short answer questions. The survey provided an opportunity for participants to share their experiences about items including writing goal identification, completion of goals, unanticipated outcomes from participating in the group, and challenges encountered during the group meetings. Second, after the completion of the virtual writing group, participants were asked to participate in an interview where they explored questions surfacing how a virtual writing group helped with academic writing goals and transition from student to an academic. Questions about technology use, challenges and benefits were also explored. The semi-structured interviews allowed for follow up examples or surfacing further details. Descriptive statistics were used to determine frequency counts and mean averages for multiple choice survey questions. For the open questions and interview data, thematic analysis occurred. Ethics approval was received by the Human Research Ethics Committee of the University of Melbourne.

## Results of the Research

From the data, we gained insight into factors that influence how and why a virtual writing group can be a support mechanism for ECAs. As well, results identified strategies for creating and supporting such writing groups within a virtual environment. Drawing on the data, five key themes emerged: 1) Attributes of the writing group that impact success; 2) Supportive characteristics of mentorship for academic writing; 3) Supportive processes that impact academic writing development within a technology-enabled environment; 4) Challenges that impact virtual writing groups; and 5) Benefits of virtual writing groups.

### Attributes of the Writing Group that Impact Success

From the survey and interview data, there were four attributes identified by participants. These attributes were: 1) support the success of the writing group itself; 2) design of the meetings; 3) need for establishment of goals; and 4) making community connections; and developing accountability and expectation.





Findings identified that the design of the scheduled, synchronous meetings needed to be regular, and short in length. One participant stated “[It] was short and straight to the point and the timing was perfect... then you can do more work.” Building on meeting design, meeting time itself should promote community development as “it was the commitment of being there and supporting each other that we launched really well.” Supportive activities during the generative meeting (e.g., introductions, sharing of goals, etc.) were noted as intentional, purposeful, and effective in supporting writing goals.

There was a need for goals to be established to encourage successful writing outcomes. Participants spoke of their pre-planned goals and how “writing group helped assist you in keeping a timed space in your calendar.” Everyone completed each group cycle with achieving some degree of their goal and “those new to the writing group model rose to the challenge to complete and meet expectations.” A key factor that influenced goal achievement was the use of the peer review activity. Each member had at least one reciprocal peer review during an eight-week cycle. The peer review supported writing commitment as one participant stated, “I had a deadline I'd committed to, that I needed to send that copy to my peer reviewer... that for me was a good motivation to get that paper written.” For those members not able to complete all of their writing goals, it was noted that they identified writing was still strongly achieved.

Over the eight weeks, members found themselves making community connections with peers that were both supportive and developmental for their writing. Peer review exchanges were found successful because “there obviously was enough vulnerability between you and that person and an authentic connection that allowed that to take place.” Through active participation, members developed authentic and vulnerable discourse about their writing and approaches to career publications. One participant exclaimed, “I felt encouraged to submit the paper to my target journal - which I did!”

Further, the development of community also influenced the level of accountability and expectations of the members. It influenced accountability of self and one’s expectations for accountability within and for the group. A participant stated that, within the group, “there's an accountability to yourself on accountability to the larger group as well that was important” Further, [it] “has made me feel that there was some accountability for the work that I was doing.”

### **Supportive Characteristics of Mentorship for Academic Writing**

Data collected during the interviews also identified characteristics of mentorship taking place across the series of meetings. The participants found the regularity of meetings containing content that was “responsive” to their individual writing needs and learning. The use of a single facilitator across the entire eight weeks was noted as supportive and as a “champion” for the group members. Group members also took roles of mentorship - “It's a community working together, but there is a degree of mentoring within that community.” This was specifically noted in the helpfulness of the peer review activity for learning. One participant suggested, “Perhaps even peer review is a different kind of mentorship in itself. “ Another suggested that, “reading other people’s work was useful – to see what other people were doing” as it led to “learning from others.” Further, learning in the form of mentorship took place as “there's some things that [the senior academic] can bring to the conversation - years of experience that would help to provide some



guidance and wisdom.” While the eight week commitment meant that someone might miss a session due to illness or other commitments - “it’s a very short period of time and there can be enduring connection afterwards.”

### **Supportive Processes that Impact Academic Writing Development Within a Technology-Enabled Environment**

Findings also identified that the use of technology provided a means for successful participant connections within an environment that supported writing development. The use of synchronous technology (i.e., Zoom, video conference software) allowed for “very rigorous” conversations and impacted the nature of community development. The inclusion of video was also noted to be particularly helpful for participants. “It was lovely that it was video, so I could see people as well as talk to them.” Overall, the synchronous technology was an effective mode of communication with appropriate sound quality and Internet connection. Further, the use of email to share notes from the meetings and for peer review was also used as part of the communication for the writing group.

### **Challenges that Impact Virtual Writing Groups**

The virtual writing group was not without challenges. In particular, the global locations of participants in the two groups (i.e., Australia, Canada, and Saudi Arabia) meant the meeting times may not have occurred at a convenient time for each group member. Working across time zones meant that meetings occurred early in the mornings for some, and later in the day for others. The third group members also encountered challenges of time zones changing (e.g., spring of the year) at different time in the different countries. “We had to change [meeting times] every three weeks to compensate as the different countries of our group members encountered their daylight savings time change.” However, this was “not a huge challenge” for all of the members. Another challenge included the inconsistency of video at all times by all members. The lack of video did decrease the presence within conversations. Finally, it was noted that when members are new, there needs to be time at the beginning to develop social presence and to share goals. The goal sharing was found to be integral as it is a scaffold for the peer review which was found essential for participants. Newcomers would be encouraged to “try to meet the deadlines that have been set for any peer review exercises in terms of producing writing as well as critiquing other people’s writing. It’s just being a good participant and contributor.”

### **Benefits of Virtual Writing Groups**

There were two main benefits identified from the data collected. First, participants perceived there being an impact of their learning towards their future preparations. This was experienced through the scaffolding design established initially from the pre-meeting goal writing and furthered in the conversations and peer review participation. From these active experiences, writing habits were established and supported. The activity and interactions between members opened up opportunities for establishing connections that may impact long term collaborations. One participant was very optimistic from the connections made in the group: “I’m open or hopeful, that I can collaborate future because I like to take the gains beyond the period of the writing group.” Second, the meeting design itself availed opportunities for crossing geography



limitations to overcome time and space which was termed “boundaryless.” Underscoring this, another participant declared, “The opportunities came from meeting online... I was meeting people that I wouldn’t usually have met because we were in different countries.” Further, the meeting designs themselves facilitated a structure and purposefulness. As participants felt that “being part of the VWG helped me work to deadlines. Overall, all participants found their experience in the virtual writing group to be of benefit to their development as ECAs and their writing development.

## Implications

Three key implications for practice have emerged from the study. First, ECAs need a supporting and trusting environment where learning with and from each other is an essential component of the writing group. Each person in the group will bring their own expertise, as well as learning needs. Together, these outline the foundation for how the group can interact and support each other. Each group will have its own unique dynamic given the needs of the participants.

Second, the senior academic within the virtual writing group provides mentorship but will need to be an active participant who is also engaged in writing. Sharing the experience of writing and peer reviewing by both early and senior members needs to be part of the community experience. It is helpful for ECAs to observe and hear the struggles and insights a senior academic works through as he/she discusses individual writing process. Modelling, discussing, and reflecting are all key components that contribute to the vibrancy and health of a virtual writing group in support of ECAs.

Three, for the ease of access to the meeting, it is important all members of the virtual group have their technology ready to use before meetings. The need for clear audio as well as the need for all members to use video. The video helps to enhance the sense of community and fosters presence.

## Limitations and Future Research

There was limited participation across the three iterations of the study. Scaling up the virtual writing group to include a larger number of participants and with diverse participants groups is recommended. Further, to study the evolution of the virtual writing group over time to see how participants develop their academic writing capacity. It would be interesting to investigate how the experience of such a virtual writing group has modelled practice as ECA begin to work with their graduate students and with colleagues. In addition, further exploration of the nature and type of technology that is selected and best supports each of the groups as they engaged in developing their confidence and competence as academic writers through the virtual writing group experience.

## Conclusion

With the ever-growing expectations for academics to create impact through knowledge mobilization, ECAs need to engage in opportunities that can continue to develop their academic writing capacity. This underscores the importance of continuing the support and mentorship of the supervisor and student relationship in graduate programs for the support of academic writing. There is a need for support and



mentorship in the early years of their academic careers. Through the affordance of technology, virtual writing groups provide a forum, not bound by time or geography, wherein early and senior career academics can come together in a collaborative community to support academic writing.

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## Virtual Reality's Promises and Pitfalls for Distance Education: A Literature Review

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### Abstract

This literature review synthesizes research from scholarly articles and websites about the applications of virtual reality (VR) for distance education. The existing, but limited, scholarship of VR in online teaching and learning fits into the broader context of topics such as emerging technologies, interaction in distance education, and the role of higher education in the 21st century. The literature offers useful definitions, theories, and frameworks that can be adapted to the applications of VR in distance education. The micro-level and macro-level research landscapes provide a rich backdrop to illuminate the teaching and learning practices of VR in distance education as well as complex social justice issues in the post-industrial world. While VR enhances learner-content interactions and promotes 21<sup>st</sup> century skills, using VR in distance education will likely perpetuate the existing knowledge gap and digital divide because of access costs. More studies are needed to better understand the promises and pitfalls of this potentially transformative technology that can shape the future of distance education.

**Keywords:** Virtual Reality, Distance Education, Digital Divide, Higher Education, Interaction, Emerging Technologies

### Introduction

Virtual reality (VR) originated in United States' Air Force flight simulators during the 1960s. By the 1990s, some K-12 classrooms had adopted it (Pantelidis, 2009). Since then the use of VR in gaming and entertainment skyrocketed in high-tech societies such as Canada and the United States. According to a recent industry report, there are 45 million VR users in the United States with an estimated increase to at least 70 million by 2022 (Boland, June 24, 2019). However, North America has not yet fully embraced VR education applications; this is particularly the case for distance education at the higher education level. While the consequences of integrating VR technology into distance education remain especially under-researched, the existing scholarship illustrates mixed results about the benefits of using this medium as a tool for learning and teaching. Incorporating VR into distance education promises to increase interaction, but may also widen the knowledge gap and digital divide in North America.

### Emerging Technologies, Online Interaction & 21<sup>st</sup> Century Higher Education

The scholarship of VR teaching and learning fits into the broader context of topics such as emerging technologies, online interaction, and the role of higher education in the 21st century. The literature on these topics offers useful definitions, theories, and frameworks that can be adapted to the applications of VR in



distance education. Together, these micro and macro research landscapes provide a rich backdrop to illuminate the teaching and learning practices of VR in distance education as well as complex social justice issues in the post-industrial world. Several forms of enhanced reality technology exist including VR, augmented reality (AR), and mixed or merged reality (MR). The collective term for enhanced reality technologies is “eXtended reality” (Georgiva et al., 2017, p.1). The terminology variations are important for teaching and learning because of the affordances of each medium. VR refers to a completely immersed experience in an artificially constructed space. AR describes an actual physical location enhanced with computer-generated imagery. Less clear, “mixed or merged reality blends real and virtual worlds in ways through which the physical and the digital can interact” (Georgiva et al., 2017, p.1). Each form of eXtended reality will likely shape the future of distance education. This paper focuses on VR because it offers the widest purview through which to explore distance education since VR does not require physicality in any particular location. The literature on emerging technologies, online interaction, and the role of higher education in the 21<sup>st</sup> century helps to frame our understanding of the use of VR in distance education.

The properties of emerging technologies apply to VR in distance education. Veletsianos (2016) defined emerging technologies as having the following four properties: “not defined by newness; coming into being; not-yetness; and, unfulfilled but promising potential” (p. 7). Veletsianos explained that practices may emerge with existing technologies, so it is useful to separate emerging technologies and emerging practices, although they may often be simultaneous. These properties all describe VR, especially when considering that an emerging technology must be considered within the context of use rather than the existing technology by itself. VR is not new since it is widely used in gaming. It seems to be in a state of coming into being in education without yet being widespread. Not only is using VR for teaching limited, but universities are only getting their feet wet with curriculum programs to teach students VR creation skills. For example, Lethbridge College in Alberta, Canada is among the first North American higher education institutions to offer a one-year certificate in AR/VR skills (Bobinec, 2019). The educational applications promise new forms of interaction and the potential to remove physical barriers. VR’s educational use, particularly in higher education, clearly meets the four criteria Veletsianos (2016) outlined for emerging technologies. VR also promises to increase interaction in immersive environments.

The literature on the nature of interactions provides another way to examine the use of VR in distance education. Wagner (1994) defined interaction as “reciprocal events that require at least two objects and two actions...these objects and events mutually influence one another” (p. 8). While seemingly dated, this definition is particularly useful because the existing, but still limited in breadth and scope, VR educational apps rely on extensive learner-object interaction to achieve learning outcomes. Moore’s (1989) seminal research identified three kinds of interaction in distance education: learner-learner, learner-content, and learner-instructor. These three pillars of interaction continue to guide best practices in online course design as exemplified by Quality Matters. Garrison, Anderson, and Archer (2000) provide a another way to understand the nuances of interaction in an online course via the Community of Inquiry framework whereby the educational experience is shaped by overlapping interactions within social, cognitive, and teaching presences. This literature review did not identify any research that explored VR interactions in terms of the Community of Inquiry framework. Although, this will likely be a future possibility as VR educational contexts expand beyond learner-object affordances and seek to incorporate increasingly sophisticated opportunities



for learner-learner and learner-instructor interaction that also promote social, cognitive, and teaching presences.

The affordances of using VR in distance education illustrate the potential for specific kinds of interactions, particularly at the learner-content level. In their article about interaction frameworks, Conole, Galley, and Culver used Gibson's (1979) seminal definition of affordances as the "action possibilities" (2011, p. 2), which means what the medium can and cannot do regarding actions and interactions. Another way to think about affordances is to use Norman's (2002) definition that pertains "to what people see; he argues that if the user does not see or perceive the affordance, then it is not so" (as cited in Hartwick and Nolan, 2018, p.116). The affordances of the majority of existing VR education apps available to the public, like in the Education category of the Oculus website, promote learner-content interactions because those apps are designed for a single user and are only relevant for individuals willing try VR.

The scholarship about VR affordances in the context of North American higher education is fragmented. Some of it is understandably discipline-specific. Even so, the literature illustrates important connections between VR affordances and student learning conditions and outcomes that apply to distance education. General research studies conclude that the benefits of using VR for education "parallel all the reasons one would use a two-dimensional, computer-assisted instruction simulation [such as] to lead learners to new discoveries, to motivate and encourage and excite" (Patelitis, 2009, p.61). Youngblut (1998) found connections to constructivist learning theories, applications for special needs students, and outcomes showing that students enjoyed creating their own virtual worlds. Georgiva et al. (2017) argued that VR promotes a "deeper understanding of emotions, the human condition, and the cultural and social systems that situate human activity and imbue it with meaning" (p.2). In their research about using a proprietary 3D virtual learning environment (3DVLE) for English language learners, Hartwick and Nolan (2018) explained how "the visual and spatial richness of 3D virtual learning environments afford opportunities for experiential learning shaped by other users and by artifacts of 3D objects in the environment" (p. 117). They argue that "high quality artifacts that learners can interact with" (p.130) help create an immersive environment and that the immersive environment stimulates students to utilize reflection and metacognition to make sense of their learning (Hartwick & Nolan, 2018). Similarly, Brazely (2018) showed how architecture students improved their spatial visualization skills using VR for walkthroughs of designs. He also argued that VR promotes "deep and coherent learning" (p.14). The extant conclusions about VR affordances and learning within disciplinary contexts should be extrapolated, tested, and enhanced via future empirically based and generalizable research studies in distance education.

Penland, Laviors, Bassham, and Nnochiri's (2019) research, *Virtual Learning: A Study of Virtual Reality for Distance Education*, unfortunately falls short of its ambitious title. They compared computer science students' learning outcomes and perceptions of using a VR app about asteroids versus using a web-based version of the same content. They tested the notion that "allowing students, even if only virtually to engage in an experiential learning process in their distance education...can increase the knowledge gained by the student" (p.158). The outcomes demonstrated mixed learning results (some students did better on certain quiz items using the VR content) and that students preferred using the VR app. The problem with their findings is that their scope was so limited that they offer little to the field of distance education other than a literature review and questions for future research. Nor did they offer any data or conclusions about the



affordances and learner-content interactions. They could have at least drawn conclusions about why the students preferred VR and what that might mean for distance education. Anderson's equivalency theorem could have guided them.

Another way to examine the role of interaction using VR in distance education is to apply Anderson's equivalency theorem. He suggested that "deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level" (Anderson, 2003, p.4). Because the affordances of VR stimulate learner-content interaction and quality education apps that promote learner-content interaction already exist, distance education courses may opt to increase use of VR. The Oculus Education category of VR apps are a good place to start.

Oculus, owned by Facebook, currently offers over 200 education apps. Most are free (or inexpensive at less than US\$5), immersive, and academically accurate. Learners can already explore ancient Athens, develop empathy for distant others by visiting a refugee camp in Tanzania, and float around the International Space Station with a guided tour from a resident astronaut. These apps embody the characteristics of affordances that make for a quality educational experience: the apps must be easily navigable, visually rich, and academically accurate. For example in the history discipline, the Anne Frank House app is exemplary because it affords the learner to meander through her Amsterdam home while listening to excerpts of her autobiography explicating her thoughts as she was situated in each particular hiding place within the home. The user makes decisions about where to go (into the kitchen, up the stairs, etc.) and discovers new audio content by interacting with the space and the objects within the space. Distance education courses may wish to take advantage of apps like these, especially as institutions attempt to scale up courses with increased students and are not able to increase the learner-faculty or learner-learner interactions due to institutional cost considerations. However, cost for the learner should be weighed when exploring VR within distance education, particularly as it relates to social justice issues regarding the knowledge gap and digital divide.

A potential negative aspect of incorporating virtual reality into distance education is that it may perpetuate the existing knowledge gap and digital divide, raising serious social justice concerns (Tait & O'Rourke, 2014). Rohs and Ganz (2015) drew on the existing literature about the knowledge gap and the digital divide. Their explanations of these social and educational problems apply to the use of VR in distance education. Generated in 1970 by Tichenor, Donohue, and Olien, the Knowledge Gap Theory postulates that people with higher socioeconomic status acquire, utilize, and benefit from mass media information at faster rates than do people with lower socioeconomic status. As digital sources dominated the media landscape in the 1990s, the term digital divide prevailed to describe the adaptation of the knowledge gap to the plethora of digitization (Brown, Barran & Irving, 1995 as cited in Rohs and Ganz, 2015). VR technology is a form of digital media with potential for increased educational impact, yet it is still expensive. The cost of VR hardware is decreasing, but remains out of financial reach for many North Americans.

VR technology is cost prohibitive for many institutions and individuals. Well known Google and Oculus products illustrate the costs. AR viewing devices such as the low-tech Google Cardboard sells for approximately US\$15 (Amazon.com). However, Cardboard experiences are not immersive. Cardboard experiences also require a newer smart phone, which again is a digital divide issue. The cost of a typical Oculus Go headset, which offers an immersive and untethered experience, is approximately US\$200





(Amazon.com), which keeps the technology out of reach of many middle and lower income households in North America. Furthermore, Oculus released the newest headset, Quest, earlier this year at a cost of US\$400-\$500 depending on memory capabilities (Hayden, 2019). The Quest offers user improvements such as six degrees of freedom, two hand controllers, and the ability to move among multiple rooms without repeating setup (Robertson, 2019). These affordances could promote even more interaction than with the Go. However, educational apps have not yet migrated from the Go system to the Quest system. A few months after product launch, the Oculus Quest website does not even contain an education category for the apps and the apps that are there (entertainment) are more expensive than the Go apps. Oculus explicitly markets the Quest as a gaming headset, so whether they will even develop educational content for the Quest remains to be seen. Educational users interested in the latest VR headset technology will have to wait for the educational content to catch up. This is both a promise and pitfall of VR at the same time.

Even if households are not able or willing to purchase their own VR viewer, interested users may find options at their local libraries, thus mitigating the knowledge gap and digital divide for those who take advantage of such offerings. Libraries across North America are slowly offering VR technology to their patrons. Using VR technology at a local library may promise to increase both formal and non-formal distance education learning. For example, the Bibliotheque et Archives Nationales du Quebec, in Montreal offers a VR experience appropriately on a subject of their expertise: interiors of libraries (Lambert, 2016). In California, Oculus piloted their Rift sets at 100 libraries (Lambert, 2017). In a review of the first quarter of 2018 blog posts about VR use in libraries and museum, Oyelude (2018) noted that the American Library Association welcomed a presentation at their Midwinter Conference about using VR to draw in teen patrons. While examples demonstrate a pattern of libraries embracing VR, the full extent is not clear because a systematic review of North American libraries' embrace of VR technology could not be located for this paper. Even more important for distance education is the fact that libraries will typically curate which VR apps their patrons will be able to access (Northern Michigan University Lydia M. Olson Library, 2019).

Even if libraries purchase and promote VR technology, it does not mean that higher education distance students will have access to the content they actually need for their specific course requirements. Therefore, using VR in distance education both formally and non-formally will likely increase the digital divide and knowledge gap in North America. However, not all researchers agree with this skepticism. Georgieva, Craig, Pfaff, and Neville (2017) disagree and argue that eXtended reality technologies "have the potential to democratize learning by giving all learners access to immersive experiences that were once restricted to those with financial means or the right connections" (p. 2). It remains to be seen if this technophile view prevails in the future, but it surely should be studied within the broader 21st century macro context.

A growing body of scholarly literature questions the suitability of potentially antiquated higher education practices in the midst of 21st century complexities. Using VR in distance education should be part of this conversation because VR is an emerging technology and educational practice within distance education. The macro conditions of neoliberal globalization such as outsourcing and mechanization of jobs are leaving students and employees with narrow skillsets ill-prepared to deal with social and economic transformations (Dede, 2010; Bates, 2016; Davidson, 2017). Incorporating VR into distance education may be an integral component to a new vision for higher education because VR can help prepare higher students for the kinds of skills they need to be successful. Davidson (2017) calls for a new education "undergirded by a new



epistemology, a theory of knowledge that is deep, synthetic, active, and meaningful, with a real impact in the world” (p.161). Davidson argues that technology must be deeply intertwined with 21st century higher education because “simply, there is more and more technology in the world we send graduates into” (2017, p.121). Similarly, Dede (2010) urged practitioners and scholars to reflect upon distance education interactions because “such knowledge could contribute to students’ overall success in achieving 21st century learning outcomes, including mastery of subject content, and 21st century skills, including critical thinking, communication, and problem solving” (p.112). However, like other internet and communications technology applications that support lower order thinking (Watson, 2006), VR educational content is not yet extensively capable of achieving these worthwhile learning goals. While the current VR education apps excel with lower-order cognitive activities, the future interaction affordances promise to promote the higher-order and 21<sup>st</sup> century skills that Dede and Davidson suggest guide higher education teaching and learning.

The macro conditions will have important implications for the role VR in distance education in terms of learning and social justice because interactions via VR facilitate active learning in environments that can promote the kind of deep learning that Davidson (2017) envisioned. Familiarity with VR will likely help higher education students succeed in an increasingly technology dominated and globalized world. VR will likely transform distance education by offering new ways to learn. Imagine someone learning a welding technique on campus and then practicing via VR from their home or library. Similarly, imagine a team of medical students collaborating on a practice virtual surgery. Just as the academic understanding of open education resources involves a profound “re-conception of learning as conversations across context” (Sharples, Taylor & Vavoula, 2006, p.22), so too the discussions and research into the applications of VR in distance education will likely stimulate new studies in the coming years as we seek to better understand the complex ways we teach and learn using VR technology in the 21st century.

Returning to the micro level, higher education faculty will need to prepare and adjust to the 21<sup>st</sup> century macro conditions. Ally’s (2019) Competency Profile for the Digital Teacher explained that faculty must be knowledgeable about, able to explore, and adapt to emerging technologies. Davis’ (1989) Technology Acceptance Model applies to help faculty determine whether VR is useful and easy enough to use to justify the time and frustrations to learn it. On a cautionary note, we would do well to remember there are plenty of higher education faculty who are perfectly competent online teachers who are uninterested in and unwilling to innovate their pedagogy by incorporating the latest educational technologies. Their reluctance to change should not signal something negative. Rather, higher education is a conservative profession because it is craft-based and perpetuates teacher-centric traditions that, in many ways, have worked well for several centuries (Westera, 2004). Students will likely continue to benefit from a variety of pedagogies, some of which rely on immersive technologies and others that are more traditional. Even with recognized reluctance to learn VR, distance education opportunities are ripe to harness the promises of VR because it can virtually overcome the obstacles of place and time unlike any other educational technology.

## Conclusion

Virtual reality is an emerging technology and educational practice in North American distance education. It promises to increase learner-content interactions because of its affordances. It also promises to stimulate learning outcomes and skills that will be useful in the 21st century context. However, it will also likely



perpetuate the existing knowledge gap and digital divide. More research studies about the use of VR in distance education will help determine whether the advantages outweigh the serious social justice concerns in the future.

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## Role of Informal Education Supported by Social Networks and Internet Platforms in the Development of the Anti-Corruption Movement in Russia

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### Abstract

This paper explores the factors influencing the emergence and growth of the anti-corruption movement in Russia with a particular focus given to the role of informal online education. Secondary and primary data were collected and analysed with the aim of increasing understanding of the relationship between informal online education and social movement development. Results were studied through the lens of two social change theories: resource mobilization and intersectionality. The major findings of this study suggest that the utilization of different social networks and internet platforms is useful in mobilizing support for the social movement, promoting human rights values and strengthening democracy, especially in countries with anti-constitutional censorship in the media that does not allow any issues that are not in favour of the government to be raised. The findings can be used as recommendations and guidelines by academics, educators, online programme developers, and by various organisations to develop and implement informal online learning aiming to raise public awareness of socio-political issues and mobilize society to stand against something that affects its life negatively.

**Key Words:** Social Movement, Informal Education, Online Education, Corruption

### Introduction

Online education is often considered in the framework of formal and non-formal educational settings. However, at the present moment there is a new learning tendency to provide new information and knowledge outside of formal institution and/or formal curriculum. Thus, the role of informal learning is becoming crucial, especially in the progress of human rights education in the countries that lack democracy. Livingstone (1999) defined informal learning as "any activity involving the pursuit of understanding, knowledge or skill which occurs outside the curricula of educational institutions, or the courses or workshops offered by educational or social agencies" (p.51). It is self-directed learning or the learning from experience. Informal learning takes places outside the institutionalized formal education system which is usually curriculum driven and acknowledged by grades and diplomas (Livingstone, 2001). Due to its self-directed nature, informal education requires instruments that many human beings are familiar with and have access to. Therefore, various social networks and online platforms, having become a vital part of people's lives, might be used as the main informal online education tools.

This study focuses on the role of informal online education on the development of the social movement. According to the definition of social movement given by Jonathan Christiansen, (2009), "it is not a political party or interest group, which are stable political entities that have regular access to political power and



political elites; nor is it a mass fad or trend, which are unorganized, fleeting and without goals. Instead they are somewhere in between” (p. 2). Moreover, according to Christiansen (2009), social movement usually has the following characteristics: “involved in conflictual relations with clearly identified opponents; are linked by dense informal networks; share a distinct collective identity” (p.2). This all can be related to the Anti-corruption movement in Russia that is considered as a research example.

With the research aim to increase the understanding of the relationship between informal education supported by social networks and internet platforms and the development of Anti-corruption movement in Russia, secondary and primary data was collected and analysed. Results were studied from the viewpoint of two social change theories: resource mobilisation and intersectionality. While representing the connection between the mentioned theories and case study, the paper illustrates the way certain theoretical frameworks are applied to the considered case study.

Given the nature and focus of the research aim, the following research questions appeared to be the most appropriate:

1. How does informal online education influence the development of the social movement?
2. What internet platforms and social networks were used to mobilize public support against injustice?

Based on the following research questions and the available sources, social media analysis appears to be the most suitable method for collecting and analysing the following primary data: the year of creation of a particular social network and internet platform, the number of subscribers from the moment this research was started in 2017 to the moment this paper was written in 2019, and the number of times selected YouTube videos were watched. As regards, secondary data, the paper includes the references on acknowledgement of certain platforms and social networks by the media professionals and civil society as the informational products of high quality; statements of relevant academics and practitioners and official information from the reputable sources on the character, numbers and significance of the Anti-corruption protests in Russia.

As regards the theoretical significance of this research, it is important to state that because informal education supported by internet platforms doesn't have enough theoretical and empirical underpinnings yet, consequently this study and its' potential findings might contribute to promoting a concept of informal online education that aimed to provide information and knowledge outside of formal institution and/or formal curriculum.

From the practical side, the findings made in the process of this research might serve as evidence of successful informal online education application to raise public awareness of socio-political issues and mobilize social support while aiming to tackle problems of different nature at various levels: national, regional and global. It might lead educators and civil society organisations to use informal online education approaches and tools in the social movement development process because it might be proven to be efficient. And as a result, the methodological and structural changes in the way social movement are developed, stimulated by this research, might transform many lives and societies.



## Development of the Anti-Corruption Movement Supported by Informal Online Education

According to the definition given by the International organization 'Transparency International', corruption is "the abuse of entrusted power for private gain" (Transparency International, n.d.). In Transparency International's 2018 annual report concerning the corruption perception index, Russia was ranked 138th from 180, whereas in 2017 it was ranked 131st from 176. Russia's nearest "neighbors" according to this index are Papua New Guinea, Iran and Guinea. Below Russia were only the countries where there are war or genocide nowadays, including North Korea, South Sudan and Somali (Grobman, n.d.). While Transparency International is developing recommendations which will help Russia to improve the anti-corruption climate, citizens themselves are trying to express disagreement with the present situations by organizing meetings and donating certain sums of money to investigations, revealing corruptness of senior officials.

A professor of Harvard Business School, Prof. Paul M. Healy, claims that very often anti-corruption investigations are published by private magazines or by activists of anti-corruption movements, an example of which Professor Healy takes Russian internet-project fighting against corruption 'RosPil' ['РосПил'] ([www.rosopil.info](http://www.rosopil.info)). It was created in 2010 by the professional lawyer and public figure Alexey Naval'nyi to control expenditures of budget funds in the sphere of public procurement. 'RosPil' works as a crowdsourcer: volunteers find out corruption schemes in state purchases, professional experts estimate "corruption capacity" of tenders and the lawyers write complaints to the controlling agencies. By December of 2011 'RosPil' prevented several tenders which would cost the government about \$1,3 bill (Hilly & Cartick, 2013).

In 2011 as well, 'RosPil' becomes a part of Naval'nyi's new project 'The Anti-Corruption Foundation' (<https://fbk.info/>). Today 'The Anti-Corruption Foundation' is the only Russia-based NGO that investigates and fights corruption among high-ranking Russian government officials. According the official web page of this NGO, "it is financed solely by donations from its supporters" ("Fond bor'by s korrupsiey", n.d.). As regards public campaigns to fight corruption which is the focus of this paper, 'The Anti-Corruption Foundation' is the only Russian NGO that promotes and leads such campaigns.

Before stating the timeline of the anti-corruption protests themselves, it should firstly be explained why this particular period of time was chosen for analysis. The fact is, as it was told above, the first anti-corruption project 'RosPil' in 2010 for making investigations was financed by money donated by citizens: the first post about this project in which Naval'nyi gives the readers clear evidence that they will be the main source financing 'RosPil' (Naval'ny, 2010), testifies the support of anti-corruption fighting process that society has shown already back then. However, to move from the donating step to going outside and participating in sanctioned and non-sanctioned revolts, about six years were needed for people. In 2017 for the first time in the history of the Russian Federation, the biggest anti-corruption protests were organized across the country.

The main event which triggered the mass protest, in the opinion of many experts, is the investigation film 'Don't call him Dimon', shown on March 2, 2017 to a wide audience ("Don't call him «Dimon»", 2017). The film tells the story of the corrupt empire of the chairman of the government of the Russian Federation Dmitry Medvedev. Through his puppet 'charity foundations' Medvedev owns real estate around the country, controls lots of land in the most elite districts, enjoys yachts and apartments in pre-revolutionary mansions,



and receives profit from the agricultural companies and vineyards both in Russia and abroad. The creator of this film was The Anti-Corruption Foundation. YouTube became the main internet platform where the film was presented. By the autumn of 2017, the period when this research was getting developed, the film was watched on YouTube 25 057 635 times. At the present moment, in the spring of 2019, the film was viewed nearly 30 million times (Naval'ny, 2017a).

In 12 days after the film was shown to the public, The Anti-Corruption Foundation invoked society to go to the streets on March 26, 2017 with the aim to get answers on anti-corruption inclinations, lodged against prime-minister Medvedev during the investigation 'Don't call him Dimon' (Naval'ny, 2017b). By the moment of developing this research, in the autumn of 2017, Naval'nyi's call to go to the streets was viewed 1 851 539 times. Besides that, on March 23, 2017 a post was published at the official website of Naval'nyi ("26 marta vyhodim na ulitsy", 2017), where there was an instruction for those who were planning to join the meeting in their cities and the link attached ("Komanda Naval'nogo", 2017), following which every person could find the most suitable city from the list of 100 cities.

Meetings held on March 26, 2017 in 84 Russian cities, also in Prague and London were not brought to the attention of state channels nor by any printed edition controlled by the government, but some independent publishing houses posted statistical data. One of them is internet-portal MEDUZA which published the whole picture of the revolt providing readers with data on the number of participants of the meetings of March 26 in every city where the protests were held. MEDUZA says:

"According to prerequisite counting, in all cities from 32 359 to 92 861 people came to revolts, 1666 — 1805 people were arrested" ("Skol'ko lyudei", 2017).

At the same time, the author of the article on BBC Russia says, detentions appeared to be the most large-scale in post-soviet Russia ("Antikorruptsionnie aktsii", 2017).

On April 12, 2017 The Anti-Corruption Foundation called people to participate in a new revolt by uploading a YouTube video, suggesting to organize it in June 12. (Naval'ny, 2017c). By the autumn of 2017, the number of 2 257 396 was fixed as the number of times this YouTube video was viewed. Also, as a re-call to go to the streets (July 12, 2017) on the 12th April Naval'nyi made a post on his website ("Plan patriotov", 2017).

So, on June 12, 2017 people went to the streets for the second time and, as on June 8 said one of the leading Russian political scientists Ekaterina Shul'man to the interviewer from online-magazine, answering the question "Will there be more people on June 12 than were on March 26?":

"Exact numbers don't really matter, it's the feeling of whether it's much or less that really matters. By my feelings, there will be many people" (Ushakov, 2017).

On June 13, 2017 the MEDUZA portal posted the map of revolt held in Russia on June 12, 2017. It was pointed out that the scales of revolt are growing: in 154 cities in meetings from 50 to 98 thousand people took part. The police arrested 1769 people. To compare, on March 26 meetings were held in 84 cities, the number of participants were from 32 359 to 92 861, 1666-1805 of which were arrested ("Meduza i OVD-Info", 2017).





On June 23, 2017 The Anti-Corruption Foundation on its channel published a video-report about how on June 12 meetings were held in the whole country, (Naval’ny, 2017e). This video-report testifies about big coverage of people participated in meetings on June 12.

**Theoretical Framework and its' Application to the Development of the Movement**

The main reason why the resource mobilization theory is chosen is that it is a distinctive study method of social movements. As says Steven M. Buechler (1993), according to this theory “social movements are an extension of politics by other means, and can be analyzed in terms of conflicts of interest just like other forms of political struggle” (p.218). Taking into account the political status and political ambitions of the anti-corruption movement leader, Naval'nyi, and also keeping in mind that "the victims of his investigations" are people who are close to the power, the political character of this social movement cannot be hidden.

The next important feature of resource mobilization theory is that it's supporters guess that “grievances are necessary but not sufficient to stimulate the rise of a movement because grievances and social conflict are inherent and enduring in every society. Rather, the formation of social movement organizations and the ability of these organizations to mobilize resources from potential supporters, both labor and money, are the critical factors in movement mobilization” (Golhasani & Hosseinirad, 2016, p. 1). This in turn is something that was described in the previous section of the paper: that The Anti-Corruption Foundation used various actions and tools to mobilize both types of resources: labour and money.

From the very beginning of the anti-corruption fighting process, the leader of anti-corruption movement Naval'nyi chose the strategy of resources mobilization, claims Healy:

From the very beginning 'RosPil' works on voluntary donations people make via "Yandex. Money". In two weeks after the first appeal almost 4.5 mil. rub was transferred to the "Yandex-purse". In 2012 'RosPil' got about 8.7 mil. rub (Hilly & Cartick, 2013).

But online-transfers isn't the only tool used by The Anti-Corruption Foundation to mobilize resources. According to Paul M. Healy,

...to create nets in small cities where not everyone has internet access, the propagandistic campaign where the main accent is done on traditional methods- publication on newspapers and communication with people -was organized (Hilly & Cartick, 2013).

For those who have the internet, many informational online platforms and social networks were created. To answer the research questions “How does informal online education influence the growth of the movement? What are internet platforms and social networks were used to mobilize public support against injustice?” and to prove that social networks and internet platforms can be considered as the instruments of informal online education, the following table was formed:

Name of the Social Network or Internet Platform and Date of Creation	The Number of Subscribers (if available)	Recognition by Media Professionals or/and Civil Society
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<a href="https://navalny.livejournal.com/">https://navalny.livejournal.com/</a> created in April, 2006	Number of subscribers is unavailable as in March, 2014 the blog was blocked.	The blog won the nomination "The best blog of a politician or a social activist" .
<a href="https://twitter.com/navalny">https://twitter.com/navalny</a> created in October 2009	Number of subscribers remained unchanged comparing 2017 with 2019 and is at the level of slightly more than 2 million people.	
<a href="http://www.rosopil.info">www.rosopil.info</a> created in 2010	The number of subscribers is unavailable as in 2011 the website moved to a platform <a href="https://fbk.info/">https://fbk.info/</a>	The project "RosPil" got a prize at the international blog competition "The BOBs" in nomination "The most useful resource for the society" (Petrenko,2011). The app "RosPil" fo iPad became the most popular among free apps (Zhigulina ,2011).
<a href="https://www.youtube.com/user/NavalnyRu">https://www.youtube.com/user/NavalnyRu</a> created in July, 2013	In October, 2017 - around 1,5 Million of subscribers In April, 2019– around 2,7 Million subscribers	The YouTube channel was recognized as the one that “broke the Kremlin information blockade” and “inspired mass anti-corruption revolts” (Filipenok, 2017).
<a href="https://navalny.com">https://navalny.com</a> created in April, 2014		
<a href="https://www.facebook.com/navalny">https://www.facebook.com/navalny</a> created in May, 2010	In October, 2017 – around 200 000 followers In April, 2019 – around 450 000 followers	
<a href="https://vk.com/navalny">https://vk.com/navalny</a>	In 2014 the page was blocked by the request of the Prosecutor General's Office (Brennan, 2014).	
<a href="https://www.instagram.com/navalny/">https://www.instagram.com/navalny/</a>	In October, 2017- 268 000 followers In April, 2019- around 670 000 followers	

**Table 1: Social networks and internet platforms utilized by The Anti-Corruption Foundation**

The table illustrates the year of creation of a particular social network and internet platform; the comparison in the number of subscribers between the moment of developing this research in 2017 and the moment of writing this paper in 2019; most importantly, it also includes the references (if available) on



acknowledgement of certain platforms and social networks by the media professionals and/or civil society as the informational products of high quality.

Looking at the table from the perspective of the internet platforms' and social networks' variety, and analysing the date of their creation, it is clear that The Anti-Corruption Foundation were relying in different years on different online channels. At the beginning of its work, <https://navalny.livejournal.com/> was the most popular source of dissemination of the information relevant to the topic of the movement. Already back in 2011, the blog of Naval'nyi on LiveJournal won the nomination "The best blog of a politician or a social activist" in the "Runet Blog 2011" competition. Later on, in 2014 the page was blocked by the request of the Persecutor general's office.

It is also important to mention the official web page of the internet-project fighting against corruption 'RosPil' ['РосПил'] ([www.rosopil.info](http://www.rosopil.info)) that was created in 2010. The right to consider the 'RosPil' internet platform as the instrument of the informal online education comes from the fact that in April 2011 the project "RosPil" got a prize at an international blog competition "The BOBs" in the category "The most useful resource for the society" (Petrenko, 2011). During several days after launching the app "RosPil" for iPad it became the most popular among free apps, overstepping even the slaw? leader Angry Birds. Naval'nyi himself thinks that this fact can be considered as "excellent mark of corruption perception index" (Zhigulina, 2011).

As regards the Youtube channel of Naval'nyi that is <https://www.youtube.com/user/NavalnyRu>, that was created in July, 2011, its informal education influence and resource mobilization power was acknowledged in June 2017 by Time magazine. It included Naval'nyi in the list of 25 most influential people in the Internet. This decision was explained by the fact that "Naval'nyi's YouTube channel with 1 mil. Subscribers at that time broke the Kremlin information blockade" and "inspired mass anti-corruption revolts" (Filipenok, 2017).

Last but not least in regards to Naval'nyi You Tube channel, is the fact that it is a constantly growing online platform as more and more people subscribe to it. In October, 2017 the channel had around 1,5 Million of subscribers. As at the moment of writing this paper that is April 2019 the number of subscribers reached the level of nearly 2,7 Million of people.

The same pattern in regards to growing number of subscribers follows Naval'nyi's Instagram and Facebook accounts. As it can be seen from the table, for a period less than two years, the number of subscribers on both of the accounts has increased dramatically. This testifies that "resource mobilization is an existing resource that is accessible to consumers of the Internet which helps mobilize the goals of the organization and is essential to success." (Golhasani & Hosseinirad, 2016, p.4). The mentioned above analysis is also related to the statement of Marian Burchardt (2014) in regards to resource mobilization theory, "one of the main results of local activism and an indicator of its success is that activities and programmes become more widely known and accepted" (p.67).

As regards "changing some elements of the social structure and /or reward distribution of a society" about what MCKathy and Zald (1997, p.1217), the claim describing social movement through the vision of resource mobilization theory:



By May 2, 2011 The project 'RosPil' says about the sum of found schemes in 1,6 bil.rub (this sum is considered as the whole sum of cancelled competitions), the sum of stopped schemes in 337 mil. rub. In half year of existence of the project (by the middle of June 2011) 41 public purchase is considered. (Alexey Anatol'evich Naval'ny, n.d.)

Moving forward, it is timely to consider the same research questions under the view of the intersectionality theory. As “one of the key tenets of intersectionality is explicit orientation towards transformation, building coalitions among different groups, and working towards social justice” (Hankivsky, 2014 p.3), it should be noted that in many of his calls Alexey Naval'nyi uses talks where he underlines the importance of a union of peoples with different social backgrounds and efforts, because in his opinion everyone suffers from corruption (Naval'ny, 2017c). And the proof of it are in the words of the political scientist Krashennikov, who said on March 27,2017, i.e. the next day after the first anti-corruption meetings:

I saw people of different age: the youth, the elderly people, people of middle age. I saw very different people, dressed in various ways, from the widest segments of city population (Politolog: v antikorrupsionnyh, 2017).

Moreover, apart from uniting different groups of people inside the country, Alexey Naval'nyi tries to find supporters among international state organizations: In March 2014 The New York Times newspaper published an article of Naval'nyi where he asked to create additional restrictions against 'Putin's inner circle'. In particular, he invoked western countries to freeze assets and deprive Russian businessmen from their properties (“Alexey Anatol'evich Naval'ny”, n.d.).

## Conclusion

In conclusion, this study demonstrates the active use of informal education supported by internet platforms and social networks within the development of the social movement. The findings provide a reach source on how informal online adult education influenced the level of civic awareness and mobilized society to stand against injustice. The internet space, while serving as one of the informal learning instruments, helped The Anti-Corruption Foundation to reach a wider audience and to unite it. The research findings in regards to resource mobilisation theory suggest that utilization of different social networks (Facebook, Instagram, V Kontakte, Twitter) and internet platforms (YouTube, LiveJournal) is useful in raising the level of civic awareness, shifting public perception and mobilizing support for the social movement. Looking at the findings from the perspective of intersectionality, it is important to highlight that coherent informal online education strategy, employed by the The Anti-Corruption Foundation, helps to unite people of different age and class. Overall, this research proves that the informal online education approach while actively and successfully implemented into social movement development might consequently lead to transformation of societies. The findings can be used as recommendations and guidelines by a wide range of academics, educators, online programme developers and organisations to develop and implement informal online learning aiming to raise public awareness of socio-political issues and mobilize society support to stand against injustice.

There are a number of limitations to this study. The research was conducted on a small scale due to a lack of resources allocated to it and this restricts the findings' depth. The study provides rich information on social



media educational power in regards to civic mobilization. However, as the research focuses on a single particular social movement, more comprehensive data could be gathered by conducting a comparative case study and considering how informal online education influences the development of various social movements taking place worldwide. Analysis of secondary data such as empirical and conceptual papers in social movement and informal education fields that present various perspectives on their connection should also be taken into account.

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## Hybrid Homework – Blending Blended Learning and Face to Face in four Undergraduate Education Programmes

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### Abstract

This paper presents a research-based development of learning designs that seek to deploy the best of both face-to-face and e-learning. That is the elements of face to face (f2f) courses that we acknowledge as productive from prior research and experience combined with the elements of blended learning that we see work in e-learning and MOOC contexts. We call it ‘Hybrid Homework’ because it is a cross between traditional homework and virtual e-tivities that include other ways of creating activities and gaining participation in the timespan between presence-lessons. The context of the paper is four undergraduate programmes at University College North in Denmark (UCN). The four programmes share a work/profession linked relay between theory and practice. The paper presents an incremental progression from the first makeshift experiments to the latest research-based designs. The paper also shows a constant struggle to exploit and deploy e-learning techniques without ‘becoming’ actual e-learning programmes. This proved difficult. On one hand, the programmes in the study should not come across as de facto blended learning programmes, on the other hand, the programmes must offer full programmes on all campuses, regardless of the number of students. So, the question is how we can develop learning designs that make it, pedagogically, financially and practically possible to offer full programmes and still maintain the students’ experience of high-quality courses. Our studies imply that the students regard e-learning/blended learning as low budget/low quality and that it requires high levels of self-efficacy and motivation, which the students fear they may not be able to deliver. Conversely, the learning designs developed in this study must make teaching and learning at a distance possible without a decreased experience of quality amongst students. In order to offer a pedagogical solution to a complex problem, we suggest an incremental introduction to the principals and techniques of the virtual part of the courses that allow the students to get used to learning through ‘Hybrid Homework’. Furthermore, we suggest a uniform and simple ‘hybrid homework design’ that carries a great resemblance from course to course making it simple for the student to recognize her/his role and what is expected and intended. That is, few, simple and productive digital tools utilized the same way by all lecturers that constitute an easily recognizable ‘Hybrid Homework design’ in which the students can learn and collaborate.

**Keywords:** Chronotopes of Learning, Learning Designs, Blended Learning, F2F

### Introduction

The concept of ‘Hybrid Homework’ is developed to solve a problem that is equally pedagogical, financial and practical. It proved to be a complex and slightly contradictory task. On the one hand, it is possible to design



brilliant e-learning and blended learning to students who choose to enrol themselves in such a programme (Dau & Ryberg, 2014; Kjærgaard & Sorensen, 2014; Lukassen, Pedersen, Nielsen, Wahl, & Sorensen, 2014; Salmon, 2002; Salmon, 2013; Wahl, Pedersen, Nielsen, Lukassen, & Kjærgaard, 2015). The reasons for choosing e-learning/blended learning are often both specific and individual. The same may be said for students who choose a traditional ‘brick n’ mortar’ university. The students in this study utter an urge for teacher guidance and physical presence as motivation in its own right, thus indicating that the learning strategies needed for successful participating in e-learning are not necessarily present. We were inspired by the learning strategy cases presented by James Paus Gee (Gee, 2010; Tierney, Corwin, Fullerton, & Ragusa, 2014 p: 179). We found the ‘Tabby Lou’ case especially interesting. The ‘Tabby Lou’ case is basically the story of how a middle-aged woman teaches herself 3D modeling for the game SIMS with no prerequisites apart from a computer, an internet connection, and severe intrinsic motivation, that is motivated by internal, identity-forming forces rather than external demands (Dede, 2009).

We recommend you read the whole story of ‘Tabby Lou’ if you are not familiar with it already (Tierney et al., 2014 pp.: 179-181). The moral of the story is that you can teach yourself almost anything if you develop a strategy for learning online and if you have a strong intrinsic motivation. The view that the prospects for learning online are great is also supported by other research in e-learning and blended learning (Dron & Anderson, 2014; Siemens, 2014). However, the shared condition is that the learner is motivated and that the learner doesn’t need external supervision or motivational coaching. We second that view, and our data solidifies that the demographics of this study, for the most part, is not intrinsically motivated to an extent where the level of self-regulatedness is sufficient to go directly into an online learning path without extensive scaffolding (Anderson, Spiro, & Anderson, 1978; Gibbons, 2002).

Thus, the development of learning designs has several constraints. We utilize the concept of learning designs to express a shared language for designing pedagogical activities. Describing a learning design entails describing all activities, content, techniques, technologies, pedagogies, collaborations, roles and resources in a shared discourse (Conole, 2012; Dalziel et al., 2016). Thus, developing a shared language for discussing and sharing templates for teaching.

## Methodology

The investigations were carried out utilizing the lens of Critical Realism (CR). CR is a methodology for doing investigations of social structures and interactions and, thusly, also education. The methodology was developed in the 70ies by Roy Bhaskar and described in his seminal books ‘A Realist Theory of Science’ (published in 1975) (Bhaskar, 2008) and ‘The Possibility of Naturalism’ (published in 1978) (Bhaskar, 1979). CR has since then been further developed by a number of scholars amongst which Margaret Archer, Andrew Collier, and Berth Danermark are prominent and Hubert Buch Hansen, in a Danish context (Archer, Bhaskar, Collier, Lawson, & Norrie, 2013; Buch-Hansen, 2005; Collier, 1994; Danermark, 2002). Education researcher David Scott is an important contributor to the field deploying a CR approach to education research (Scott, 2005; Scott & Usher, 2011; Scott, 2013). CR offers a dialectical view on science that acknowledges both an ontological reality that exists unaffected by our knowledge of it and a reality that exists because we articulate and recognize it. One could thus argue that it offers a dialectical middle ground between positivism and constructivism. Utilizing a CR approach also entails that we are not investigating the phenomena as such (the





e-learning interventions) but rather how the application and student experience of the interventions came to be the way they did. In that sense, we could make an analogy between educational research and a court case. In the court case the lawyer is interested in finding the reasons and indices, may be evidence, why the accused did the crime and not the crime itself. The crime happened, now we investigate why and how, etc. and later we will determine how to make amends and assess the right punishment (sentencing).

The investigation of how and why is called 'retroductivism' (Chiasson, 2005) in CR and it is a form of reasoning, where we piece together an incomplete image based on an 'immanent critique' (Bhaskar, 2010; Sabia, 2010). The 'immanent critique' is the analytical technique in CR it resembles the post-modernist concept of 'deconstruction' put forth by Derrida (Derrida, 2016) and discussed in relation to the Kantian notion of the 'immanent critique' by later scholars (Curtis, 2014; Wrenn, 2014). 'Deconstruction' and 'immanent critique' differs, however, because Derrida and 'deconstruction' is mainly a textual, discourse oriented technique, whereas, the 'immanent critique' also analyses social interaction and social structures. So, the crime is the intervention, the investigation is the retroductive analysis that formulates an immanent critique of the intervention and the 'sentencing' is the suggestion for how to better the situation for all parties (Kjærgaard, 2016 p.: 8).

The ideation of the suggestion is called abduction in CR. An abduction is a form of reasoning formulated by Charles S. Peirce (Chiasson, 2005; Laursen, 2017; Peirce, Charles S., 1906; Peirce, Charles Sanders, 1998). To make an 'abduction' is basically to make educated guesses. The method is to make systematic reflections on your data and to formulate plausible effects of a given intervention. That entails trying to foresee how specific structures and mechanisms may act and cause intended effects of an intervention and develop specific conditions under which the intended effects may become real. In other words; create the best conditions for the intervention to fulfill its intended potential.

CR does not dictate or give methods as such, however, the dialectical relation between positivism and constructivism calls for methods that enable quantification of qualitative data. Hence, methods such as Grounded Theory or Design-based Research may seem like relevant methods for CR research. This study is borrowing techniques from both Grounded Theory and Design-based Research.

## Methods

The methods applied should produce data that can inform us on how the interventions could be improved in accordance with the requirements and aims of the project, which is to enhance the pedagogical opportunities to facilitate activities at a distance in the time between presence lessons, conceptualized as 'hybrid homework'.

Thus, we ask questions in interviews that seek to place an immanent critique of the intervention, Conversely, the interviews also produce data on how the interventions and the conditions under which the interventions work may be improved.

The practical data production techniques were supplemented by desk-top studies. The desk-top studies investigated existing e-learning or blended learning programmes. We looked at:



Programme	Business model	Design	Demographic
OpenLearn, Open University UK (OU)	Free. Suggestions for degree programmes that would qualify the free course but no restraints	Very structured and recognisable design. The same design for all topics and all courses. Makes use of text, audio, video, forums, tests	Students and employees who need a quick update. Potential students of OU
SkillShare	'Spotify for education' Teachers make courses and upload them to Skillshare. They get paid according to student participation. Students pay a monthly fee	Very structured and recognisable design. The same design for all topics and all courses. Makes use of text, audio, video, forums, tests	Employees freelancers who need a quick update.
EdX Coursera	Course enrollment is free, however, you have to pay for a diploma.	Very structured and recognizable design. The same design for all topics and all courses. Makes use of text, audio, video, forums, tests	Students and employees who need a quick update. Potential students of OU

The shared trait amongst the analyzed programmes is that they are built on structured and recognizable learning design. The learner experience is in focus, while the teachers' creativity is limited by the structure of the general learning design. Based on the desk-top studies we made the hypothesis that the students would articulate a need for more structure in virtual learning designs than in presence lessons.

**Techniques Applied**

We conducted a series of interviews as 'semi-structured research interviews' (Kvale, 2008). A 'semi-structured interview' is an interview that is open to what the context may provide other relevant information. This entails the development of an interview guide and a strategy for 'probing' (Flick, 2009 p: 150). 'Probing' is when the interviewer decides to investigate an answer further even though it may be a slight divergence from the interview guide.

Our interview guide was primarily grounded in the practice of the interventions, that is asking questions directly aimed at the interventions, that the students had taken part in. The probing strategy was directed towards getting to know more about the students digital learning strategies.

We designed and distributed surveys to both students and lecturers. The first surveys were distributed to give a baseline. The second surveys were producing data on the interventions. The surveys were designed as a combination of close and open-ended questions. The close-ended questions were designed with a Likert scale; Strongly agree, agree, disagree strongly disagree. We deliberately chose an even number of answer categories so that we forced the respondents to either choose sides or click 'don't know'. Furthermore, an even number of categories gives us a statistical opportunity to categorize the answers in a positive and a negative category.

The baseline survey was carried out to give an indication of whether the interventions were acting as causal mechanisms in the quest for a quality experience at a distance.



**Empiric Data**

The data has been produced on campus. We visited the remote campus a total of 5 times and distributed 4 surveys digitally.

Students	Nurse Education	Social Education	Finance/Marketing Education
Fall 2017	11 students	4 students	4 students
Spring 2018	8 students	5 (6) students	6 students

Lecturers	Nurse Education	Social Education	Finance/Marketing Education
Fall 2017	Field notes + survey Interview	Field notes + survey Interview	Field notes + survey Interview
Spring 2018	2 Lecturers	2 Lecturers	4 Lecturers

Learning cycles	Nurse Education	Social Education	Finance/Marketing Education
Fall 2017	Meetings with key lecturers about the selection of learning goals that could benefit from 'hybrid homework'	Meetings with key lecturers about the selection of learning goals that could benefit from 'hybrid homework'	Meetings with key lecturers about the selection of learning goals that could benefit from 'hybrid homework'
Spring 2018	Shared sessions with all 4 programmes in which we shared experiences and focused on developing a shared repertoire and a commonly acknowledged and understood vocabulary for talking about 'hybrid homework'. Participants: Lecturers, ICT-instructors, researcher, consultant		
Fall 2018	Shared sessions with all 4 programmes in which we shared experiences and focused on developing a shared repertoire and a commonly acknowledged and understood vocabulary for talking about 'hybrid homework'. Participants: Lecturers, ICT-instructors, researcher, consultant		

The saturation level of the data production is presumably adequate for testing our hypothesis, however, more data and most importantly more interventions to investigate would have given a more precise view.

**Analysis**

Baseline survey population in total: 19 students		
Gender	Male 24%	Female 76%
Age	Age 15-19, 16%	Age 20-24, 53%

The analysis of the surveys revealed an age and gender biased population.



This finding indicates that the average respondent is a female student between 20-24 years of age, who have chosen to stay in her local surroundings instead of moving to the city (110 km).

### *Qualitative Survey Data*

We posed a series of questions related to the students learning strategies because we anticipated a low interest in learning strategies and a frail focus on self-regulatedness.

- When asked about their learning strategies 94% strongly agree/agree that they need the teacher present to learn.
- Only 11% agree (0% strongly agree) that they keep a log/portfolio of their learning processes.
- 72% strongly agree/agree that they take lesson notes systematically
- Only 6% strongly agree and 28% agree that they need time alone to learn
- 56% strongly agree/agree that they need a study group to learn
- 11% strongly agree and 11% agree that they can learn without a teacher present if the conditions were ideal
- 22% agree (0% strongly agree) that they are experienced with learning with digital media and producing digital artifacts (web 2.0)
- 78% strongly agree and 22% agree that they need affirmative feedback telling them if they are on the right track or not.
- 33% of the students have some experience with learning in e-learning courses
- Only 7% have experience contributing to online discussion forums.
- Only 20% strongly agree/agree think that they can learn through e-learning
- Only 27% strongly agree/agree think that they can learn through online discussion forums
- 47% agree that they can learn from teacher produced videos

### *Condensation of Quantitative Data*

The students are generally inexperienced with other learning designs than f2f lessons. They rely on a teacher present in the 'chronotope' (time/place relation) of the classroom (Mahiri, 2004 p: 217), that is learning in the same place at the same time as the more knowledgeable other (MKO) (Vygotsky, 2012). However, they are (47%) open to the idea that the MKO could be a teacher produced video (Cicconi, 2014 p: 58). Furthermore, they respond (56%) that they rely on a study group as an active part of their learning process.

### *Condensation of Qualitative Data*

- 1) The baseline qualitative data consists of interviews with students and lecturers. The protruding utterance is that the interviewees need a lecturer present to feel secure in the learning process. The interviewees also express the presences of a lecturer as the main motivation to study.
- 2) The end-line qualitative study consists of interviews with students and lecturers. The protruding utterance amongst the students is that the instruction in the 'hybrid homework' must be consistent, clear and unambiguous. Furthermore, the content presented in the 'hybrid homework' must be an enhancement of other resources (textbooks, etc.). The students indicate that the lecturer should

anticipate the students' questions and insecurities while making the videos/resource collections and, thus forestall the students' needs in the learning process in the 'hybrid homework'.

- 3) The shared sessions were conducted by the consultant, the researcher, and the IT-instructors. The aim was to share experiences and to develop a vocabulary for talking about the different 'chronotopes' and the learning designs. During the sessions we discovered general difficulties amongst lecturers to express what, when, how and why of the learning designs in a shared language. So, more questions than answers arose from the first session.
- 4) The programmes would like more efficient techniques to keep in contact with the students while they do their internships and placements.

Some of the questions were:

- When is it blended learning?
- Is it blended learning if the students work in groups in the 'chronotope' of same time/same place on campus but assisted by video and web activities and only supervised by the lecturer?
- Is it blended learning if the students are on one campus and the lecturer is at another campus and the two campuses are connected via video conference?
- When does a course shift from f2f, to blended, to e-learning?
- How can a lecturer manage his/her time when the traditional division of preparation, teaching, and feedback has changed?

They are valid and relevant questions; however, we were not in a position to answer any of them clearly and unequivocally. Mainly because the questions entail management decisions and the development of a practice of 'hybrid homework'.

## Findings

The most important finding in these investigations are:

- The students ask for clear, consistent and simple learning designs in the 'chronotope' of difference in place/difference in time.
- The students ask for instructional videos/resources that enhance the existing resources (textbooks etc.) and anticipate their needs when they try to learn on their own.
- The students like variation, creativity and organic shifts in the 'chronotope' of same time/same place lessons.
- While in internship or placement the students are mainly focused on the internship or placement and attempt to keep contact with the programme is regarded as an extra assignment and, thus, not as a part of the learning process in practice.

This leads to the guiding design principle that 'hybrid homework' requires, clear instructions and systematic consistency, while f2f can be creative and organic.

Changing the principles influences both the 'chronotope' of difference in time/difference in place and the 'chronotope' of same time/same place because if most of the structured instruction happens in the 'hybrid



homework’ the creative and organic lessons should contain something else. The discovery resembles the challenges of ‘flipped classroom’ (Lukassen et al., 2014; Schwartz, 2014; Tucker, 2012). This project only focuses on the ‘hybrid homework’, however, the development of the pedagogies in the classroom that accompany the ‘hybrid homework’ may be just as crucial.

The notion of learning designs proved quite difficult to master in practice. The main challenges lay in developing a shared understanding, a shared vocabulary and a shared repertoire of technologies and techniques. So, even though, a learning design should be shareable these investigations show a highly individual process that opens slightly over time to become a shared practice of teaching. The main issue being what Conole refers to as ‘representing the designs’ (Conole, 2012 p: 103). The lecturers struggle to express the different concepts. The struggle is linguistic, however, it is also a matter of attempting to represent an uncongealed concept, which seems to entail vague and unclear language.

### **Discussion and Conclusion**

Possibly the biggest issue in these investigations is that if ‘hybrid homework’ is designed by the lecturers then the empiric data suggests that the lecturers should stick to a shared, clear, consistent and simple design. In the cases mentioned in the beginning (OpenLearn etc.) the designs are made by professional e-learning designers to a uniform standard and the lecturers have specifically provided content that uniform standard.

The second biggest issue is to introduce teaching techniques and learning designs that the students regard as low quality and difficult to participate in and, furthermore, differ from what they anticipated when they enrolled.

Other considerations include the discovery that the students have no or little experience in learning academic subjects through video, online discussions, and production of digital artifacts. Most of the students have experience learning simple practical things through instructional videos on YouTube (knitting, cooking, fixing the gears on a bike, editing videos, etc.), however, none of them have participated in a MOOC or supported the f2f lessons with relevant videos from the internet.

Hence, in programmes where either f2f, blended learning or e-learning are the, practically or financially, plausible choice, we suggest an incremental introduction of ‘hybrid homework’ in which the students gradually have more clear and simple online tasks and where the instruction gradually moves from f2f to consistent learning designs based on the functions in the LMS (Canvas) until the learning design reaches the critical point where experience of quality, practicalities (lecturer mobility) and financial sustainability meet.

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## The Impact of Online Program Management (OPM) on The Growth of Online Learning: A Case Study

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### Abstract

A Babson Survey Research Group study reports that the number of students enrolling in online courses and programs is expected to increase in 2018. Over the prior 15 years the trend of online learning vs face to face is expected to continue in the foreseeable future (Friedman, 2018). The number of students in the United States who enrolled in at least one online course rose by 5.6 percent between fall 2015 and fall 2016. This is a faster level than in the prior three years (Friedman, 2018). Institutions of higher education are investing millions of dollars to develop and improve hardware, software, faculty development, faculty and student support, as well as marketing to increase enrolment numbers. Colleges and universities are facing increasing pressure to develop online degree programs and single course offerings. A niche has developed with the rise in online education and course offerings with the entry of online Operational Performance Management (OPM) organizations or Outsourced Program Management. These vendors provide services in student recruitment, retention, marketing, professional development, and course development. The third vendors act in persona of the college, de facto acting as members of the college community. The rapid growth of online education extends, connects, and expands the learning experience in ways never previously possible. Learners are seeking different delivery methods rather than traditional face to face classroom experience. Online learning will continue to transform lives and the society of higher education, in turn, strengthening the connections between learners and educators to improve lives, bond communities, build character, and shape futures. OPM's are impacting the future of online education with the development of partnerships between colleges and universities. These partnerships between the colleges/universities and OPM's last between five and 10 years with revenue share arrangements that are half to three-quarters of tuition dollars (Kim, 2018). D'Youville, with approximately 3,000 students in Buffalo, New York contracted with an OPM in 2018 to assist in these areas. The services support the Online Learning Department, faculty, staff, and students. The intention is to increase enrolment, offer student support, and retention services. This paper examines the impact of the interactions between OPM's, faculty, staff and students. By examining this partnership and the services offered, the researchers will provide an explanation of the processes and interactions between the constituents.

**Keywords:** Online Learning, Online Program Management, OPM



## Introduction

Online learning has evolved substantially from when Caleb Phillipps advertised in the Boston Gazette in 1728 as a “Teacher of the new method of Short Hand” through weekly mailed lessons (Holmberg, 2005). Three years later, the Phonographic Correspondence Society was founded to offer courses in a more formal basis paving the way for the formation of Sir Isaac Pitman College. The progression continued with the University of London as the first university to offer distance learning degrees in 1858 (Craig, R., University of London Website). These institutions led the way for the first correspondence school in the United States, the Society to Encourage Studies at Home, founded in 1873 by Anna Eliot Ticknor (Robinson Cole, 2012).

Methods of delivery, rigor, and quality have significantly changed from the original mail service offerings to the current format. According to Craig (2015), “By enabling three forms of interactivity – interaction with content, with the instructor, and with other learners – the Internet proved to be a game-changer for correspondence degrees.” Organizations such as the Sloan Asynchronous Learning Network estimate that for-profits occupied less than 5% of the market for distance degrees as of the year 2000. For-profit institutions such as the University of Phoenix, recognized that online delivery represented the logical step in providing accessibility to the masses. For-profit institutions recognized early that they would be able to charge the same tuition which, at scale, providing appreciably greater profit margins (Craig, 2015). Friedman (January 11, 2018) reports that “public colleges and universities had the largest growth in online course enrolment between fall 2015 and 2016, at 7.3 percent...with roughly two-thirds of all online students enrolling in programs at public schools. Online class enrolment at private non-profit schools rose 7.1 percent, many online students live within 50 miles of their school's campus (Friedman, 2018).

According to Zipper (2016), “schools have three options: do it themselves; cobble together various outsourced fee-for-service of software-as-a-service solutions from different vendors, such as Learning Management Systems (LMS) providers, marketing agencies, and instructional designers; or partner with an OPM provider.” Colleges and universities have turned to partnerships with online program management companies (OPMs) such as Wiley’s Learning House, Pearson, Helix, Bisk, and 2U. These vendors provide services in student recruitment, retention, marketing, professional development, and course development. The OPMs act in persona of the college, de facto acting as members of the college community. This paper provides experiences from the viewpoints of faculty, students, and staff working with an OPM. D’Youville, with approximately 3,000 graduate and undergraduate students in Buffalo, New York contracted in 2018 with an OPM to assist marketing, course development, recruitment, retention, and advisement. This paper reports findings from a survey of online MBA students during the first year of being supported by OPM recruiters and advisors. This paper will also address the interactions of faculty and staff who directly interfaced with the OPM during the initial contract year.

## Online Program Management (OPMs)

Online Program Management companies have been in the higher education market for approximately 23 years (Newton, 2016). As colleges and universities entered the online education marketplace, many were not prepared to support the multitude of services for offering online classes which led to the niche of OPMs.



The OPM acts in persona of the college, de facto acting as members of the college community. Personnel hired by the OPM interact with students utilizing email addresses from the contracted college or university with students having no idea these representatives are not located on-campus or are on the institutions direct payroll. This can create an issue of delineation of duties and responsibility such as, “did the “on-campus” college enrolment personnel or the OPM personnel recruit the student? Who receives “credit” for the enrolment?” Who contacts the student that may be experiencing issues in class; the instructor, the OPM advisor, or the colleges retention personnel? When you have 80 percent of students enrolling in graduate programs who graduated from the institutions undergraduate programs; how much “recruitment” is being done? When a college is paying upwards of 70 percent to the OPM for the services, questions can arise as to return on investment, especially when a contract may be five to seven years. It is best for questions such as these to be answered before the contract is signed.

OPMs have evolved and the market has grown to offering services totalling more than \$1.1 billion annually (Newton, 2016). The expectation is that growth of this sector will continue to increase. Straumsheim (2015) reports that three-quarters of a survey respondents reported their main priority in contracting with an OPM was to increase enrolments, followed by reaching new student markets. According to Newton (2016), students who study online are being recruited and a large percentage of their tuition dollars are being paid to companies that are profit-based. The estimate is that fifty percent or more of tuition dollars are paid to OPMs for services provided. There is a relatively new model that has been introduced that uses a flat fees-for-service instead of tuition-sharing (Newton (2016). The term “shared success model” has been coined to describe tuition-sharing (Newton, 2016). When the collaboration works, revenues are experienced that an institution would not have if not for the OPM. However, when the collaboration doesn’t work, the institution may eliminate the program or bring the services back to administer themselves (Zipper, 2016). The future for OPM will include competency-based, hybrid, and stackable credentials (Straumsheim (2015).The expectation of an institution aligning with an OPM is that a partnership is formed. A partnership that is beneficial for both parties.

Newton (2016) notes that, “up to 80 percent of the more than 2,600 colleges delivering online education, including schools such as Yale and the University of Southern California- outsource the management of the programs.” With the continued growth of online learning, these OPMs would be in line to significant growth. However, the state of California has recently proposed legislation that would provide the strongest for-profit accountability measures in the United States (McKenzie, 2019). According to McKenzie (2019), the “proposed bill would

*“explicitly prohibit any private for-profit postsecondary education provider that is registered with California’s Bureau for Private Postsecondary Education from entering into tuition-sharing arrangements with OPMs or other academic service providers...The law could also apply to out-of-state distance education providers that enrol California residents.”*

The proposed bill doesn’t ban OPMs however, this would significantly impact their operations. Policymakers could consider further restrictions on how the companies operate with other institutions in the state and across the U.S. if adoption of the legislation passes.



Newton (2016) notes that, in addition to questions about profiting from public education and student debt and the use of commission-based recruitment, another problem in the tuition-sharing model is that it actually works against a major premise of online education-making a college education more accessible and more affordable.” Providing a means of accessing education with students who are located possibly hundreds or even thousands of miles from a brick and mortar campus opens recruitment opportunities globally. Attendance at top tier institutions can be realized by many more students. However, at what cost?

## Research

The primary objective of this research was to ascertain satisfaction of students related to recruitment, advisement, and instruction after the college contracted with an OPM. The researchers questioned if students would report a “difference” in the relationship with college and OPM personnel and response time following integration of services. The researchers developed an online survey for data collection with a concentration on student satisfaction (Appendix A). Following approval from the D’Youville’s Institutional Review Board, the survey was emailed to 54 online MBA students utilizing SurveyMonkey with no questions asked that would denote specific student responses to maintain confidentiality. While the sample size is too small to make statistically sound judgments, several insights can still be gained. One major objective was to acquire information to implement necessary changes to improve student satisfaction.

Another aspect of this research related to staff and faculty feedback based on interactions with the OPM in course development, advisement, retention, and enrolment. Prior to the OPM, online courses were designed and developed 100 percent by the instructor teaching the course. The colleges Department of Online Learning were available for assistance. However, it was at the instructor’s discretion whether to use these services. Verbal feedback was solicited from faculty who worked with the OPMs instructional design staff and advisors regarding their telephone, email, face-to-face interactions.

The work-flow in course development begins with the instructor developing a course map, syllabus, and all course materials/assignments. The instructor would then email the weekly assignments to the OPM instructional designers for input into the course shell. Once the course was completed developmentally, the instructor would review for accuracy. This would be followed by an unofficial Quality Matters review by the Online Learning Department using a template internally designed to maintain consistency based on best practices from Quality Matters and the Online Learning Consortium. The Online Learning Department developed an instructional design manual utilized internally and by the OPM to maintain consistency in design formats. This provides students with consistency across all online courses. The OPM can also be responsible for recruitment, advisement, and retention services. Staff feedback regarding these academic services were also solicited. In many institutions, recruitment offices have enrollment numbers they are expected to meet. If a student contacts the institution regarding an online program, the student is transferred to the OPM for follow-up.



## Results

Following approval from D’Youville’s Institutional Review Board, the survey was emailed to 54 online MBA program students; a total of 26 surveys were determined to be complete and usable for the study. The remaining surveys were deemed unusable due to missing information or multiple answers (where one answer was requested). The respondents were 62% female, 38% male. 23% of the respondents were between 18-24 years of age, 42% between 25-34 years of age, and 35% between 35-44 years of age. 100% of the students reported they work full time. The data was analyzed, noting specific areas that could provide improvement in student learning and support; as well as recommendations to improve course development and support for faculty and staff. The results of the student ranking if they had problems with specific offices or support and if these problems were resolved satisfactorily are reported in Table 1. Students’ ranking of what problems/issues they encountered noted the most significant area for improvement or additional training is the learning management system (LMS), followed by obtaining textbooks and materials, using online course supplemental materials, and registration.

Have you had problems/issues in any of the following areas? (check all that apply)	
21.43%	Obtaining textbooks, online and course supplemental materials (ie: My Business course, products from publisher)
21.43%	Using online and course supplemental materials (ie: My Business Course, products from publisher)
21.43%	Registration/Registering for classes
14.29%	Advisement
0%	Recruitment
35.71%	Canvas

**Table 1: Results of student satisfaction survey of problems/issues in specific areas**

Student’s noted that time management was the most challenging aspect of the program (Table 2). With 100 percent of the students working full time, this was not surprising to the researchers. The second area noted was writing papers, followed by navigating the LMS.

What area(s) do you find challenging in the MBA program to date (note all that apply)	
63.64%	Time Management
9.09%	Organization
40.91%	Writing Papers
0%	Understanding course content
13.64%	Navigating the online learning management system
9.09%	Quizzes/tests

**Table 2: Results of areas students find challenging in the MBA program**

Students reported that the highest satisfaction related to response time from faculty, followed by technology support, then advisor support (Table 3). The institution has formed an Online Quality Committee comprised



of administration and faculty to develop policies in regard to online education. This committee is charged with developing a policies and procedures handbook. This is to assist with faculty response time, responsibilities, and other concerns. The Faculty Senate and President’s Council will provide final approval. Best practice suggest faculty “respond to emails within 24 hours, except major holidays, on which instructors will respond within 48 hours.” The institution offers assistance from the help desk personnel Monday through Saturday, along with 24-hour Tier One support through Canvas (Instructure) for both students and faculty.

How satisfied are you with the response time if you had questions/encountered problems					
	1 Not Satisfied	2 Somewhat Satisfied	3 Satisfied	4 Highly Satisfied	N/A
Faculty	7.69%	7.69%	30.77%	58.85%	0%
Advisor	3.85%	11.54%	38.46%	42.31%	3.85%
Technology Support	0%	3.85%	42.31%	46.15%	7.69%
Registration	3.85%	11.54%	46.15%	38.46%	0%
Recruitment	3.85%	0%	30.77%	23.08%	42.31%

**Table 3: Results of how satisfied students are with response time to questions/problems**

80 percent of the students reported that they completed the online orientation prior to beginning the program. The 20 percent who did not complete the orientation needs to be addressed since topics covered support student learning and provide explanation regarding policies. It is imperative that students complete the orientation to enter the program with an understanding of expectations and guidelines.

Initial feedback from faculty and staff were unfavorable. Questions related to academic freedom, copywrite of course materials, time required, compensation for course development, who was going to teach these courses were voiced by faculty. Formatting concerns, time constraints for turnaround of a Quality Matters review were voiced by personnel in the Department of Online Learning. Communication, or lack of, was an initial issue. Who, what and when students were being advised and contacted related to academic grading/issues were concerns voiced by the institutions advisors and retention personnel. There were classes of students that were recruited and advised by D’Youville personnel and faculty for four to six months, but would be advised OPM personnel and receiving the contracted payment for the remaining courses.

The experiences and interactions between D’Youville and the contracted OPM is one year into the relationship. This is too early to determine the success related to increased enrolment and student satisfaction, and student retention.

**Recommendations**

The research and feedback supported the importance of communication, clarification, and transparency with interaction with OPMs. When working with an OPM it would be recommended to have a complete



understanding of the contract between the OPM and the Institution. The inclusion of all stakeholders in the decision-making process is imperative which would include Front-line staff, and Middle-management; Faculty, Online Learning, LMS Administrators, Information Technology (ERP administrators), Financial Personal, Advisors, Marketing, Admissions, Retention Services, Student Accounts, Financial Aid, and the programs that will be affected. Contact with the other OPM's institutions is imperative to the process to determine best practices, and how their implementation took place.

The next step would be to document each department processes and responsibilities, to ensure the transition is smooth. The addition of the stakeholders will enhance the transition and would be the point at which you can diagram the current process institution-wide. Working with those processes and the way in which the OPM wants to work, develop a combined effort approach to streamline the processes. Involvement from the faculty is imperative for successful cooperation from the various programs to provide advice on retention aspects.

Before the institution initiates the OPM's curriculum team, it is imperative that there is a complete understanding of the process; with clarification as to who is responsible for what and the timeline. Determine if there is going to be a best practice template, utilization of Quality Matters and/or Online Learning Consortium practices, adherence to Americans with Disabilities compliance (American's with Disabilities Act of 1990), copyright, union contracts or academic year requirements. Faculty and/or faculty unions need to participate in each of the curriculum meetings to ensure they are involved in the overall process. If faculty are not involved, there could be union issues and work stoppages. When this takes place, this will prolong the onboarding process of the OPM and add confusion. D'Youville is a unionized institution and faculty are diligent regarding their Intellectual Property.

## Conclusion

The primary objective of this study was to determine student satisfaction following an OPM assuming the role of recruitment and advisement. The researchers questioned the impact of the OPM on student support. Based on the data collected from the MBA student survey, they did not report any difference between the college personnel versus the OPM personnel in the recruitment, advisement. Students seemed not to be impacted positively or negatively when an OPM is involved.

The results from the MBA student survey, in combination with verbal feedback from faculty and staff provided ideas and initiatives to immediately improve the student, faculty, and staff experience. Areas such as requiring students to complete the orientation prior to beginning any coursework is imperative, communication between OPMs and / or the institution need to be responsive to the student, and assessment by the institution should be continual. Communication and planning is integral in the all stages of partnering with an OPM. Having thought-provoking conversations with stakeholders prior to submitting an RFP will make the process more productive and effective. Institutions need to understand the commitment they are making with an OPM and the impact on stakeholders. Time needs to be taken for due diligence prior to the signing of contracts that could last as long as seven years.



Including stakeholders who are developing and supporting the online courses is integral. It is important that universities enter into the agreements with OPMs have the CFO and legal counsel fully review the contract. Including all stakeholders is imperative to a successful partnership. Individuals associated with online learning need to embrace change and be flexible. Many institutions choose not to partner with an OPM, instead they use internal talent to administer and grow. These institutions hire experts in specific areas that they require additional support and knowledge. They invest in training current employees and faculty in current online technologies and learning methodologies. These institutions maintain autonomy and accountability internally without compensating an outside entity who could impact success. 100 percent of the tuition dollars stay with the institution.

OPM's, as for-profit organizations, incorporate a strategy which could be inconsistent with the mission and vision of the college or university. For institutions considering partnering with an OPM, due diligence is imperative. Sharing responsibility with an OPM can provide the support an institution may not possess internally, providing growth and financial gain. However, this could come at a cost of autonomy. It is important to look at the return on the investment, the cost of implementation, and the effects on the organization. A decision this significant should be well researched and thought out.

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## Effect of Customer Based Brand Equity on M- Service Adoption: A Case of Undergraduates of the Open University of Sri Lanka

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### Abstract

Consumer based brand equity is an increasingly popular philotra in the context of m - service since it is one of the market-based assets for a business organisation. The literature identifies that brand equity has an effect on consumer behavior, but the effect of consumer-based brand equity on m - service adoption is limited. Therefore, the purpose of this study is to investigate the effect of consumer-based brand equity on consumer mobile services (m - services) adoption; using a case of undergraduate students at the Open University in Sri Lanka. Consumer based brand equity construct was operationalised using Brand Loyalty (BL), Perceived Quality (PQ), Brand Awareness (BA), and Brand Association (BAS). Brand adoption was operationalized using four variables: Satisfaction with Service Provider (SSP), Intention to Use (IU), Actual Use Behaviour (AUB) and Trust (TR) in the service provider. The research design is conclusive and single cross sectional in nature. Convenience non-random sampling technique was utilized, and data was collected via a researcher administrated questionnaire. A total of 285 respondents were surveyed. Analysis involved statistical models such as validity and reliability. This study proposed a model to investigate the link between brand equity and m service adoption. Further, Partial Least Square (PLS) modeling technique was used to analyse the causal relationship between consumer-based brand equity and the m-services adoption. The results indicated that consumer based brand equity has strong significant positive relationship with consumer m - services adoption. Further, multigroup analysis was performed to investigate whether the relationship between the brand equity and the m service adoption vary in terms of the brand name. The findings manifested that the relationship of brand equity and m service adoption differs in terms of the brand name. Finally, this study implies that business organisations should strategically improve the dimensions of the consumer-based brand equity to increase the m services adoption among undergraduates at the Open University of Sri Lanka.

**Keywords:** Brand Equity, M – Services Adoption, Open University of Sri Lanka

### Introduction

In the context of the mobile services (m-services) sector, the construct of brand equity have been investigated as different notions. Thus, studies on the link between customer-based brand equity and customer adoption in the m-services sector is limited (Li & Wang, 2012). Scharl et.al, as cited in Li & Wang (2012), revealed that



mobile technology is becoming increasingly attractive due to the flexible, ubiquitous access to the internet. Initially, mobile services include voice and text messaging. Today these facilities are available with all mobile phones. Further, mobile communication technologies have one of the highest rate of penetration in consumer markets around the world (Mao, Strite, Thatcher & Yaprak, 2005). Supporting the fact that mobile technology has a greater reach than any other technology around the world, in 2018, there were 5.135 billion unique mobile phone users in the world. That is 68 percent penetration over the global population (Global Digital Report, 2018). According to The Mobile Economy (2018), there will be three SIM cards for every two subscribers by 2020. In other words, in the future there will be three SIM cards for every two customers. In the mobile services market in Sri Lanka, the number of mobile subscriptions in Sri Lanka has been at 28.2 million (Gunewardene, 2017). Further, Sri Lanka Central Bank Report (2018) has revealed that mobile phone penetration is 161.6 percent for 100 individuals while internet penetration is 33.5 percent for 100 people. This implies that market penetration of mobile services in Sri Lanka is higher than the global mobile services market. Furthermore, Liyanage (2015) has pointed out that university students spend around two hours daily making phone calls and send 50 to 100 SMS. This indicates the importance of studying undergraduates' m-service adoption behaviour in the perspective of consumer based brand equity. Brand equity refers to the measuring how much a brand is worth.

Aaker (1996) has pointed out the importance of developing brand equity to support corporate success, as it can be used as a point of differentiation that leads to competitive advantages based on non-monetary. Moreover, identifying the sources and development of brand equity, and how it affects consumer purchasing decisions have been widely researched by many scholars (Voorveld, Neijens & Smit, 2009; Yoo, Donthu & Lee, 2000). However, in the context of m-services, there have been a limited number of studies conducted on brand adoption as a consequence of brand equity (Li & Wang, 2012). Consumer adoption is an individual's decision to be a regular user of a product. It is followed by a consumer loyalty process (Kotler, Keller, Koshy & Jha, 2014). Thus, this study addresses the research question of 'What Extent Does Brand Equity Effect Brands of M-Service Adoption among Undergraduate Students in Sri Lanka: A Case of the Open University of Sri Lanka'. Therefore, the objectives of this study are two fold 1) to investigate the effect of consumer based brand equity on m-services adoption; 2) to compare the strength of the relationship between consumer based brand equity on m-services adoption in terms of the brand name.

## Literature review

### *Defining Brand, Branding and Brand Equity*

According to the American Marketing Association, "a brand is a name, term, sign, symbol or design, or a combination of them, intended to identify the goods or services of one seller and differentiate them from those of competitors" (Kotler et al., 2014). Therefore, brand is a product or a service in which features or attributes are different in the ways of functional, rational or tangible related to a products performances from another product or service whose features are designed to satisfy the same need. This indicates that a brand is any method of distinguishing one product from the rest of the competitive products which designed to satisfy same need.



Branding is empowering products and services using the power of a brand (Kotler et al., 2014). Therefore, it creates cognition that organizes their knowledge of products in a way that explains their decisions as rational and, in the process, it provides values to the firm. In a particular product category, brand value can be created if consumers are convinced that there are meaningful differences among brands.

Brand equity measures how much a brand is worth. It is considered an important topic in the field of business and the appropriate measures are concerned by marketing and brand managers (Agarwal & Vithala, 1996). Further, brand equity is a multi-dimensional construct (Li & Wang, 2012). It shows how consumers think, feel and act with respect to a brand, prices, market share, and profitability the brands lead. There are different perspectives used to study brand equity such as consumer perspectives and financial perspectives (Kotler, et al., 2014).

Yoo & Donthu (2001) define brand equity in the perspective of consumer - based brand equity as when both the focal brand and unbranded product have the similar level of marketing stimuli and product attributes with the difference between consumers' response on them being brand equity. The difference in consumer response can be delegated to the brand name and it reveals the impact of the long-term marketing efforts invested into the brand. According to Keller (1993), "brand equity is a set of brand assets and liabilities linked to a brand, its name and symbol that add to or subtracted from the value provided by a product or service to a firm and/or to that firm's customers". These definitions reflect that consumer based brand equity is a value or asset generated through consumer perceptions regarding a brand name. Further, it is either an individual or an organization which identifies that brand equity lies in what customers have seen, read, heard, learned, thought, and felt about the brand over time (Kotler et al., 2014). Thus, the responses from different customers are based on their knowledge about a brand. Hence, brand equity can be either positive or negative. As Keller (1993) explained there are three ingredients of customer-based brand equity. These are:

1. Brand equity generates from differences in consumer responses, therefore, if there are no differences in responses the brand name of the product is essentially a commodity and competition is on the price of the product.
2. Differences in the responses of customers due to the brand knowledge.
3. Brand equity reflects the perceptions, preferences, and behaviour related to all aspects of the marketing of a brand.

Further, in the marketing literature, operationalization of brand equity is categorized into two sets as consumer perceptions (brand awareness, associations and perceived quality) and consumer behaviour (brand loyalty, willingness to pay a high price). Moreover, there are advantages of both attitudinal dimensions and action dimensions of brand equity since only measuring using attitudinal dimensions are poor predictors of behaviour in the market place. Aaker (1996) identified brand equity dimensions as brand awareness, perceived quality, brand associations, brand loyalty and other proprietary assets. Moreover, different scholars have adopted these dimensions to measure the consumer -based brand equity (e.g: Yoo et al. ,2000; Kim et.al., 2009; Lee & Back, 2010; Kim & Hyun, 2011; Wang & Li ,2012). In this study, brand awareness, perceived quality, brand associations, brand loyalty were used to measure brand equity in the m-services among undergraduates in the Open University of Sri Lanka.



### *Brand Loyalty*

Brand loyalty is the core dimension of brand equity. When brand equity is mismanaged, it goes to the heart of the customer relationship which might affect loyalty (Aaker, 1996). Brand loyalty is a deeply held long-term commitment to consistently repurchase or re-patronize a product/service of the same brand, free from the effects of situational factors and marketing efforts that have the potential to result in switching behaviors (Aaker, 1996; Baker, Sciglimpaglia & Saghafi, 2010; Wang & Li; 2012).

### *Perceived Quality*

Perceived quality is one of the key dimensions of brand equity. It refers as a competitor frame of reference (Aaker, 1996). It is a consumer's evaluation of a recent consumption experience regarding a product's overall excellence (Aaker, 1996; Baker et al., 2010).

### *Brand Associations*

Brand associations involve image dimensions that are distinctive to a class of a product or to a brand. It can be structured in three perspectives a) brand as a product (value) b) brand as a person (brand personality) c) brand as an organisation (organisational associations) (Aaker, 1996). Also, anything that includes attributes of a product/service, reputation of a company, and characteristics of product/service users, which is linked to consumer memory to a brand (Aaker, 1996; Baker et al., 2010; Wang & Li, 2012).

### *Brand Awareness*

Brand awareness is a variable and an important dimension which is sometimes undervalued in brand equity. Awareness affects perceptions and attitudes. In certain situations, it can lead to brand choice and loyalty. Brand awareness indicates the prominence of the mind of the customer. There are levels of awareness as recognition, recall, top of mind, brand dominance, brand knowledge and brand opinion (Aaker, 1996). The strength of the trace of a brand in consumer memory, is reflected by the consumers' ability to identify the brand under different conditions (Aaker, 1996; Baker et al., 2010; Wang & Li; 2012).

### *Consumer Adoption of M-Services*

The consumer adoption process is the mental steps through which some individual passes from first hearing about an innovation to final adoption. It has five steps which are awareness, interest, evolution, trial, and adoption. Factors influencing the adoption process differs depending on individual readiness to try new products, effect of personal influence, differing rates of adoption, and differences in organizations' readiness to try new products (Kotler, et al. 2014). Further, there is no universally accepted model to interpret the process an individual engages before adopting a new innovation. The term of adoption is interpreted as a kind of behaviour change (Sträub, 2009).

### *M-Service Adoption*

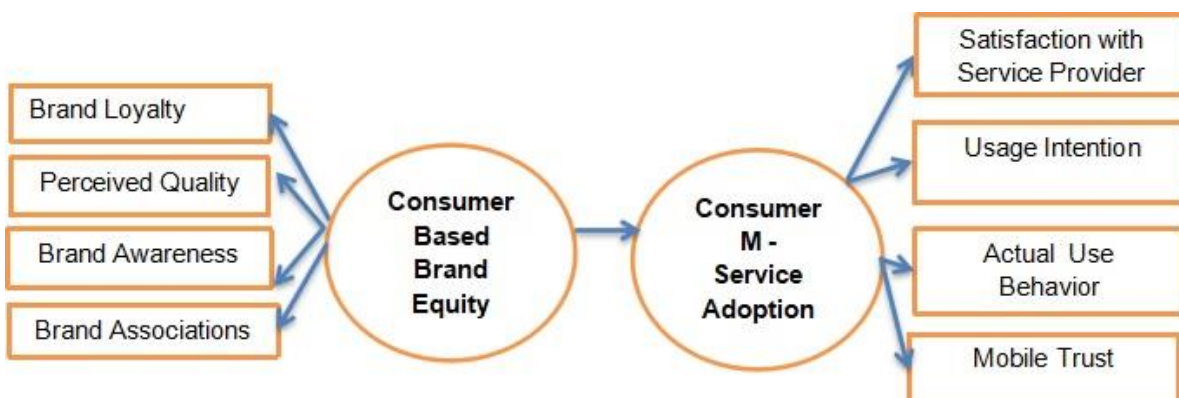
M-service adoption and acceptance issues have a significant impact on practices on business and personal communication individual levels around the world (Mao, Srite, Thatcher & Yaprak, 2005). Li & Wang (2012) has mentioned that there have been many research studies on factors influencing m-service adoption focusing customer satisfaction, loyalty, intention to use or intention to repurchase. There are different theories that are widely used or extended by adding variables in investigating the consumer adoption of m-



services such as Technology Acceptance Model (TAM) (Davis, Bagozzi, &Warshaw, (1989), Theory of Diffusion of Innovations (DIT) by Rogers in 1995, Theory of Reasonable Action (TRA) (Fishbein & Ajzen,1975), Expectancy Disconfirmation Model (EDM) (Oliver, 1980), the trust theories (Kim, Shin & Lee, 2009) and cultural theories (Hofstede, 2001). However, there are no universally accepted dimensions to operationalise the customer adoption of m-services construct. Different scholars have used different perspectives and indicators to measure the mobile phone adoption (Wang & Li, 2012).

Wang and Li (2012) list down different dimensions investigated to measure the consumer adoption (Appendix I). This study tried fill this gap by studying the consumer m-service adoption by integrating the TAM model, Expectancy and Disconfirmation model by selecting consumer adoption of mobile services as actual use behaviour (Lu &Su, 2009), satisfaction (Tong, Hong & Tam, 2006) usage intention (Richard & Meuli, 2013), and mobile trust (Kim, Shin & Lee, 2009). Satisfaction is a function of the customer expectation and product’s perceived performance (Kotler, et al., 2014). Thus, if a product or brand meet expectations, the consumer is satisfied. If a brand is not meeting expectations the customer is dissatisfied. Consumers make expectations about a product/service even before making the purchase decision and after the purchase. Based on experience of the product, the customer develops perceptions about its performance. This directs consumers to confirm or dis-confirm the repurchase expectations (Tong, Hong & Tam, 2006). According to Ajzen (1991), attitudes towards a particular behaviour is an individual level of interest towards that particular behaviour. Arts, Frambach and Bijmolt (2011) has pointed out the important differences across intention and actual innovation adoption behavior.

Trust is a mental anticipation that the trusted party will not take advantage of the trust (Buduchi, 2005). This indicates that there is dependency between trusting parties in Mobile trust. Mobile Trust is a continual issue in various relationships such as interpersonal and business relationships (Kim, Shin & Lee, 2009). According to Figure 1, there are two latent variables as Consumer based Brand Equity and Consumer Adoption. Consumer based Brand Equity is the independent variable and Consumer Adoption is the dependent variable. Thus, in this model, Consumer Based Brand Equity is determined by Brand Loyalty (BL), Perceived Quality (PQ), Brand Awareness (BA), and Brand Association (BAs). Consumer Adoption is determined by Actual Use Behavior (AUB), Satisfaction with Service Provider (SSP), Usage Intention (UI) and Mobile Trust (MT). Therefore, the conceptual framework of the study is as follows.



**Figure 1: Conceptual Framework**

- H1: Brand Awareness positively influences on Consumer based Brand Equity  
H2: Brand Association positively influences on Consumer based Brand Equity  
H3: Brand Loyalty positively influences on Consumer based Brand Equity  
H4: Brand Associations positively influences on Consumer based Brand Equity  
H5: Brand Equity has a significant positive effect on Consumer – M-Service Adoption  
H6: Actual Use Behaviour has a positive influence on Consumer – M-Service Adoption  
H7: Mobile Trust has a positive influence on Consumer – M-Service Adoption  
H8: Satisfaction with Service Provider has a positive influence on Consumer: M-Service Adoption  
H9: Usage Intention has a positive influence on Consumer – M-Service Adoption  
H10: The effect of Consumer based Brand Equity on Consumer – M-Service Adoption vary with the m service brand.

## Methodology

### *Research Design*

This study attempted to investigate the effect of level of brand equity on mobile service adoption among undergraduates at the Open university of Sri Lanka. Therefore, quantitative approaches were adopted to measure brand equity and its effect on m-service adoption. Thus, this research design is a conclusive, single cross sectional descriptive and a sample survey technique was used for the data collection. According to the Open University Annual report (2016) there were 22456 undergraduates studying in five faculties such as Faculty of Education, Faculty of Engineering, Faculty of Natural Sciences, Faculty of Humanities and Social Sciences, Faculty of Health Sciences. The research questionnaire was initially developed and a pilot survey was carried out on a sample of 80 students ( $n = 80$ ) at the Colombo regional center of the Open university of Sri Lanka. Results of the pilot study were used to make improvements to the final survey questionnaire where appropriate. Non random, convenience sampling technique was used to select the participants. A self-administrated questionnaire was distributed among four hundred ( $n = 400$ ) undergraduates. Two hundred and five ( $n=285$ ) questionnaires were returned which was average response rate of 71.25%.

### *Operationalisation*

The consumer based brand equity construct was operationalized based on Aaker's (1996) brand equity (BE) dimensions such as; brand awareness (BA), perceived quality (PQ), brand associations (BAs), and brand loyalty (BL). Indicators were then developed to measure each dimension of the BE construct. BA was measured using six indicators, PQ was measured using six indicators, BAs using five indicators and BL using six indicators. Mobile service adoption was measured using four dimensions (Wang & Li, 2012) such as Satisfaction with service provider (SSP), Intention to use (IU), Actual use behaviour (AUB) and Mobile trust (MT). Satisfaction with service provider (SSP) was measured using nine indicators, Intention to use (IU) was measured using six indicators, AUB using three indicators and MT using eight indicators. Therefore, initially there were 23 indicators to measure the consumer based brand equity. Further, customer adoption of m-service was measured using 26 indicators. Participants were instructed to state their degree of agreement on each statement using non-comparative itemized 7-point scale. Table 1 depicts the descriptive statistics on respondents use of m services including brand name, type of phone, package type as follows.

M Services Characteristics		Number	Percentage
Brands	Dialog	118	41.4
	Mobitel	101	35.4
	Hutch	16	5.6
	Airtel	43	15.1
	Etisalat	8	2.5
Type of Phone	Smart	243	85.3
	Ordinary	42	14.7
Package	Prepaid	229	80.4
	Postpaid	56	19.6

**Table 1: M-Services Characteristics**

Table 2 shows the demographic characteristics of the respondents including age, gender, hometown, and monthly spending on mobile services as follows.

Characteristics		Number	Percentage
Age	20-24	84	29.5
	25-29	140	49.1
	30-34	30	10.5
	35-39	20	7.0
	40-44	11	3.9
Gender	Male	142	49.8
	Female	143	50.2
Hometown	Colombo	139	48.8
	Kalutara	32	11.2
	Matara	26	9.1
	Kandy	23	8.1
	Gampaha	30	10.5
	Other	35	12.3
Spending on Mobile	0-500	121	42.5
	501-1000	114	40
	1001-1500	16	5.6
	1501-2000	14	4.9
	2001-2500	5	1.8
	More than 2501	15	5

**Table 2: Demographic Characteristics of the Sample**



### Measurement Assessment

To assess the reliability and validity of measurement properties, confirmatory factor analysis(CFA) ensured that all the dimensions of brand equity and customer m- service adoption construct comprised the content validity. Content validity refers to the measure consists adequate set of items to measure the domain of the concept (Malhotra, 2007). As shown in Table 3, all dimensions are with Cronbach Alpha (in the range of 0.784 to 0.932) and Composite reliability (CR) (in the range of 0.874 to 0.944) are above the standard value of 0.7. Therefore, the reliability of the measurement properties was established. Convergent validity refers to the degree to which a dimension of the construct differs to other dimensions which measure the same construct. Composite Reliability (CR) estimation and Average Variance Extracted (AVE) values for dimensions of brand equity and m- service adoption were greater than 0.5. Therefore, convergent validity of the study model was achieved. Discriminant validity was carried out to ensure the theoretically un-relatedness of the indicators. Table 04 shows that AVE estimates are greater than the shared variance ( $r^2$ ) estimations. Therefore, discriminant validity was established for all dimensions.

Dimension	Cronbach's Alpha	Items Deleted	Composite Reliability	Average Variance Extracted (AVE)
BA	0.784	BA1,BA3, BA6	0.874	0.698
BA <sub>s</sub>	0.899	BA <sub>s</sub> 1	0.925	0.712
BL	0.819	BL5,BL6	0.881	0.650
PQ	0.840	PQ1	0.887	0.611
AUB	0.793		0.877	0.707
MT	0.884	MT5, MT7, MT8	0.915	0.683
SSP	0.932	SSP2	0.944	0.678
UI	0.892		0.925	0.755

**Table 3: Cronbach Alpha, Composite Reliability and AVE**

Dimension	BAT <sub>a</sub>	BA <sub>s</sub>	BL	PQ	AUB	MT	SSP	UI
BA	0.698							
BA <sub>s</sub>	0.52	0.712						
BL	0.329	0.518	0.650					
PQ	0.316	0.365	0.36	0.611				
AUB	0.26	0.341	0.451	0.45	0.707			
MT	0.326	0.303	0.385	0.385	0.326	0.683		
SSP	0.361	0.463	0.402	0.302	0.386	0.386	0.678	
UI	0.44	0.429	0.456	0.46	0.281	0.589	0.489	0.755

**Table 4: Discriminant Validity**

## Results

To assess the effect of brand equity on customer m-service adoption, structure model for the hypotheses testing partial least squares (PLS path modeling) was chosen to test the proposed model. According to Barroso, Carrion and Roldan (Hsiao, 2016) PLS might be a strong method since it has the least demands regarding measurement scales, sample size and residual distributions. The results of the analysis depict the Table 5 and Figure 1.

Hypotheses	Path Coefficient		T Statistics ( O/STDEV )	P Values	R <sup>2</sup>
H1	BE -> BA	0.815	33.641	0.000	0.664
H2	BE -> BAs	0.797	38.069	0.000	0.636
H3	BE -> BL	0.879	40.153	0.000	0.694
H4	BE -> PQ	0.838	70.081	0.000	0.772
H5	BE -> MSA	0.833	38.792	0.000	0.702
H6	MSA -> AUB	0.797	29.475	0.000	0.636
H7	MSA -> MT	0.738	22.985	0.000	0.554
H8	MSA -> SSP	0.909	98.052	0.000	0.827
H9	MSA -> UI	0.88	50.953	0.000	0.774

**Table 5: Path Coefficients and t values**

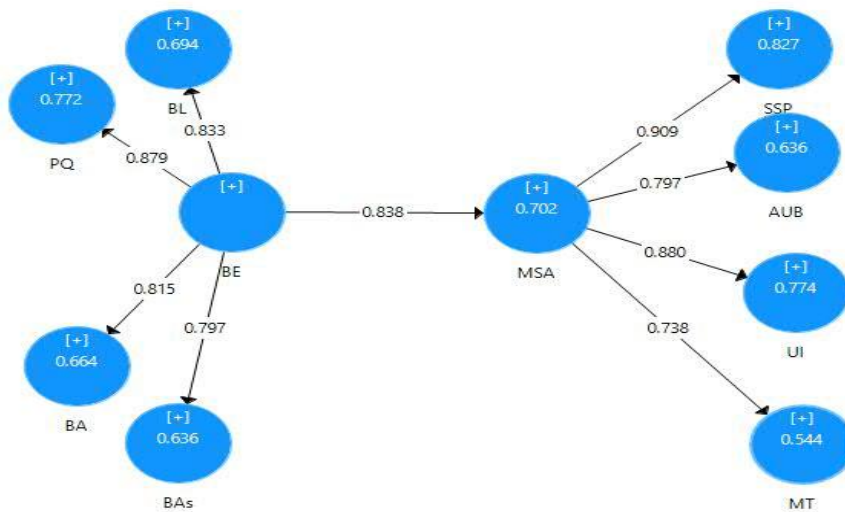
According to Table 5, all hypothesized paths were significant, customer m service adoption was determined by brand equity (H5) at the significant level of 0.005 ( $\beta = 0.833$ ,  $t = 38.792$ ), H5 was supported. Brand awareness is a strong reflector of Brand equity with  $\beta = 0.815$  and  $t = 33.641$  at significant level of 0.005. Therefore, H1 is supported while Brand Association is also a strong reflector of Brand equity with  $\beta = 0.797$  and  $t = 38.069$  at significant level of 0.005. Therefore, H2 is supported. Brand loyalty with  $\beta = 0.879$  and  $t = 40.153$  at significant level of 0.005. Thus, H3 is supported. Perceived Quality with  $\beta = 0.838$  and  $t = 70.081$  at significant level of 0.005. Thus, H4 is supported.

Further, dimensions of customer m service adoption such as Actual use behaviour ( $\beta = 0.797$ ,  $t = 29.985$ ), Mobile trust ( $\beta = 0.738$ ,  $t = 22.985$ ), Satisfaction with service provider ( $\beta = 0.909$ ,  $t = 98.052$ ), Use intention ( $\beta = 0.88$ ,  $t = 50.953$ ) at significant level of 0.005. Thus, this indicated that H6,H7, H8,H9 were supported.

According to Table 5 results depict that the direct effect of brand equity on the customer m service adoption is positive and in terms of variance explained, the brand equity explained 70.2 ( $R^2 = 0.702$ ) percent of variance of the customer m service adoption. Further, in this model variance explained by Brand awareness was 66.4 percent ( $R^2 = 0.664$ ) whereas Brand Association was 63.6 percent ( $R^2 = 0.636$ ), Perceived Quality was 77.2 percent ( $R^2 = 0.772$ ), and Brand Loyalty was 69.4 percent ( $R^2 = 0.674$ ) at significant level of 0.005.



Further, customer m-service adoption dimensions were explained as Actual use behaviour was 63.4 percent ( $R^2=0.634$ ), Mobile trust was 54.4 percent ( $R^2=0.554$ ), Satisfaction with service provider was 82.7 percent ( $R^2=0.827$ ), Use intention was 77.4 percent ( $R^2=0.774$ ) at significant level of 0.005.



**Figure 1: Path coefficients and R<sup>2</sup> Values of the model**

To assess the second objective of the study, multi-group analysis was performed. Table 7 shows the results as follows (Appendix III). It shows that all the path coefficients and t values were significant for all the brands other than the brand association of Airtel brand which has insignificant influence on brand equity of Airtel ( $0.161 > 0.05$ ). Therefore, H10 is supported. The relationship between the brand equity and the m service adoption vary with the brand.

Further, analysing the level of brand equity in terms of m-service brands in Table 8, 79 (67%) consumers rated Dialog brand as having a high level of brand equity, while 33 (28%) consumers were having a moderate level of brand equity. 6 (5%) consumers rated their brand perception as low. For Mobitel brand, 77 (77.20%) consumers rated the brand as having a high level of brand equity. 18.81% consumers reported a moderate level of brand equity. 4 (3.9%) of consumers rated their brand perception as low. For Hutch brand, 14 (87.5%) consumers rated the brand as having a high level of brand equity while 2 (14.28%) consumers reported a moderate level of brand equity. For Airtel, 40 (93.03%) of consumers rated, as Hutch brand, a high level of brand equity, whereas 3 (6.97%) consumers reported a moderate level of brand equity.

Brand	Brand Equity			Total
	Low	Moderate	High	
Dialog	6	33	79	118
Mobitel	4	19	78	101

Hutch	0	2	14	16
Airtel	0	3	40	43
Etisalat	0	0	7	7
Total	10	57	218	285

**Table 8: Level of Brand Equity among Brands in Sri Lankan Market**

Mean Value Range	Level of Satisfaction
1- 3.59	Low
3.6 – 5.59	Moderate
5.6 - 7	High

**Table 9: Mean Value Range**

## Discussion and Conclusion

The purpose of this study was to investigate the effect of the consumer-based brand equity on m-service adoption among undergraduates as a case study of the Open University of Sri Lanka. Therefore, the current study has explored the consumer-based brand equity in consumer behaviour using survey data to fill the gap in the consumer behaviour research on the linkage between consumer based brand equity and brand adoption. Based on the empirical results key findings of this study were 1) consumer based brand equity has a significant positive relationship with consumer m services adoption; 2) the relationship between brand equity and the brand adoption vary on the brand name; 3) the dimensions identified to measure the brand equity (Brand loyalty, Brand Awareness, Brand Association, Perceived Quality) and m-service adoption (Satisfaction with Service Provider, Intention to Use, Mobile Trust and Actual Use Behaviour) have a significant influence of on each construct.

First, the issues of brand equity in m-services context have been paid very limited attention in the marketing literature (Wang & Li, 2012). Therefore, this study contributes to fill this gap. Wang & Li in their study measured brand equity using factors such as brand loyalty, brand associations, brand awareness and perceived quality. Further, they found out that brand loyalty and brand associations have a higher effect on brand equity than the perceived quality and brand awareness. Whereas in this study Perceived Quality has the highest effect followed by the Brand Loyalty. Aaker (1996) pointed out that higher perceived quality related to credible brands can increase the consumer evaluations of the brands and it is a reliable predictor of purchase history. Further, this implies that consumer perceptions are clearly predict the behaviour of brand equity.

Further this study contributes to the brand adoption literature, by identifying dimensions of the consumer m-service adoption. Most of the studies focused on purchase intention (eg; Wang & Li, 2012) to measure the adoption behaviour. But in this study, the researcher used multiple dimensions as satisfaction with the service provider, use intention, actual purchase behaviour and mobile trust.



### *Implications of the Theory*

The implication to the theory lies on this study since this study has taken the effort of the linking abstract concepts such as brand equity and brand adoption. Brand equity is considered a very important element in corporate success. Therefore, identifying consequences of brand equity is vital. This study investigated both attitudinal and action notions of the construct of brand equity. Further, TAM model and Expectancy Disconfirmation model were used to identify the dimensions of consumer m-service adoption. Most of the scholars have used dimensions of TMA models as the dimensions of the consumer m-service adoption (e.g: Wang & Li, 2012; Walgren, Ruble & Donthu, 1995). In this study, the researcher proposes four dimensions for the consumer m-service adoption as Satisfaction with the Service Provider, Use Intention, Actual Purchase Behaviour and Mobile Trust.

### *Implications to Practice*

This study identifies the university undergraduates' perception on five different m-service providing brands in Sri Lankan telecommunication sector. Further, this study compares the relationship between the brand equity and m-service adoption between the brands. This provides implications that brand equity varies with the brand name. Therefore, m-services providers can get the insight on how they should manage this relationship. Further, this study provides implications for getting the competitive advantage in the industry, even though, m-service attributes are not investigated in this study. Furthermore the sample profile of the study provides insight on the undergraduate market for m-service brands and data on characteristic of the mobile service usage also provides implications on the telecommunication market in Sri Lanka. These will be useful to m-service providers to make strategic plans to overcome the competition in the market.

In conclusion this study has several limitations. The limitations of the study relate to the scope of the study, which represents the undergraduate students from the Colombo regional center of the Open University Sri Lanka. Therefore, the perceptions of brands from the other regional and study centers are not considered. Further, the study was conducted using a structured questionnaire. Therefore, psychological and behavioral implications on brand equity and m-service adoption could not be captured. Furthermore, the number of respondents was selected based on convenience sampling technique. Therefore, the number of respondents from Engineering, Natural Sciences and Education were low. Another limitation is the lack of formally recorded sources of past research studies on brand adoption in Sri Lanka. This created a limitation on identifying the dimensions of brand equity and consumer m service adoption in relation to Sri Lankan m services sector.

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**Appendix 1**

Theoretical base	Adoption Measure	Literature
TAM	Intention to Use, Actual Use behaviour	Li & Yeh, 2010; Liu et al. 2010; Lu & Su, 2009; Ko et al. 2009; Schierz et al. 2010; Wang et al. 2006
ISSM	Satisfaction, Actual Use Behaviour	Kim et al. 2009a; Lee & Chung, 2009;
EDM	Satisfaction, Continued Usage Intention	Tong et al., 2006
Trust Related Theories	Usage Intention, Mobile Trust	Kim et al., 2009b; Lin, 2011
Culture related Theories	Satisfaction, Continued Usage Intention	Koa, 2009; Lee et al. 2007

**Source: Summary of existing studies of M-Service Adoption ( Wang & Li, 2012)**

**Appendix A MBA Student Survey**

Thank you for taking the time to complete this survey! A few important things to know: the survey takes approximately 5 minutes (8 questions) and you can choose to withdraw from this research/survey at any time by not completing/submitted the survey. Your responses are important and will assist in providing information to improve the program.



For Confidentiality purposes: DO NOT place any identifying marks, ie, your name in order to maintain confidentiality.

1. When did you begin the MBA program (check one)?
  - Spring 2017
  - Fall 2017
  - Spring 2018
  - Fall 2018
  - Spring 2019
  
2. What is the name of your advisor? (please don't "look this up", include if you know who it is)
 

\_\_\_\_\_

No idea
  
3. Did you complete the online orientation?
  - Yes
  - No
  
4. Have you had problems / issues in any of the following areas? (check all that apply)
  - Obtaining textbooks, online and course supplemental materials (ie: products from publisher)
  - Using online and course supplemental materials (ie: My Business Course, products from publisher)
  - Registration/Registering for classes
  - Advisement
  - Recruitment
  - Canvas
  
5. What area(s) do you find challenging in the MBA program to date (note all that apply)
  - Time management
  - Organization
  - Assignments
  - Understanding course content
  - Navigating the online learning management system (Canvas)
  - Other \_\_\_\_\_

6. How satisfied are you with the level of support you have received?

	1	2	3	4
	Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied

- Faculty
- Advisor
- Technology Support
- Registration
- Recruitment





7. How satisfied are you with the response time if you had questions/encountered problems

1	2	3	4
Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied

Faculty  
Advisor  
Technology Support  
Registration  
Recruitment

8. Were the answers you received satisfactory?

1	2	3	4
Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied

Faculty  
Advisor  
Technology Support  
Registration  
Recruitment

## Research on Mobile Learning in Open and Distance Education-based on Electrical and Electronic Technology course of Jiangsu Open University

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### Abstract

Open and distance education learning supporting service is the foundation of open education and also an important guarantee for students to learn. Traditional learning supporting service has some limitations. For example, it is sometimes difficult to explain complex knowledge or skills in time, hard to achieve personalized learning needs, etc. Mobile learning makes up for the shortcomings of traditional learning supporting services, teaching content is seamlessly embedded into the teaching activities, and the participants actively participate in the learning of the content and promote the construction of personalized knowledge during the interaction process. In this paper, the specific application mode of mobile learning in distance education is deeply studied. Based on the open learning platform of Jiangsu Open University, taking the course of "Electrical and Electronic Technology" of Jiangsu Open University as an example, this paper researched the resources of mobile learning platform, the implementation of mobile learning, the advantages of mobile learning in Jiangsu Open University, and analyzed the problems in mobile learning of open and distance education and gave corresponding solutions. The paper explores the use of wireless communication networks to meet the individualized learning needs of students, builds an adaptive front-end display for different mobile terminal equipment platforms, and optimizes multimedia resources and teaching activities providing student-centered learning process, including collaborative learning and interactive learning, to meet the individualized learning needs of the students, such as the time and location of study, the content and style of learning, etc. It fully exerts the role of teachers in guiding, inspiring and monitoring the teaching process, and fully reflects the initiative, enthusiasm and creativity of students as the main body of the learning process, and promotes the application of mobile learning in distance education.

**Key Words:** Mobile Learning, Open and Distance Education, Open University

### Introduction

Traditional interactive learning limits the use of free time in study by adult in-service students, which restricts the development of distance education in the field of ubiquitous learning. Mobile Learning(M-Learning) refers to the use of wireless mobile networks, the Internet and multimedia technology, students and teachers can communicate through mobile terminals such as mobile phones, PAD, laptops and other convenient and



flexible interactive learning, as well as education, information exchange on science and technology(Chen,2018). Mobile learning is a new generation of distance education developed on the basis of E-Learning, with the help of mobile technology, which can provide learners with more convenient, flexible and effective learning methods. According to the Education Center for Applied Research, mobile smart terminals are more popular among college students, and 75% of surveyed students believe that smart terminals can help them participate in academic learning activities more efficiently. On January 22, 2019, Deloitte released the "2018 China Mobile Consumer Survey". The report (useit, 2019)shows that in 2018, the mobile phone holding rate of Chinese users ranked the first in the world, and the mobile phone holding rate of Chinese users amounted to 96%. The Deloitte report also noted that Chinese users spend more time on content than the global average. The popularity of smart phones has laid the foundation for mobile learning, and Internet-based mobile learning is becoming popular in universities. The mobile learning of Jiangsu Open University has experienced the following three stages: the first stage, computer-based online teaching; the second stage, based on QQ, WeChat and other chat platforms, this is the primary mobile learning; the third stage, based on the mobile learning APP.

## **The specific application mode of mobile learning in distance education**

### *2.1 Mobile learning based on Information push*

The text- and- image based learning content are sended to the student's mobile device through short messages, WAP, or something like these, this mobile learning model has been widely used. For example, in the "Form E-Learning to M-Learning" project in Europe, students of NKI Network Academy can download learning content such as preface, unit introduction, learning unit and other resources to mobile devices for offline learning(Paul,2007). The Westminster University in the United Kingdom has developed a multi-choice question-and-answer test system with automatic reply function. After the tester answers the test questions by SMS, the student can receive feedback such as the correct rate and receive the information of the subject of next lesson, and also the website information that need to be viewed in advance(Laura,2007).

### *2.2 Problem-solving mobile learning based on instant messaging*

Problem-solving mobile learning based on instant messaging supports students to use online computers, laptops and mobile phones for online learning. Students can log on to the mobile learning platform at any time and any place. Students can choose online courses, learn online, submit assignments, and participate. Through the mobile earning platform, students can also communicate with teachers and classmates online, view course schedule and academic feedback in time, and view the homework and test questions reviewed by the teacher in real time. The platform also helps students master the distribution of students' grades and provides knowledge points analysis for typical questions, supplemented by follow-up exercises, tests and Q&A.

### *2.3 Mobile Learning based on Mobile Learning APP*

Based on the mobile learning APP, students can watch the video teaching of the course anytime and anywhere, to achieve a true understanding and mastery of the course content. This learning mode is no longer a passive acceptance and infusion of knowledge. It focuses on the purpose, initiative, process and generative nature of learning.



The teaching content of the mobile learning platform of Jiangsu Open University is not a simple copy of the face-to-face course. Instead, it summarizes the face-to-face course, and then comprehensively summarizes and strengthens them to provide students with cognitive growth and knowledge construction.

#### *2.4 Mobile Learning based on Streaming Media Applications*

Traditional media learning resources cannot directly transfer to mobile learning platforms due to resource format, content size, and resolution. The development and application of streaming media technology are the guarantees of the convenience and interactivity of mobile learning. The mobile learner can watch the played audio, video, animation and other learning resources at a fixed time according to the program list through the streaming media technology in the form of broadcast. The streaming media in the form of broadcast is not convenient enough in terms of time and place, but the advantage is that network resources are saved. The on-demand streaming media technology is convenient for students to download or watch anytime and anywhere. It can be reused and has a high utilization rate. Its advantage is that the content form is flexible, and the teaching focus and difficulty can be made into simple and vivid multimedia learning resources(Chen,2016).

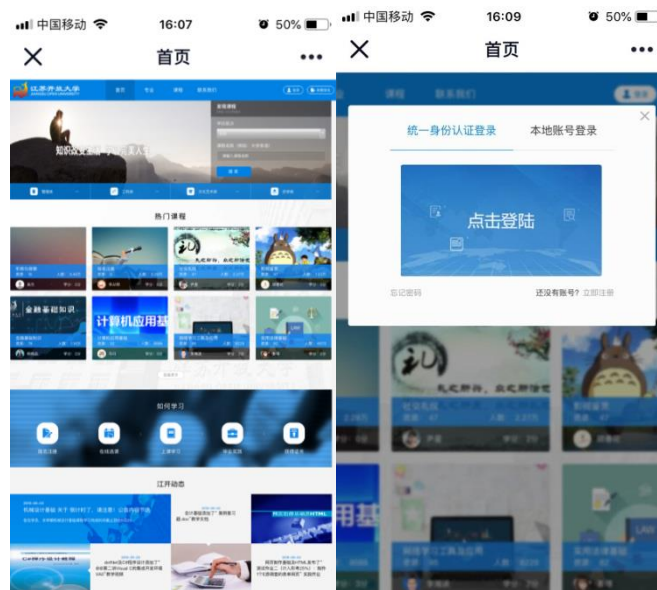
#### *2.5 Mobile learning based on Virtual reality*

Mobile learning based on virtual reality is a new type of mobile learning mode(Ou,2010). It is a new learning mode that combines distributed virtual reality technology and mobile learning technology. This model system consists of mobile learning and fixed learning, mobile learning resources, virtual reality networks, wireless communication networks, and mobile learning management systems. Students use wireless communication technology to complete data transmission through different mobile learning port to realize mobile virtual reality interaction. Learners can learn independently and collaboratively in virtual reality mobile learning. In the learning environment, learners can get a variety of information such as visual, auditory and even tactile in the context. The learner not only can bring the mobile device into the real learning environment, but also can use the simulation and demonstration functions of the mobile device.

### **Mobile Learning Platform of Jiangsu Open University**

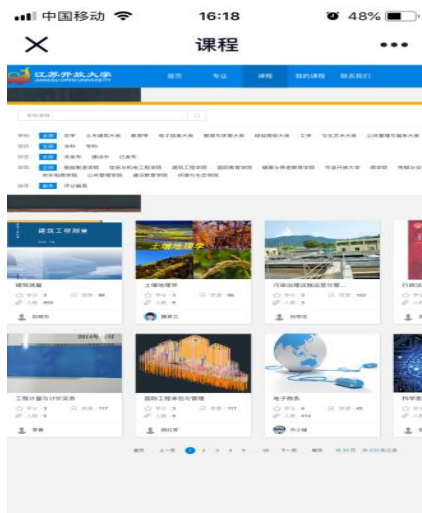
#### *3.1 Curriculum Resources of Jiangsu Open University*

Students can download and install the mobile learning app of Jiangsu Open University on mobile phones, PADs or laptops, so they can start learning anytime, anywhere, and participate in learning situations through interactive activities such as watching, hearing, touching, click, and so on. Taking the mobile phone as an example, the homepage of Jiangsu Open University Mobile Learning App is shown in Fig. 1.



**Fig.1 The homepage of Jiangsu Open University Mobile Learning App**

After the students of Jiangsu Open University register in the Learning Platform, courses can be selected online by “Major” or “Course”, as showed in Figures 2 and 3.



**Fig.2 Choose by major**



**Fig.3 Choose by course**

The learning platform of Jiangsu Open University integrates national high-quality education resources and provides complete teaching process resources, including video, text materials, multimedia courseware and online Q&A, and homework testing. On the mobile learning platform of Jiangsu Open University, students can enjoy the teaching style of famous teachers in well-known universities in China.

A scientific teaching organization contributes to the effective implementation of the learning process. The teaching organization of Jiangsu Open University is based on the curriculum, taking into consideration factors



such as the student's place of birth and employment, establishes an online learning class according to the student-teacher ratio of about 40:1. The class is divided into several groups according to the number of people. Each class has a fixed tutor, and the course tutor conducts online tutoring, group discussions, and one-on-one communication. The fixed and scientific student-teacher ratio, clear teacher-student relationship make up for the lack of teaching organization in mobile learning. Studying at Jiangsu Open Learning University's mobile learning platform, students can see the partners who are studying together online, as showed in Figure 4. This kind of learning is like learning in the classroom, there are classmates to study and communicate together, and they can help each other and make progress together.



**Fig.4 Partner studying together**

Through the ranking list, as showed in Fig. 5, students can know the learning situation of themselves and other students, and this can stimulate the mutual pride of students to learn from each other and make progress together.



**Fig. 5 Ranking list**

### 3.2 Course of Mobile Learning: Electric and Electronic Technology

#### Course Name: "Electrical and Electronic Technology"

This course is a basic technical course for mechatronics major, focusing on the theory and application of electrical and electronic technology. The students are mainly engaged in the technical, engineering and management personnel of engineering and technical positions such as electromechanical product design, processing technology, equipment design and testing for various electromechanical enterprises. The content of the course is closely related to the student's personal work experience and can continue to stimulate and sustain the student's motivation and interest in learning. Students can start learning anytime, anywhere.



Enter the "Electrical and Electronic Technology" home page, the learning resources are presented in Fig. 6.

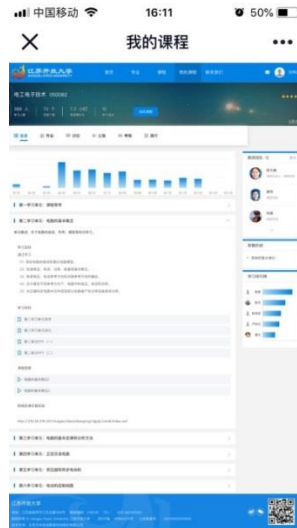


Fig. 6 Electric and Electronic Technology home page

Taking the fourth unit sinusoidal AC circuit as an example, the learning materials include the fourth unit learning guide, learning handouts, learning PPT, teaching video sinusoidal AC circuit, homework, learning exchange forum, lighting circuit simulation experiment, etc., as shown in Fig. 7.



Fig. 7 Contents of the fourth unit of the Electrical and Electronic Technology



Students watch the videos to master the key points and difficulties. Experiment is an important aspect of the Electrical and Electronic Technology. Through simulation experiments of the mobile learning platform, it compensates for the lack of experiments in distance education.

### **3.3 Advantages of mobile learning in Jiangsu Open University**

#### *3.3.1 Personalized learning*

The mobile learning app of Jiangsu Open University has realized personalized learning. Personalized learning of the course "Electrical and Electronic Technology" is mainly reflected in the learning environment and the personalization of learning habits. The system can intelligently perceive certain learning habits of students. By analyzing students' learning habits, speculating and perceiving students' interest in learning, the system and course tutor provide rich learning resources according to the teaching themes and students' interest in learning to improve students' interest and passion in learning.

#### *3.3.2 Achieved problem-solving mobile learning*

Through mobile learning of Jiangsu Open University, students use the mobile phone to send questions to the academic tutor. After the tutor analyzes the questions raised by the students, the results are delivered to the students in real time. If the students have questions, they can immediately use QQ Text, voice or video to communicate and discuss directly with the teacher, and to complete the teaching and learning activities in a problem-solving manner, and the learning mode that can solve the student problem quickly and realize the traditional face-to-face learning. Since Jiangsu Open University introduced mobile learning to the distance education learning support service, the effectiveness of the distance education learning support service has improved. Through the survey, students' satisfaction with learning has been previously improved.

## **4 Problems and solutions of mobile learning**

### **4.1 The main problems of current mobile learning**

#### *4.1.1 Teaching resources can't meet the demand*

At present, most mobile learning resources are in language learning and early childhood education. The learning contents and types are not suitable for professional adult education, and high-quality media resources are insufficient. The main reasons for the lack of high-quality mobile learning resources that can be truly recognized by students are as follows: (1) Mobile learning resources are poorly interactive and interaction, navigation design is not clear enough; (2) Pay too much attention to fragmented learning. Although distance education students are generally adult learners with jobs, they generally use the fragmented learning time outside of work to study. The design of the course is so focused on fragmented learning that the integrity of the learning resources is ignored, the complete logical structure behind each knowledge point is disrupted, and it is difficult for students to grasp the entire knowledge structure.

#### *4.1.2 Information push is not timely and active*

Compared with PC-based network learning, mobile learning has the advantage of receiving push information in time. In the traditional network environment, after the user closes the browser, it is sometimes difficult to receive responses from the system, teachers, and classmates. In the survey, we found that the students'





satisfaction with the function of the mobile learning platform is high, but the satisfaction with the active push ability of the information is low, which is mainly reflected in the fact that many students report that the mobile learning information is not pushed in time, such as the mail and the information of the teacher's replies cannot be known in time.

#### *4.1.3 Lack of effective monitoring in the learning process*

Current mobile learning generally lacks effective monitoring, which affects the efficiency of learning, and even leads to the unsatisfactory completion rate of students. The research shows that some mobile learning learners do not have the ability of self-learning and self-management under the network environment. The lack of effective monitoring of mobile learning has led some learners to have no clear learning plans. These students are easily disturbed during the learning process and it is therefore difficult to maintain lasting attention. Students' poor attention persistence during mobile learning is mainly manifested in two aspects: (1) Most students will go to other websites to browse shortly after they start learning; (2) During mobile learning, instant messaging software such as WeChat or QQ often interferes with student learning, such as sudden WeChat messages or reminder signals from friend circles updates, which can affect students' attention.

### **4.2 Problems solutions of mobile learning**

#### *4.2.1 Teaching resources to meet needs of students*

The design of distance education learning resources should fully consider the characteristics and needs of students in the distance open education. At the same time of considering fragmentation learning, we must also pay attention to the integrity of learning resource. The fragmentation of learning content is not the random cutting and differentiation of knowledge points, but requires designers to focus on independent knowledge points, and make fragmentation of learning resources, so that the learning content is concise, the knowledge fragments are combined into a knowledge framework with a complete logical structure, the knowledge structure of the complete logical structure, the meta-knowledge points form a seemingly loose but solid knowledge system through some connections of content. Improve the information push reminder function. The mobile learning platform should remind the students when there are unreviewed notices or announcements, the home page has a small red dot flashing to give continuous reminders, indicating that there are unread reminders and mobile push notifications; at the same time, when the mobile learning platform receive new notices and announcements, the mobile phone of student also has corresponding information push and unread red dot reminder.

#### *4.2.2 Establish an evaluation system*

Establish learning evaluation, judge students' learning process and results. Learning evaluation is not only the simple feedback of learning results, but also the learning behavior and learning activities in the learning process, and gives the basic data of intelligent optimization. Traditional learning evaluation mainly includes evaluation of students' course content learning, evaluation of participation in interactive communication analysis, evaluation of examination and learning work, and evaluation of extracurricular resource learning. The environment and implementation of mobile learning are different from traditional teaching, and the focus of learning evaluation is also different. Mobile learning evaluation pays more attention to the evaluation of students' learning progress, academic performance, progress, personality characteristics,



abilities or other behaviors, master the learning situation of students in real time, and help students adjust their learning strategies in time to make learning more effective. In order to effectively overcome the external interference of mobile learning and maintain lasting attention, the presentation of mobile learning resources should pay more attention to task-driven learning, in order to focus the learners in a short time, complete the tasks and stimulate and cultivate the learners' interest in learning. In order to make meaningful mobile learning continue to occur, the design of mobile learning content should focus on stimulating students' interest, allowing students to have a strong motivation for content learning, to prevent consciously the environmental interference and improve learning efficiency.

## Conclusions

Mobile learning is an organic combination of mobile communication technology, network technology and educational technology, which meets the requirements of student who wants to learn at anytime and anywhere. This paper studies the specific application mode of mobile learning in remote open education, and takes the "Electrical and Electronic Technology" course of Jiangsu Open University Mobile Learning Platform as an example to construct a "learner-centered" teaching mode to meet the needs of students in terms of learning time, place of study, content, and methods, and give full play to the guidance, inspiration and monitoring of teachers in the teaching process. The paper studies the learning resources, the organization of teaching activities, the advantages of mobile learning of Jiangsu Open University's mobile learning, and analyzes the current problems of mobile learning in distance education, then gives corresponding solutions.

## Acknowledgements

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## **New Approach to Farmers' Learning in an Evolving Context**

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### **Abstract**

The rapid development of mobile Internet and multimedia technologies has provided convenient, flexible and concomitant learning to farmer learners and created beneficial conditions to meet their diversified, individualized and practical learning demands. This paper presents the practices of CABTS in developing App based big data, cloud computation and mobile Internet technologies with the objective of accelerating the training of new type of career farmers who love agriculture with good command of technologies and skills of farm business operation. With the platform as a vehicle, CABTS pooled agricultural technologists and extension agents to provide on-line learning, Q&A and tracking services to farmers. Meanwhile, issues related to the operation of cloud platform are analyzed and recommendations are tabled in order to advance the platform to a new level.

**Keywords:** Farmer, Cloud Platform, Online Learning, App

### **Introduction**

In recent years, with the rapid development of information technology, the leading role of informatization in China's modernization has become increasingly prominent. Especially in the agricultural field, the integration of informatization into the process of agricultural modernization has played a huge role in all aspects of agricultural production, processing, circulation and consumption, as well as brought new thinking, new methods and new means to education and training of farmers. The Central Agricultural Broadcasting and Television School (hereinafter referred to as the CABTS) is a public organization sponsored and administered by the Ministry of Agriculture and Rural Affairs of the People's Republic of China. It is a school that uses modern distance education to carry out education and training of farmers, and is a specialized institution for cultivating high-quality farmers. In order to improve the effects of educating of farmers and the efficiency of agricultural technology extension services, the CABTS made full use of information technology to develop and build the Cloud Smart Farmers App platform based on big data, cloud computing and mobile internet technology. It was launched online in August 2017. The cloud-based Smart Farmers App targets the majority of farmers, and its core function is to provide online learning, technology promotion and support services to farmers.



## Primary Functions and Effects

### *Online Learning*

In recent years, online education and training in China has flourished, and the “knowledge payment” in the agricultural field has become a hot spot in the Internet industry. However, online learning for farmers has been always a shortcoming. Factors such as lack of hardware and software conditions, complex and diverse requirements, and lack of clear market-oriented models have constrained the rapid development of online learning for farmers, and there are no patterns and practices to be used as reference. In order to realize online learning for farmers, the Ministry of Agriculture and Rural Affairs clearly encourages the promotion of online learning in the cultivation of high-quality farmers, and supports the payment of online learning fees for farmers through government purchases. On the basis of summarizing past experiences, considering that smartphones have been popularized among high-quality farmers and mobile operators can provide companion and convenience for online learning, the Cloud Smart Farmers Platform uses the App as the main carrier tool for online learning.

In the construction of learning resources, CABTS has developed more than 100 quality courses in conjunction with agricultural colleges, scientific research institutions and well-known enterprises. It provides comprehensive theoretical courses such as modern agricultural production and management, agricultural entrepreneurship, agricultural products e-commerce, and agricultural product quality and safety as the mainstream. The online courses of professional skills are mainly developed by local agricultural and rural administrative departments and training institutions to take in consideration the development of local agricultural leading industries. Based on the online learning platform of Cloud Smart Farmers App, all the courses have been shared.

Through rewards, courseware contests and other operational means, agricultural experts and agricultural technicians are encouraged to participate in the development of online learning resources. In response to the characteristics of farmers, most of the courses are divided into 5-25 minutes of short video courses, and eye-catching and interesting titles are used to attract farmers to participate in learning. Learners can post their own feelings and suggestions after learning, and everyone can see these messages and participate in interactive communication. The online learning platform of Cloud Smart Farmers App has built a “live classroom” to provide technical guidance through live lessons to farmers during busy the farming season. For example, the “Distance Training on African Swine Prevention and Control” organized by the Animal Husbandry and Veterinary Bureau of the Ministry of Agriculture and Rural Affairs in January 2019 attracted nearly 300,000 to the online learning, with a very positive response from the society.

In terms of teaching management, the on-line learning platform of Cloud Smart Farmers App has the functions of learning time statistics, credit management and interest adjustment. The quizzes during the course, comprehensive tests and teaching evaluations enable the training institutions to keep abreast of the knowledge of learners and improvement of teaching content. The learning platform ranks the test scores and completions of the learners, and gives differentiated mobile phone credit rewards to motivate the learners.



Innovation of policies and means has achieved good results. Take the pilot work in Jilin Province in 2018 as an example: a total number of 8034 farmer learners in 14 demonstration counties participated in the online learning pilot work through Cloud Smart Farmers App platform, involving 46 grassroots training institutions. During the 5-month study period, 82% of the learners (6602) completed an online learning task of 30 hours (45 minutes for one class), and the test scores reached 100%. The pilot work moved 30% of the offline learning courses online, the saved expenses are used to cover the cost of accommodation and transportation of study tours. This approach also ensured the quality of delivery of the lecturers. The overall cost savings exceeded 35%.

#### *Online Technology Popularization and Support Services*

In order to speed up the application of new agricultural technologies and new achievements, and better solve the "last mile problem" of agricultural technology extension in rural areas, China Agricultural Technology Popularization App (targeted user groups are extension agents and agricultural specialists) built by the Department of Science and Technology Education of the Ministry of Agriculture and Rural Affairs integrated well with Cloud Smart Farmers App to deliver on-line agricultural technological extension. Farmer learners, through the functions module of "Q and A of agricultural technologies" of Cloud Smart Farmers App, can submit in the form of text, image and short video technical issues encountered in production. The platform will automatically push to technicians and agricultural experts in the matching area of the industry, and technical questions raised by farmers will be answered by agricultural technicians and agricultural experts within two hours. Cloud Smart Farmers App developed the "community" function module, and the research institutes and leading enterprises jointly have established a number of professional communities such as "rice technology", "smart plant protection", "leisure agriculture" and "scientific fertilizer application", which has materialized on-line exchange of farmer learners with experts and agricultural technicians of the field.

#### *Practical Support Service Tools*

The Cloud Smart Farmers App platform provides farmers with a series of practical support service tools. "Agricultural Technology Video" has launched more than 4,700 agricultural technology promotion videos; "Sannong Information" and "Market Price" push the latest Sannong Policy and Market information; "Agricultural Express" timely reports on agricultural information in various places; "Disease Diagnosis by looking at images" provides image comparisons of more than 6,000 kinds of pests and diseases and recommended control measures for over 300 crops; "Financial Guarantee" provides agricultural insurance and rural finance in terms of problem solving, quota evaluation, loan application and other services. In addition, through the mining analysis and refined classification of page views, attention indicators and other indicators of "Agricultural Technology Q&A", over 45,000 items of production and operation techniques demanded, 75,000 hot topic issues and over 300,000 classical agricultural technological knowledge are sorted. Based on these data resources, the agricultural technology knowledge think tank was developed. Currently, it is put into trial operation in the form of "smart question and answer robot".

Up to now, the number of registered users of Cloud Smart Farmers App platform has exceeded 4.5 million, including 350,000 experts and agricultural technicians and 4 million farmers. Cloud Smart Farmers App ranks among the best in the same category of mainstream search engines such as Baidu and 360. More than 65% of the country's 540,000 agricultural technicians have downloaded and used the Chinese agricultural



technology promotion App. There are 6 provinces with a utilization rate of more than 80%, of which the utilization rate of Anhui Province (16,253 agricultural technicians) has exceeded 90%. The platform has accumulatively provided answers to 3 million questions posted online by farmers, increasing by nearly 5,000 daily. The number of questions given by experts and agricultural technicians has reached 25.5 million, and the average rate of reply is 8.6 times. The answer rate has remained above 92% and 83.7% of questions answered are acknowledged or responded by the originator. Nearly 5,000 online learning courses and agricultural technology videos have been launched on the platform, and more than 20% of the courses have more than 20,000 learners. It has become a well-known leading online learning brand for farmers in China. The massive farmers information, agricultural information and agricultural technology information collected by Cloud Smart-Agricultural App platform have initially formed a big data cluster effect, and have far-reaching promotion in agricultural condition monitoring, high-quality agricultural materials recommendation, and credit information system construction. In 2017, Cloud Smart Farmers App platform was selected as a case study of agricultural and rural big data. In 2018, in the first national “Helping Farmers App Rankings” selection campaign, Cloud Smart Farmers App won the most popular cultural and educational App award.

The Cloud Smart Farmers App platform implements “unified design, hierarchical construction, resource sharing, and responsibility sharing” in accordance with the construction idea of “platform upshift and service outreach”. Unified architecture design, unified data resource pool, and unified interface standards have greatly facilitated the technical implementation of platform promotion and application, and quickly promoted the application at the grassroots level. At present, the construction of provincial sub-platforms in Hunan, Jiangsu, Henan and Jilin is progressing smoothly. It not only realizes the data docking with the national platform, but also develops special content around the regional leading industries, and the application effect is good. For example, the number of registered users of the “Agricultural Technology” App of Jiangsu Platform, a cloud platform, has reached nearly 300,000.

## **Major Issues Encountered in the Development, Operation and Maintenance**

### *Online Course Development Issues*

China is a vast agricultural country with an agricultural population of nearly 580 million. The variety of agricultural regions and the rich types of industries have led to the development of online courses in agriculture to involve a large number of contexts and subjects, and the application is obvious geographical differences. As a developing country, the overall education level of Chinese farmers is still not ideal, which leads to the development of online courses in agriculture needing to deliver practical technical training to farmers in accordance with industrial development, as well as education of professional ethics and legal knowledge for farmers. Also, training should include environmental protection, knowledge and skills in food safety and business management, with heavy tasks of curriculum development. The long agricultural production cycle, coupled with the fact that the farming season cannot wait, has led to many limitations and lengthy processes in the development of online courses in agriculture. At present, the development of agricultural online courses on the Cloud Smart Farmers App platform is mainly based on the independent development of CABTS and the local agricultural and rural administrative departments. In terms of investment and teaching resources, there is large gap with the actual needs of the majority of farmers.

### *Conditions Constraints for Farmers to Learn Online*

The organizational problem of farmers' online learning is still plaguing the operations team of Cloud Smart Farmers App. 38.4% of the Internet popularization in rural China and 63.2% of those non-netizens made it difficult to require all farmers to learn through online courses. Giving attention to both online and offline learning has made it difficult for local training institutions to conduct online learning. At the same time, the problem of lack funds to access Internet and the lack of smart phone use skills has also prevented a considerable number of farmers from participating.

### *The Enthusiasm of Online Technology Promotion Personnel is not High*

At present, the expert users and agricultural technicians of the Cloud Smart Farmers App platform mainly rely on administrative means to promote online learning, and there still lacks an effective incentive mechanism, especially for expert users. The number of people on line and the enthusiasm for participation are not ideal. This affects the quality of operations of functional areas of "Agricultural Technology Q&A" and "Expert Community", which restricts the development of online technology promotion and results promotion. The resources of the research institutes, agricultural universities, and institutions have not been fully mobilized.

## **Going Forward**

### *Improve Functions and Expand Applications*

The core functions of the Cloud Smart Farmers App platform needs to be further improved to provide functional interfaces for online promotion of agricultural universities and research institutes as independent units, accelerate the establishment of agrotechnical question-and-answer sorting mechanism, and regularly push hot-topic problems and problems for experts in modern agricultural industrial systems. It is imperative to improve the online learning platform, create a lightweight, fragmented and community-based learning scene more suitable for farmers' learning characteristics; actively explore online and offline integration training, and guide high-quality farmer cultivation projects to the "three-stage" training transition of "online training", "offline classroom" and "field visits"; new functional modules such as agricultural technology experiment demonstration, agricultural public information collection, agricultural science and technology poverty alleviation, and rural public services need to be developed.

### *Integrate Resources and Promote Application*

The organization and construction of a public resource-building and sharing platform should be speeded up to provide technical standards and shared space. Through policy support and collaboration, it is to actively guide social capital investment, and explore sustainable market-oriented operation mechanism and diversified investment pattern; incentives and performance evaluation of agricultural experts and agricultural technicians should be carried out, and we need to actively strive for granting policy support to agricultural experts and agricultural technicians to participate in online services, in terms of job title evaluation and performance assessment; through support plans to the content development teams, cashing points of virtue currency, service star selection and contests of courseware, it is to promote the development of learning resources and uplift the participation of users.



## Achieving Knowledge in Action through Online Collaborative Learning: What We Have Learned?

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### Abstract

Internationalization is a priority area in higher education. Many institutions are exploring various approaches to achieve this goal including strategies such as internationalizing the curriculum. This paper provides an example of how educators can design and facilitate international authentic online collaborative learning that engages multiple perspectives, higher order thinking, and critical discourse. Given the affordances of digital learning technologies, students and educators are able to investigate topics with others from around the world within a virtual classroom environment. For 12 years, the authors facilitated an international collaborative inquiry for student teachers where they engaged in critical discourse with practicing teachers and teacher educators who acted as experts. Through a reflective process, the authors share highlights of their experiences and research, as well as identify tensions and disconnections at institutional (macro), program or department (meso), and instructional (micro) levels, that impact the ability to create and implement innovative practices in achieving internationalization of the curriculum. They conclude the paper by sharing three implications for educational institutions in creating conditions for authentic online collaborative learning.

**Keywords:** Online Learning, Online Collaborative learning, Inclusion, Internationalization, Internationalization of the Curriculum, Higher Education

### Introduction

Contemporary higher education is actively engaging in such trends as internationalization of the curriculum, global competencies, greater flexibility and accessibility (e.g., online) to courses and programs, and fostering of inclusivity. Program designs are being better informed through what is being learned in terms of learning and how people learn. “The new science of learning is beginning to provide knowledge to improve significantly people’s abilities to become active learners who seek to understand complex subject matter and are better prepared to transfer what they have learned to new problems and settings” (Bransford, Brown, & Cocking, 2000, p. 13). Through this, along with the affordances of digital learning technologies, we are able to better design learning within technology-enhanced learning environments. This paper provides an example of internationalization of the curriculum where learning in a technology-enhanced environment provides opportunity for students to engage with peers and experts locally, nationally, and internationally. Drawing on the research, we were able to transform theory into practice in terms of the development of an international collaborative online initiative that created opportunities for students to engage with experts





from around the world. Through the implementation of a global mindset, instructors and students discussed common topics, with an international perspective. This initiative provides an example of how the nexus of the design of learning, the affordances of digital learning technology, and a global mindset can transform learning in higher education.

Starting in 2006, we began to design, develop and lead a cross-institutional online collaborative initiative that involved preservice teachers (students), teacher educators, and in-service teachers as experts. Through a four-phase learning experience, students were able to increase their understandings of diversity and inclusivity and develop global relationships. The purpose of this paper is to reflect on 12 years of practice and research of this online internationalization initiative. The practice of creating and fostering international competencies and global relationships requires the development of substantive and authentic learning outcomes and purposeful integration of digital learning technology to bridge both time and geography. As part of our 12 year review, we identify tensions and disconnections between the macro (institutional), meso (program or department) and micro (instructional) levels that impact not only the success, but also the sustainability of such an initiative 2qA in higher education.

### **Internationalization of the Curriculum**

There are various definitions and understandings of internationalization in higher education (Knight, 2004; de Wit, 2011). As noted by Garson (2016), there is over 30-years of debate in establishing a shared understanding and interpretation of internationalization. For the purpose of this paper, we draw on Knight's (2008) definition of internationalization as "...the process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of higher education at the institutional and national levels" (p. 21). The focus is on the intentionality of the "academic endeavours and education for the public good" (Garson, 2016, p. 22). In terms of internationalization agendas in higher education, it needs "[the] process of integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education, in order to enhance the quality of education and research for all students and staff, and to make a meaningful contribution to society" (De Wit, Hunter, Howard, & Egron-Polak, 2015, p. 29).

Currently, higher educational institutions are grappling with how to create more comprehensive, integrative approaches to internationalization that spans across all programs. As well as how to better support students to thrive in a global society by developing awareness of other cultures, different cultural values and ethics, and an international mindset (Vishwanath & Mummery, 2019).

Internationalization of the curriculum (IoC) provides one approach to meet this goal. IoC, as defined by Leask (2009), is "the incorporation of an international and intercultural dimension into the preparation, delivery, and outcomes of a program of study" (p. 209). Such initiatives reported in the literature that advance IoC agendas include study abroad, recruitment of international students, foreign language learning opportunities, international partnerships, faculty exchanges, participation in foreign conferences, and recruitment of international students (Knight, 2004; Leask, 2009; The Hanover Research Council, 2010). The challenge is where and how can IoC be integrated into existing programs?



## International Online Collaboration

One example of IoC is our 12 year international online collaboration between Australia and Canada that involved students (pre-service teachers), teacher educators, and practising teachers. The goal of this work was to foster authentic discussions among participants from the two countries as they explored common topics such as cyberbullying, special educational needs, Indigenous perspectives, technology integration, and learners of English as an additional language. This initiative gave students experience of engaging as global collaborators. During the 12 year period over 5,000 students engaged in the initiative along with 38 teachers and teacher educators as experts from Australia, Canada, USA and Russia. Through the use of asynchronous and synchronous communication, student learning was extending beyond the local classroom and a single instructor for the course.

### The initiative was implemented for six weeks using the following four phase approach:

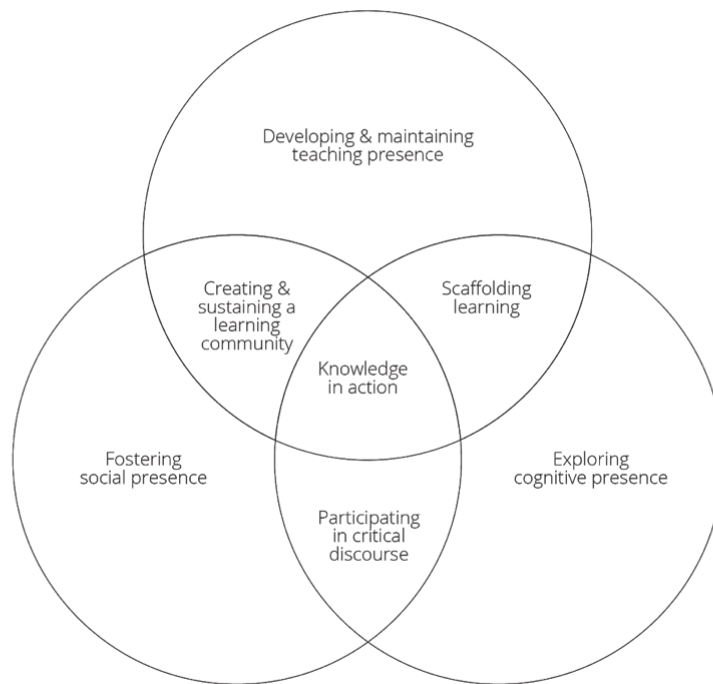
1. Community building (Week 1): Students established social presence and trust within the online community through sharing introductions, personal stories and images, and dialoguing the peers.
2. Learning from a shared experience (Week 2- 3): Students read a selected stimulus novel that aligned with key topics for the initiative (e.g. *Parvana's Journey*, Ellis, 2005; *A Group of One*, Gilmore, 2005). In teams, students created a novel summary, made links to curriculum, identified questions related to pedagogical implications, and created inquiry questions related to the novel. After they posted their summaries, teacher educators sourced initial online discussion questions from the pedagogical questions which sparked the online discussion.
3. Learning from teachers as experts (Week 4-5): Students were joined in the online discussion by practicing teachers and teacher educators to deepen their understanding of topics. It provided an opportunity for students to ask experts for strategies, resources, and stories related to the various topics. The interactions with experts included both asynchronous and synchronous discussions.
4. Critical reflection (Week 6): Based on their experiences, students reflected on the development of their content knowledge and also the process of learning through the experience (Lock & Redmond, 2011).

## Conceptual Framework

The Online Collaborative Learning Framework (Redmond & Lock, 2006) was used as a conceptual lens to both design the online collaborative initiative and to view the findings from several studies conducted over the 12 years. The framework was developed using the basis of Garrison, Anderson, and Archers (1999) Community of Inquiry model (CoI). The framework was designed to provide a structure for designers, educators, and researchers to explore collaborative and interactive online spaces where the participants share perspectives, literature, and experiences as they are de-constructing and/or co-constructing knowledge.



The three key presences (social presence, cognitive presence, and teaching presence), interact to form an additional four actions: 1) scaffolding learning, 2) participating in critical discourse, 3) creating and sustaining a learning community, and 4) knowledge in action, as indicated in Figure 1. Through the interaction of students with peers and experts, they are able to deepen their learning and develop a richer understanding of the topics through multiple perspectives and critical discourse. For further details on the framework, refer to Redmond and Lock (2006).



**Figure 1. Online collaborative learning framework (Adapted from Garrison, Anderson, and Archer's community of inquiry model, 1999).**

## Methods

Reflection is “an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation” (Schön, 1983, p. 68). To frame the reflective process based on the 12 years, we have drawn on Schön’s (1983) notion of reflection-on-action. We are reflecting on experiences as designers, facilitators, and researchers of this online international collaborative initiative. Through this process, we acknowledge implications for practice in support of IoC and fostering global competencies, as well as identify tensions and disconnects between the macro (institutional), meso (program or department) and micro (instructional) levels that impact success and sustainability of such an IoC initiative in higher education. The following question guided our reflective inquiry: What factors influence the sustainability of a cross-institutional online collaboration designed to foster international competencies and global relationships?



Over the 12 years, we have studied the initiative by gathering data from student focus groups and individual interviews, expert interviews, course and assessment artefacts including online discussion posts, assessment tasks and reflections, and facilitator reflections. We have published such papers as the following: ‘International online collaboration: Modeling online learning and teaching’ (Lock & Redmond, 2006); ‘International online collaboration: Giving voice to the study of diversity’ (Lock & Redmond, 2011); ‘Investigating pre-service teachers’ inquiry into Indigenous perspective’ (Redmond & Lock, 2015); ‘Pre-service teachers’ perspectives of cyberbullying’ (Redmond, Lock, & Smart, 2018); and ‘Secondary pre-service teachers’ perceptions of technical pedagogical content knowledge (TPACK): What do they really think?’ (Redmond & Lock, 2019). We have used such publications to ground our meta-analysis of the 12 years of research as we engaged in this reflective process.

### Findings and Discussion

Through the reflective process based our research using the lens of the Online Collaborative Learning Framework, we acknowledge that the initiative provided students with a rich learning experience where they engaged in knowledge in action. Through the design of the six week experience, learning was scaffolded and supported to foster critical discourse among students, teacher educators, and practicing teachers. All who participated experienced the creation of an online learning community. Further, through this work, we were also modelling examples of IoC, as well as technology integration. Through our research, we asked students about their experience. The following are examples of some of their comments: “...this was a capacity building activity; I can use the information in other courses and in my own teaching”; “This project was the stimulus for an in class project in my prac school”; and “I felt it was creditable information when student shared experiences plus links to literature/research” (Redmond & Lock, 2008, p. 4299).

An aim of the design was to foster robust discourse among students, teacher educators, and practicing teacher within a flexible online learning environment. Through the exposure to multiple perspectives, students gained new insights into various topics. The following student quotes reflect some insights gained with regard to the authenticity of the learning experience:

- “It is interesting to see the world through somebody else’s eyes. From this novel, you gained an insight into one person’s view of the world. How does perspective change the way we see other people? How does the way we see children affect the way we teach” (Redmond & Lock, 2009, p. 269);
- “The discussion was informative, and it was personally enriching to hear real-life experiences on particular issues. It was great to have an opportunity to learn through other people’s experiences with topics surrounding inclusion, instead of just learning everything from a text book” (Redmond & Lock, 2009, p. 270);
- “It forces those in the discussion to consider ideas and beliefs beyond what they already hold” (Redmond & Lock, 2009, p. 271); and
- “Exposure to new ways to implement technology is fantastic as an aspiring teacher because it helps to develop confidence within us. I definitely found a new confidence in regards to the implementation of technology in a classroom” (Redmond & Lock, 2009, p. 271).



Diversity and inclusivity were two underpinning themes to this work. Through the readings and discussions, we wanted students to gain greater understanding of diversity but also how to create and foster inclusivity in their teaching practice. The following student quotes demonstrate how they gave voice to the topic of diversity:

- “I especially enjoyed the expert forum about Cultural Diversity and hope to implement some of the ideas that I read about in my future classrooms” (Lock & Redmond, 2011, p. 23);
- “I really appreciated having a classroom in which I could voice my concerns/questions about teaching, and to hear back from people from all different backgrounds and experiences” (Lock & Redmond, 2011, p. 23);
- “I feel a sense of loss to be losing touch with our Australian counterparts. It was wonderful to bridge our worlds, not only as citizens of different countries but as teachers in the making. I truly enjoyed the added perspectives given” (Lock & Redmond, 2011, p. 23);
- “I’m starting to realize that inclusion doesn’t just mean plonking a special needs student down in a class and expecting the teacher to conjure up something. The whole teaching process should be changing” (Redmond & Lock, 2017, p. 1054); and
- I really do think, open mindedness, a willingness to try different things, a willingness to embrace all students as individuals and to do your best to include all by thinking creatively might be the best strategies that a pre-service teacher can take to the classroom” (Redmond & Lock, 2017, p. 1055).

What became evident through our experiences and research, were the tensions and disconnections that occurred at all three levels within the institution that impacts IoC initiatives such as the one we are sharing in this paper. First, at the macro level, institutions are championing internationalization and IoC through funded projects, policies, and practices. The challenge is how are we defining internationalization, internationalizing the curriculum and internationalization at home and what will that look like from an institutional perspective? When these items are put into action, are they separate items that are add-ons to programs or are they part of the bigger initiative that becomes woven into the work across the institution? Further, with internationalization as a priority area, careful consideration and investment of resources and supports are required to foster sustainability and scalability of initiatives that identifiable impact.

Second, at the meso or procedural level, that of the department or faculty, often, there is a lack of fluidity or agility to make change. Internationalization may be a university priority but there may be tension in doing this in context where courses are approved and part of a program. Once programs are approved, there is less ability to implement unique IoC opportunities. For example, when programs have limited flexibility due to a national accreditation program and professional standards, this impedes the ability to design and implement such initiatives such as reported in this paper. There may be support for internationalization and some willingness for IoC, yet the ability to implement such items within courses or across programs tends not be taken up. What can be found is that internationalization tends to be seen as study abroad which is separate from courses, in contrast to online learning with international students and experts as part of the course



experience. Such an approach, reduces the complexity and to some degree the messiness of integrating IoC within courses and/or programs.

Third, at the micro or instructional level, there is a need for instructors to be open to a global mindset. As well as to be innovators or early adopters (Rogers, 2003) who create international learning experiences within their courses, often these individuals have the will and skill to do this work. They have or are part of an international professional network who can find others who have mutual interests in being part of such work. These individuals tend to be risk takers who are willing to design and facilitate learning in a global classroom environment. However, it cannot be assumed that all instructors are confident and/or competent to work online or work with students and instructors from other locations as they come together around mutual topics of interest. Shifting the mindset and practice for such IoC work, requires learning opportunities, and providing supports and resources to help instructors to conceptualize, design, and implement models of internationalization and global connections as part of their teaching and learning practices.

### **Implications for Educational Institutions**

As we reflected on the data and our experiences, we identified three implications for educational institutions in creating conditions for authentic online collaborative learning. First, online collaborative learning within the global classroom needs to shift from being a specialized initiative to that of being mainstream. In our situation, it was an initiative embedded in a course, which over time with changes in the program, was then eliminated. As much as we worked to invite others into being part of this online collaboration, it did not move from being an initiative within a course.

Second, educational institutions have the technical affordances that enable global conversations with peers and experts. We embraced using the digital learning technology to connect with experts from around the world using both synchronous and asynchronous communication. We have been involved in online learning for a number of decades and see this a common practice. The challenge is to shift the mindset that learning can and needs to occur with and from others beyond the classroom context. Not all instructors nor students are open to online learning or willing to open the classroom to others who are not enrolled in it.

Third, it cannot be assumed that instructors and students are prepared for online collaborative learning. Co-creating knowledge through sharing ideas requires risk taking. It also requires developing confidence and competence in being an online collaborative learner. As we think about next steps, we need to carefully consider not only the possibilities for more opportunities for authentic online collaborative learning, but also how we can support others in engaging in this form of learning. How can we more intentional in how IoC work can be scaled up and sustained?

### **Limitations and Further Research**

One limitation of what we report in this paper is that it is grounded on a reflective process based on our research and experience over 12 years. Through this reflection, however, we have identified a number of



tensions and disconnections that are impacting internationalization and internationalization of the curriculum. We see the need to conduct further research with higher education institutions who have prioritized internationalization to investigate what are their disconnects at the three levels, how are these tensions or disconnections impacting the achievement of this priority area, and what strategies are they implementing that is supporting both scalability and sustainability of such initiatives?

## Conclusion

This paper provides a meta-analysis of an international online collaborative initiative that ran for over a decade. The designers and facilitators of this work have reflected both on their experiences and their research as they examined factors that influence IoC. Unlike many IoC interventions, this initiative has been long lasting and has been researched from a variety of different perspectives. While this study does not offer a conclusive answer to the question of IoC, it does provide a model of implementation supported by data.

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## The OERu Rubik's Cube: Fitting the Pieces Together for Transnational Micro-credentialing

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### Abstract

The OER universitas (OERu) is an international innovation partnership of like-minded institutions who assemble quality accredited online courses from open educational resources (OER), for independent study with peer learning support. Learners study for free and pay for assessment-only services to gain academic credit towards university qualifications. This international panel will share experiences and lessons learned from three countries who are pioneering a sustainable, international micro-credentialing solution for OER. It is hard to deny that increasing individuals' access to knowledge and opportunities to obtain education credentials is a conduit (and will create a platform) for greater humanitarian equity and social justice in our global educational landscape. We explore some of the tensions inherent in supporting the broader social justice mandate from the perspective of an OERu partner university, while balancing the increasing pressures being faced by institutions as government funding decreases and the demands for new sources of revenue, innovative programs, greater efficiencies, additional accountabilities/regulations and leaner organisations become the new norm. Working with the OERu has required creative yet credible ways to give students credit from their global OERu coursework, towards an exit credential with Thompson Rivers University, Canada. We discuss the following topics to see what has been successful (or not) in this endeavour:

1. Using a Transfer Credit team to assess course credit from our various OERu partners
2. Leveraging Prior Learning Assessment and Recognition (PLAR) infrastructure by utilising challenge assessments of OERu content and courses
3. Rethinking the traditional 3-credit course model by offering the ability to bundle related micro 1-credit courses

In New Zealand, the *EduBits* initiative, offering alternative digital credentials, was launched in July 2017 by Otago Polytechnic, one of the OERu's founding partners. *EduBits* recognise skills and knowledge *already acquired*, with assessment against approved competencies, and the award of digital badges (and associated digital certificates). Learners in OERu micro-courses can opt to complete assessments and gain *EduBit* credentials. In addition, with micro-courses approved by Otago Polytechnic's Academic Board, transcript credit for the associated full courses can be issued. The transcript credit then counts towards the OERu's First Year of Study through our transnational credit transfer model.

**Keywords:** Micro-Credentials, Open Educational Resources, Alternate Digital Credentials, OERu, Open Educational Practices, Academic Credit



## Introduction

The OER universitas (OERu) is an international innovation partnership of like-minded institutions who assemble quality accredited online courses from open educational resources (OER), for independent study with peer learning support. Learners study for free and can pay for assessment-only services to gain academic credit towards university qualifications.

Originally conceived as the 'OER university' (OERu) by the participants at the inaugural meeting of interested institutions in February 2011, the network used the lower case 'u' referring to a community of scholars sharing information freely, as intended by the original Latin meaning of "*universitas magistrorum et scholarium*" from which the word 'university' was derived (OER Foundation, 2011). The name was changed to 'OER universitas' following objections from Universities New Zealand for using the concept of 'university' for this network of universities, because the use of the term is restricted by the Higher Education Act in New Zealand, where the OERu is based (Mackintosh, 2017, p.107).

With OER, "it is possible to learn globally but accredit locally" (McGreal, Mackintosh, & Taylor, 2013, p. 49). The OERu has devised a system of pre-approved credit transfer, using transcript credit from accredited partner institutions for designated OERu qualifications, based on a bilateral Credit Transfer and Credit Accumulation Agreement (OER Foundation, 2018). This agreement, developed collaboratively by the network over the last five years, is signed by both the assessing partner who issues transcript credit, and by the 'receiving' partner who recognises transfer credit towards their own approved qualification. The designated OERu award is conferred by the receiving partner.

Using OER-enabled, open online courses, the network has established a "parallel universe" (Taylor, 2007) that operates within existing institutional policy frameworks. The OERu transnational credit transfer model is predicated on a system that recognises the institutional autonomy of our partners regarding all aspects of assessment, credit transfer protocols, institutional residency requirements for the number of credits to be assessed locally, and pricing for assessment-only services. This 'opt-in' approach, combined with transparent and open planning processes derived from open source development practices, has underpinned OERu's success in fitting the pieces together to simultaneously improve social justice in higher education while increasing potential return on investment by pioneering an OER-enabled, transnational micro-credentialing model with pathways to achieve university qualifications.

### **Balancing Social Justice in Times of Fiscal Austerity - Charles Sturt University, Australia**

Universities around the world are grappling with the challenges of fiscal austerity. Consider, for example, that two-thirds of OECD (developed) countries have decreased the proportion of public expenditure allocated to education between 2005 and 2011, and more than half of the developing countries reduced spending on education between 2008 and 2012 (Czerniewicz, 2016). Budgetary pressure and increased competition place greater demands on the ability of institutions to contribute fiscally towards the sustainability of open education initiatives. Paradoxically, the adoption of open education approaches affords institutions the



opportunity to reduce the associated costs for course design and development of online courses; however, increased competition among higher education providers fuels the perceived threat that sharing courses freely could cannibalise student registrations for full-fee courses.

The primary aim of the OERu is to widen access to more affordable education, with the OERu founded on the notion of community service and outreach (McGreal, Conrad, Murphy, Witthaus, & Mackintosh, 2014, p. 127). In 2012, the OERu conducted a context evaluation and surveyed institutions to rank the primary reasons for joining the OERu network (Murphy, 2012). The OERu's philanthropic mission of widening access to affordable education for learners excluded from post-secondary education ranked highest in the list of motivations for participation in the network. This was followed by the opportunity to participate in an international network of accredited institutions as a key driver for institutional participation in OERu. Interestingly, the ability to retain competitive advantage, as OER collaboration models become more mainstream, was ranked third in the list of motivations.

Notwithstanding the potential of open courses to widen access to learning opportunities in the developing world, participation rates do not match the rhetoric. For example, participation rates from learners in Africa in courses with offshore MOOC providers are typically below 10% (Coursera 2% (Gloy, 2018), EdX 6% (Shah, 2018) & FutureLearn 8% (Walton, 2016)). The OERu is performing marginally better with 18% of new participant survey respondents located in Africa, but there is still a long road ahead to improve social justice in higher education in a sustainable way.

Lambert (2018) has analysed the degree to which the Open Education literature is aligned to social justice principles. She documents how the principles of social justice have become lost in the details of texts and technological determinist debates, positing a revised definition for open education to provide a theoretical framework for equitable education:

Open Education is the development of free digitally enabled learning materials and experiences primarily by and for the benefit and empowerment of non-privileged learners who may be under-represented in education systems or marginalised in their global context. Success of social justice aligned programs can be measured not by any particular technical feature or format, but instead by the extent to which they enact redistributive justice, recognitive justice and/or representational justice (Lambert, 2018, p. 239).

The OERu's efforts to date have focused primarily on redistributive justice, whereby the partnership provides free and unrestricted access, without the need to register an account or sacrifice personal data, to all our open online courses for learners who cannot afford to pay for participation. The OERu is extending its redistributive justice to institutions through its 'Outreach Partnership Initiative', whereby post-secondary institutions in the developing world who cannot afford membership fees can join the network for free (OER Foundation, 2018). The Outreach Partnership encourages 'South-North' knowledge sharing by inviting Outreach Partners to contribute to the development of OERu courses. The OER Foundation provides free capacity development opportunities, focused on digital skills for collaborative OER development. The Outreach Partnership initiative may contribute to improving recognitive justice by enriching socio-cultural



diversity in the OERu's open curriculum, and there are opportunities to improve representational justice through co-construction of OERu open courses.

### **Implementing Oeru Transnational Credit Transfer at Thompson Rivers University, Open Learning, Canada**

The OERu has presented an interesting challenge as Thompson Rivers University (TRU) in Canada has needed to work with three separate entities (OERu, the assessing partner, and TRU) in regards to providing learning and pathways to the Certificate in General Studies programme (Thompson Rivers University, 2018). In brief, learners study courses through the OERu, then apply for assessment at a partner institution, and finally send a transcript to Thompson Rivers University, which is then recognised as pre-approved transfer credit towards the Certificate.

To ensure that TRU is providing credentials in an academically rigorous way, the university needed to be sure that the material provided by the OERu aligns with the assessment, while also ensuring that the assessing institution is able to provide transcriptable credit for review. One aspect of higher education that TRU's work with the OERu has highlighted is how wide a spectrum there is in relation to credentials, credits, and courses. Part of the work has been to understand the differing vocabulary used across the globe in Registrars' Offices. One country's "course credit" is another country's "contact hours", so the transfer credit team has followed established guidelines in the assessments to assess the unique differences in the transcripts (BC Transfer Guide, 2015).

Even though the final say in accepting credit rests with the receiving institution, TRU has needed to work with both the OERu partner institutions and the OERu itself to create reliable pathways for learners to complete. In the following section, this paper will discuss three specific creative yet credible ways that have been established to provide this pathway to our global learners via the OERu network and partnerships.

#### **1. *Transnational transfer credit utilising a transfer credit team:***

At TRU, any course transcribed from an accredited institution is potentially eligible for credit. For example, within the OERu context, TRU has assessed and accepted courses for credit from the University of Southern Queensland (Australia), Charles Sturt University (Australia), and Thomas Edison State University (USA), and TRU is currently reviewing more courses from Otago Polytechnic (New Zealand). In order to do this, the TRU transfer credit team compiles course outlines, methods of assessment, and any other relevant details, and liaises with subject matter experts within campus faculties and departments. When reviewing the OERu's 'English for Academic Writing' course, for example, a committee of five academics within the English and Modern Languages department scrutinised and debated the material until a consensus was reached as to how this course would transfer. Courses are either deemed equivalent to an existing TRU course, are recommended for generic credit toward a credential, or are rejected as acceptable transfer credit. We believe this rigour ensures that students who take courses through the OERu and its partner institutions will properly demonstrate competency in the subject matter required to grant the Certificate in General Studies.

2. ***Leveraging our Prior Learning Assessment and Recognition (PLAR) infrastructure by utilising challenge assessments of OERu content and courses:***

At TRU, students can challenge a selection of existing TRU courses for credit by successfully completing a challenge exam, which is the ability to write a final exam to challenge the course material and gain the respective full credit (Thompson Rivers University, 2019). We are currently exploring the option of expanding this ability by creating TRU administered challenge exams for open source courses offered through the OERu. Learners would pay an assessment fee to take an exam, which would then be assessed by a TRU faculty member. Upon successful completion of the final exam, the learners would receive credit for a credential taken at TRU (such as the Certificate in General Studies or any other appropriate credential offered at TRU). PLAR presents a very exciting opportunity for TRU to be a leader in assessing knowledge and providing a reputable pathway to credentials. The open source mandate of the OERu allows partner institutions to easily share curriculum and assessment tools (such as the final exam), which TRU could review and potentially implement. The OERu course 'Learning in a Digital Age' is a perfect example of this opportunity to utilise pre-established assessments to provide credit via PLAR.

3. ***Rethinking the traditional 3-credit course model by offering the ability to bundle related micro 1-credit courses:***

Currently, TRU accepts two courses based on the micro-credit model. 'Learning in a Digital Age', developed by Otago Polytechnic, consists of four North-American one-credit micro-courses. Learners assessed by Thomas Edison State University (TESU) are required to complete three of the four micro-courses. TRU will recognise the three transcribed credits towards the Certificate in General Studies. The Otago Polytechnic version is based on four micro-courses, and learners who successfully complete the three credits for the approved micro-courses will be eligible to transfer toward TRU's Certificate in General Studies. 'Regional Relations in the Asia-Pacific', from the University of Southern Queensland, also consists of four micro-courses, which, when complete, transfers as three credits towards the TRU credential.

The feasibility of the OERu model was first tested in 2014 when a TRU student graduated using credit obtained through an OERu course assessed by the University of Southern Queensland (OERu, 2014). Recently, TRU is excited to open the door towards micro-courses being aggregated into the traditional 3-credit model (traditional at least by North American standards). This is a new pathway to completion that has only been possible through the progressive thinking of partnership agreements like the OERu. The one potential drawback we are anticipating is the potential cost increase to learners should they have to pay for four micro assessments rather than one single assessment. However, should this model prove successful, there may be a potential for economies of scale to drive down assessment costs.

### **Incorporating Alternative Digital Credentials Within the Oeru Ecosystem - Otago Polytechnic, New Zealand**

The concept of OERu micro-courses was first proposed at the 2013 meeting of OERu's international partners (OERu, 2013) as a solution to deal with differences in the standard size of courses in different regions of the



world. By way of illustration, based on the international standard of 1,200 notional learning hours for a full year of academic study (Commonwealth of Learning, 2015), a typical three-credit undergraduate course in North America equates to 120 notional learning hours, compared with 150 notional learning hours in New Zealand for a standard course. In the United Kingdom, a module is typically 200 notional hours, whereas many university courses in Australia are 160 notional learning hours. The OERu has assembled all full courses comprising three or four micro-courses of 40 notional learning hours each. This has achieved a standard ‘transfer currency’ with three OERu micro-courses equating to the learning hours for a standard undergraduate course in North America, four micro-courses for Australia and New Zealand, and five micro-courses for a United Kingdom module of 200 notional learning hours. The standard OERu micro-course is large enough to implement a valid and reliable assessment for each micro-course, thus enabling the implementation of micro-credentials that can map to formal academic credit for full courses.

In New Zealand (NZ), the EduBits initiative, offering alternative digital credentials, was launched in July 2017 by Otago Polytechnic, one of the OERu’s founding partners. EduBits recognise skills and knowledge already acquired, with assessment against approved competencies, and the award of digital badges (and associated digital certificates). These micro-credentials reflect specific experience and professional capabilities of individuals. For employees, then, they are one way of showing employers they have the skills needed, and for employers, they ensure their staff have the capabilities they require, potentially through work-based learning opportunities (Acree, 2016; Berry, Airhart, & Byrd, 2016). As Crow (2017, p. 6) emphasises, micro-credentials should be “competency-based, personalized, on-demand, and shareable”. With its tagline of “Show What You Know” (EduBits, 2019), the EduBits website enables candidates to compile and upload evidence at their own pace. This is then submitted for evaluation by a qualified assessor, with confirmation of outcome achievable within ten working days. Upon successful evaluation, candidates are emailed with a link to the EduBits Vault, where they can claim and share their micro-credential online, on their social and professional networking sites, or even as part of their email signature.

EduBits were part of the New Zealand Qualifications Authority (NZQA) micro-credential pilot from August 2017 to June 2018, and, perhaps more significantly, micro-credentials are now recognised on the NZ Qualifications Framework. As the NZQA highlights, micro-credentials “focus on skill development opportunities not currently catered for in the tertiary education system, and for which there is strong evidence of need by industry, employers, iwi and community” (New Zealand Qualifications Authority, 2018, para. 2). With the increasingly dynamic and competitive nature of employment, developing and evidencing up-to-date knowledge and capabilities is key to “improv[ing] and future-proof[ing] the employability of individuals and support[ing] the productivity of the workforce” (ibid., para. 3), as well as addressing critical shortages in industry skills (New Zealand Government: Careers NZ, 2018).

In the United States, several digital platforms are available, including *Digital Promise*, which, by February 2019, was hosting “over thirty-five other organizations offer[ing] micro-credentials” (Greene, 2019, para. 4). Micro-credentials are currently being piloted in Africa (Association of International Schools in Africa, 2019), and the European MOOC (Massive Open Online Courses) Consortium has created a Common Micro-credential Framework (Kennedy, 2019). In Australia, one education network claims that “95% of human resource managers [are] actively seeking micro-credentials from potential candidates” (Training.com.au,



2018), with micro-credentials predicted to be added to the Australian Qualifications Framework by late 2019 (Jackman, 2019). The work of the OERu and its international partners in this space, then, is particularly timely.

Since September 2018, two members of Otago Polytechnic's Learning and Teaching Development team have been working closely with the OERu Director to include the EduBit micro-credentialing service as one option in the credit transfer system across OERu's global partner network. Assessments are written to align with the learning outcomes approved by Otago Polytechnic's Academic Board for selected OERu micro-courses. For quality assurance purposes, and to ensure validity and reliability, assessments are then moderated by an independent subject matter expert, before being published on the EduBits website (with links from the relevant OERu course(s)).

Learners in OERu micro-courses can opt to complete assessments and gain EduBit credentials. In addition, with micro-courses approved by Otago Polytechnic's Academic Board, transcript credit for the associated full courses can be issued. The transcript credit then counts towards the OERu's First Year of Study through our transnational credit transfer model. This includes the Certificate of General Studies at Thompson Rivers University in Canada, and the Certificate of Higher Education Business (OERu) at the University of Highlands and Islands in Scotland.

For those learners who prefer to build their confidence before diving into a micro-credential option, and given that digital badges can increase motivation (Cooper, 2018; Gibson, Coleman, & Irving, 2016; Mah, 2016), we also offer the opportunity to complete a basic knowledge test and earn a digital badge and/or certificate of participation. In this way, learners can scaffold from 'no stakes' knowledge tests through to micro-credentials, and then, if they so wish, map these against formal transfer credit.

### **'Learning in a Digital Age' - An OER Case Study in Reuse for Transnational Micro-Credentialing**

'Learning in a Digital Age' (LiDA) is a first-year, university-level course, designed to develop the skills and confidence to become a competent and autonomous learner in this digital age, and has achieved credit recognition in Canada, New Zealand, United Kingdom, and the United States. LiDA comprises four micro-courses (OERu, n.d.):

1. Digital literacies for online learning
2. Digital citizenship
3. Open Education, copyright and open licensing in a digital world
4. Critical media literacies and associated digital skills

Providing a course to help learners gain more value from the growing inventory of OER and Open Access resources, to support post-secondary learning, was a primary concern for OERu. While designing the First Year of Study programme for the OERu, the team determined there was a pressing need for a credit-bearing course to improve digital fluencies, and thus the LiDA course was conceived (OER Foundation, n.d.). Developing the LiDA course through the OERu's open design model, including a transparent and dynamic public record of the decision-making process, facilitated opportunities to 'crowdsource' the curriculum.



Drawing on course outlines from similar university courses, an extensive network of experts and professionals from around the world identified and discussed the foundational requirements for the LiDA curriculum. A course specification document was generated and submitted to the Academic Board at Otago Polytechnic in New Zealand for approval. The course specification was then reviewed by Thomas Edison State University, United States, Thompson Rivers University, Canada, and The University of the Highlands and Islands, United Kingdom, and was approved for credit transfer with signed articulation agreements towards the following exit qualifications at a first-year, undergraduate level:

- Certificate of Higher Education Business (OERu) at the University of the Highlands and Islands
- Certificate of General Studies, TRU
- Undergraduate Certificate in First Year Foundations, TESU

Through EduBits (EduBits, 2019) at Otago Polytechnic, learners can earn micro-credentials for assessed learning for each of the LiDA micro-courses. On completion of the required number of micro-credentials, Otago Polytechnic will issue transcript credit for transfer towards designated OERu exit qualifications for the LiDA course.

In addition to these options for micro-credentials and formal academic credit, the OER Foundation has launched the 'Digital Literacies Subscription and Sponsorship Programme' (OERu, 2019), whereby institutions and university libraries can purchase a subscription for an online competency test in copyright and Creative Commons licensing, based on the LiDA course materials, and hosted by the OER Foundation. As an OER collaboration, subscription partners will have unrestricted access to all OERu micro-courses which can be used as additional support materials, including, for example, information literacy training through the university's library. In support of the university community service mission, some OERu partners are currently (June 2019) exploring collaborations with community and regional libraries to offer face-to-face support sessions for the LiDA micro-courses.

## Conclusion

The OERu international innovation partnership has achieved a functional model for transnational micro-credentialing, with pathways to achieve formal credit towards university qualifications, based on open courses assembled entirely from OER. As such, the network is well positioned to achieve the theoretical threshold at which a critical mass for the OERu concept can be attained on a global scale. Below this theoretical threshold, the concept is less viable, but above this, it will grow and scale.

The critical threshold "is the point at which there is a decisive and sustainable competitive advantage relative to the current market proposition" (Mackintosh, 2012, p.273). Conceptually, having three institutions that each agree to co-operate on an OER course for a predetermined qualification, represents the point where individual partners gain more in return than they invest. For example, with three institutions, for one OER course assembled by an institution and mapped to an agreed credential, institutions will receive two courses in return.





The success of the OERu cooperation is attributed to a compelling vision of providing free learning opportunities for all students worldwide, with pathways to achieve affordable qualifications, noting that this ambitious goal is well aligned with the community service missions of publicly funded universities (Mackintosh, 2017, p. 113). This, combined with incremental design underpinned by rigorous planning, open sourcing everything, ensuring decision-making autonomy of university partners, and avoiding the temptation to innovate on too many fronts simultaneously, by designing a system that can operate within existing policy frameworks, has contributed to our success in building a sustainable parallel learning universe for all.



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## Global Best Practices in Online Learning to Support a Quality Student Experience

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### Abstract

Online learning continues to grow in strategic importance for education providers around the world. The challenge for many is the need to understand how to create an effective environment for student learning. While there are a number of best practices that can be found in the research, it is not always clear what the best option is for various situations. By reviewing global resources for quality in online learning, educators can identify those that will work best in their learning environment. This project involved a current and broad review of quality standards around the globe in order to provide information that can be widely shared, adapted and adopted by online learning providers. Encompassed in this analysis were many of the rubrics that are used to review course design, teaching effectiveness, and overall program quality. Many of the resources included were those that have been vetted and provided by known sources (e.g., Quality Matters, the Online Learning Consortium, etc.) and created internally at educational institutions. Although, it is understood that in some cases, education providers adapted these known rubrics to create a version that can fit their needs. Since many of these tools can be modified and used by education providers in other countries, the details provided include recommendations for adaptation as well as steps for implementation. Since these resources are often used as part of a continuous improvement process, further information on how they can be used in accreditation or government regulation processes will be discussed.

**Keywords:** Online Quality Standards Rubric, Scorecard, Effectiveness

### Introduction

Access to online learning courses or full programs continues to expand around the world. This can be seen in countries like the United States where higher education institutions are offering more seeing increases in online learning at the same time those institutions are experiencing a drop in their total student populations (Seaman, Allen & Seaman, 2018). Other areas of the world are seeing growth due to the ability to use online learning as a way to reach a larger population (Trines, 2018).

At the same time, the best practices implemented for online learning vary to some degree by country and region due to laws, accreditation, regulations, and other cultural factors. For example, in some countries it may be more popular to offer online learning through massive open online courses (MOOCs) or mobile learning platforms. Further compounding the need to understand best practices for quality is the fact that there are regions that are relatively new to online learning that may not have access to training to develop skills necessary to develop quality online courses and implement effective teaching practices. In those areas



with limited adoption there may also be a need to educate learners, government officials and other stakeholders about the effectiveness of online learning.

In some regions of the world, quality assurance frameworks and rubrics are widely used to provide a standard for institutions to evaluate the quality of their online learning courses or programs (Southard & Mooney, 2015). They are meant to provide a baseline of best practices by which institutions can benchmark their offerings to identify areas of improvement in addition to adherence to best practices. These rubrics can also serve as a valuable resource to institutions seeking to show accountability and effectiveness of their programs to accreditors and government officials (Shelton, 2010). These quality standards came out of a need to validate online learning as a credible means of delivering education as well as a lack of specific guidelines on how it should be implemented.

In 2015, the International Council for Open and Distance Education (ICDE) released a report providing an overview of many quality models and recommendations for the future (Ossiannilsson, Williams, Camilleri & Brown, 2015). Since that initial report, many updates have been made to existing rubrics while new rubrics have also emerged. This paper seeks to provide an overview of quality assurance rubrics that can be used by educators seeking to implement best practices that can assist in providing a quality educational experience to learners.

This review was designed to review many of the widely accepted rubrics used by higher education institutions and provide additional guidance on how they can be adapted and implemented on a broader scale. The analysis relied on the review of openly available quality assurance frameworks that are more widely accepted and implemented on a broad scale.

### **Importance**

With the elimination of space, time and geographic barriers to education, online learning is typically considered to be the next iteration of distance education. In many ways, this is good since this improves upon a system that has been around for hundreds of years. Online learning offers the potential advantage of providing more timely feedback and allows for learner-to-peer, learner-to-instructor, and learner-to-content interactions that can improve student engagement (Anderson, Rourke, Garrison, & Archer, 2001).

The need for quality in online, blended, and digital learning is not a new concept. Shelton (2010) was a pioneer in identifying a comprehensive list of factors that need to be considered for a fully online program. She further expanded these efforts in 2015 to address blended learning and again in 2016 when she explored factors related to quality teaching effectiveness in the digital learning classroom. Even before this, concerns about the effectiveness of online courses prompted the development of tools to improve and validate quality. One of the earliest to be developed came about thanks to MarylandOnline receiving a grant in 2003 that led to the development of a quality assurance framework now known as Quality Matters (Shattuck, 2007; Shattuck, Zimmerman, & Adair, 2014).

As online learning has continued to grow, the need for developing and maintaining a quality program is even more important today. In fact, Allen and Seaman (2017) found that total enrollments at U.S. institutions have seen a decline between 2012 and 2015, yet the number taking a course via distance education continues to



grow (Allen & Seaman, 2017). This growth, coupled with a lack of consistency in the quality across institutions, and in some cases within an institution, has created a perfect storm for criticism of curriculum offered in a non-traditional format where a student cannot look their professor in the eye during a lecture. When a consumer questions the credibility of a program, it prompts action by politicians, accreditors and regulating bodies.

The issue of credibility in online learning is not just a U.S. issue, countries throughout the world are seeking appropriate measures to assess the quality of online learning. Those that aren't today will likely be looking at this soon. For institutions, this idea of a quality learning experience is especially important since online learning opens up access to learning providers throughout the world and can be of critical importance in countries where access to quality higher education experiences are limited.

Institutions that care about the success of their students have to be concerned with the quality of their online learning courses and overall program effectiveness. Knowing that accreditors and government regulators are also concerned with the student experience means that it is especially critical that best practices be adopted in the development of the online learning environment and then measured using an appropriate tool that can benchmark the institution or its courses based on industry standards. A high degree of compliance with the standards provided in a quality assurance framework can provide an institution with a safety net to avoid legal troubles while at the same time providing a competitive advantage when seeking to recruit students.

### **The Quality Assurance Frameworks**

How quality in online learning is assessed around the world varies and may depend on government oversight. The acceptance and widespread (or limited) use of online learning also influences whether there are quality standards in place. In those countries where online learning has been widely accepted, there tend to be more mature and robust frameworks to support accreditation or government regulation requirements. However, there are many regions where online learning is regulated as a subset of traditional educational delivery modes which fail to address the specific needs of the distance education environment. Without specific guidelines in place, institutions are left to determine their own standards for quality which results in varying levels of adoption and implementation of best practices.

When there is an interest, or recognition of a need, to validate the quality of online learning, institutions often seem to take one of three approaches to evaluating standards

1. Use of an already developed rubric that is research-based and considered credible and valid.
2. Modify an existing credible rubric to take the best components of already developed tools and customize to the institution.
3. Develop a framework in-house that meets the need of the institution.

The problem with using the second or third method to determine quality is that important standards may be excluded for the wrong reasons. Doing this will also limit the ability of the institution to benchmark against peers or adequately address learner needs when building a quality online learning environment. While the



institution has a standard that they can follow, it makes it difficult for outside stakeholders to adequately evaluate the overall effectiveness of the learning environment and identify areas of improvement. Established rubrics offer institutions with a more relevant option since they can provide an external validation.

Quality assurance frameworks can be divided into multiple categories, but for the purpose of this review, they are examined in terms of their focal point: comprehensive program overview or course level. At the comprehensive level, programs are evaluated at the macro level and consider all services and functionality that needs to be present for the total online learning ecosystem. At the course level, the review occurs at a more micro level and may consider the quality of the course design or best practices that should be implemented in order to effectively teach an online course.

For the review of comprehensive online program rubrics or scorecards, formal frameworks that can lead to some form of certification were included by the following organizations:

- The Online Learning Consortium (OLC)
- European Association of Distance Teaching Universities (EADTU)
- Quality Matters (QM)
- African Council for Distance Education (ACDE)

The OLC offers the Quality Scorecard for the Administration of Online Programs which provides best practices for quality in multiple areas of the online learning ecosystem. This includes areas such as administrative support, student services, technology, and faculty resources while also evaluating the use of course design best practices (Shelton, 2010). With this scorecard, institutions can use this in their continuous improvement process or seek a third-party review that provides an endorsement (certification) from the organization. This research-based scorecard was developed in 2010 and is regularly updated using the Delphi methodology every few years to keep the content current.

The E-xcellence program offered through EADTU offers a similar framework and third-party assessment provided through the OLC (“Full Assessment”, 2009). A manual is provided to provide context to the framework standards. The program also offers an option for institutions to do a shorter online review to quickly assess its readiness to complete the full process.

Taking a different perspective, the QM program review leads to certification in one of four areas and successfully being certified in each area can lead to an exemplary status being awarded to the institution. However, institutions are not required to pursue certification in all four areas (

The final framework reviewed at the comprehensive program level was a Quality Assurance Policy Framework prepared by ACDE. The framework was developed to support the work of a toolkit on quality assurance that was initially developed by ACDE (“ACDE Quality Assurance Policy Framework”, n.d.). Within



the toolkit, institutions can find an evaluation rubric that can help to benchmark against the standards and best practices (“The ACDE QA Toolkit”, n.d.).

The review of course level frameworks to examine quality in online learning at the micro level included rubrics from two of the same organizations that developed program level rubrics.

- OLC
- QM
- Australasian Society for Computers in Learning in Tertiary Education (ASCILITE)

The OLC is once again included for the OSCQR Course Design Rubric. Originally developed by Open SUNY (State University of New York), it was later adopted by the OLC in order to share this resource with a broader community. Open SUNY used the frameworks developed by Quality Matters, the California State University – Chico, and others as a foundation and then worked with a community of experts to identify current best practices to develop a new rubric. With 50 indicators, the rubric looks at all aspects of course design including the course objectives and learner engagement. This resource continues to be updated regularly and is unique in that it has a significant focus on accessibility to support the needs of all learners (“OSCQR is Unique”, n.d.).

Another course level rubric introduced by the OLC is the Quality Course Teaching and Instructional Practice (QCTIP) scorecard. This rubric was introduced in 2016 in response to a need to provide best practices on teaching practices in the online classroom. This tool includes best practices for course design while also taking a closer look at the needs of faculty and students to create an effective learning environment (“OLC Quality Course Teaching and Instructional Practice”, 2019).

The QM rubric was developed by online learning practitioners in Maryland in the early days of offering education via the internet who came together to identify standards for quality (Shattuck, 2007). Over many years, the standards and review process were refined until QM became a standard for quality online course design that reached beyond Maryland. While the rubric has been updated many times since its early days, it still continues to be a relevant tool for benchmarking quality in online learning.

A more recent addition to the quality frameworks includes the Technology Enhanced Learning Accreditation Scheme (TELAS) introduced by ASCILITE in 2018. This tool includes 8 categories and 39 standards for quality. While still in the early stages, the development and use of this tool is being promoted globally to be used as a benchmarking tool (“ASCILITE Quality Online Learning Assessment, Accreditation and Recognition”, 2018).

A total of seven quality frameworks were reviewed in this project. No one tool is being represented as being better than the others, but it is important for institutions to review each and determine which best meets their needs. As mentioned earlier, many institutions will modify an existing framework to better fit their needs. In other countries, this may mean translating the tool and adapting to meet specific needs within the region it will be used.





It should be noted that the reason that this review divided the frameworks between the comprehensive and course level is that it is important to implement both types of reviews. Only reviewing the effectiveness of course design will not lead to an overall quality experience for the learning. While the comprehensive program reviews do include a component of course design, to successfully complete those sections, an institution must have a formal and effective course design review process in place.

## Conclusion

While there are many more frameworks and quality rubrics available to assess online learning, this review was meant to address some of those that are more widely used and led to some type of certification. It is important to note that there are a number of accreditation criteria or government regulations that also address online learning to some degree but were not included in this review. In many cases, those criteria are requirements that have to be met by institutions of higher learning. This project was meant to identify resources that provide best practices in the field and that can lead to recognition for excellence by institutions that effectively implement those standards.

However, following the standards included in a quality framework is highly recommended. Not only can this provide an institution with a baseline on improvement needs, but the information gathered can be used to reflect the institution's commitment to quality to all stakeholders (including accreditors and government agencies). Of course, the most important stakeholder, is the learner. Adopting best practices, as indicated in these course quality frameworks, can also help the institution to create an effective learning environment.

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## Culture Vultures: How Open is Open?

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### Abstract

The role of openness, within distance education more generally, and Massive Open Online Courses (MOOCs) specifically, is a matter of some contestation (Cronin, 2017). The meaning of open is diffuse, and may mean radically-different things to different persons. This paper scrutinises the concept of open, using an Irish language MOOC, Irish 101, as a case study. Empirical findings are presented and analysed in the form of exemplar learner contributions within the course (from a sample of  $n \sim 24,000$ ), and the concept of open is interrogated through considering the learner experience, in particular the concept of cultural learning. Themes relating to openness in this novel context are considered, and the importance of diverse types of learning and achievement is emphasised. This learning is contrasted with the tensions inherent in providing courses for such purposes, given the typical metrics of success by which MOOCs are judged.

**Keywords:** Massive Open Online Courses (MOOCs), Cultural Learning, Openness, Qualitative case study.

### Introduction

The meaning and nature of the term 'openness' is an aspect of education which has long been under consideration (Peters and Deimann, 2013). Typically taken to be a good, what precisely openness means has tended to vary greatly depending on who one asks; It can be viewed as an attitude, a philosophical principle, a best-practice approach or a pedagogical imperative, to name but several (Weller, 2014). Cronin (2017), for example, suggests four broad interpretations of the meaning of openness are found within the literature: openness admission, open as free, open educational resources and open educational practices (p.16-17). Though potentially-complimentary, these aspects need not be so, and indeed may perhaps be found to be both complex, and negotiated (ibid, p.30). It follows that despite the development of an entire sub-field dedicated to the concept, the links between what openness means, and its practical implications, are often far more mercurial, with Bayne, Knox and Ross (2015) noting that 'the field has lacked coherent definitions of 'open', and too often tended towards optimism, advocacy and conviction, rather than a critical understanding of what openness might mean for education' (p. 248). The rise of Massive Open Online Courses (MOOCs) has brought its own questions of what precisely openness truly means when considered at scale (Rodriguez, 2013: 69-70). On the one hand, it has been argued MOOCs may be a potential means by which education might be expanded to excluded groups, though this has generally been caveated with the difficulties inherent in such provision (Firmansyah and Timmis, 2016: 3). However, Lambert's (2019) analysis of the literature suggests that provision of MOOCs based on objectives of open access and equity reduced



over a four-year period between 2014 and 2018, she contextualises this within timeframe of the move by the major platforms in introducing a fee paying element during this time and a change in focus. Lambert (ibid: p2) asserts critically “...MOOCs 2.0 shifted to support traditional higher education students, rather than those excluded from it”. MOOC learners remain furthermore atypical using a range of metrics, and where atypical are generally more affluent and educated than non-MOOC learners (Hansen and Reich, 2015: 62-63). In light of this latest critique it is clear that MOOCs continue to be challenged in reaching the wider goals associated with the open agenda.

In this paper, we report on the initial results of an exploratory case study, using a particular MOOC, Irish 101, as an example of not just a community of learners, but also a live manifestation of openness across many dimensions, some of which are lesser-considered within the literature and present new potential research directions for MOOC designers and researchers to consider. Our methodology makes use of a range of qualitative data, including learner comments and social media posts on the project website, and is analysed using an interpretivistic lens. We use specific examples to highlight the socially-oriented and provisional nature of MOOC learning, in addition to the surprising levels of interaction found from learners with course materials across an extended period of time. We argue that MOOCs do have a role in providing a pedagogical support for such learners, and as such enriching learning, but that wider economic and macro-level drivers may limit the ability of universities to provide such opportunities, given the logic of monetisation which has underpinned much of the development of the MOOC field (Lapworth, 2018: 17). This is particularly true when seed-funding for such initiatives is sourced from funding agencies or philanthropic organisations of funds (Lambert, 2019).

### **MOOCs and Openness**

The relationship of MOOC provision and the concept of openness is, at best, ambiguous. Posited as a means of expanding learner participation and democratising education, MOOC provision has rarely met these ideals, despite the important rhetorical role that they may play (Rey Agudo, 2019). Theoretically conceived of as a way of providing open access to learning (or to learners), it has been noted that the emphasis has all too often been on the concept of freedom (as an example) in a monetary sense (‘free of charge’) rather than a more philosophical one (free access) (a distinction highlighted in Bulfin, Pangrazio and Selwyn, 2014: 295-296). The reasons for this neglect are varied, but may relate quite acutely to the particular type of openness envisioned by the institutions and stakeholders which have driven the growth of MOOCs, namely one of openness at scale, rather than one of depth (Silveira, 2016: 210). The ‘massive’ element of MOOC provision has also been central to a secondary series of debates relating to financial sustainability (see Yuan, Powell and Olivier, 2014), with the core issue appearing to frequently evoke the means through which scale can be used to leverage additional capital for expansion and to sustain the often-significant levels of capital invested in MOOCs. Quantification of outcomes has thus been central to this understanding of participation, and consequently it may be the case that this more-limited focus has failed to consider how aspects of openness relate to the actual learning experience. Indeed, and in contrast with the open-resource ethos of many other forms of education, MOOCs ‘are generally made available under strict copyright terms...’ (Liyaganawardena, Williams and Adams, 2014: 43), limiting greatly the means by which students can share, reproduce and edit materials with which to learn, and perhaps also limiting the potential of MOOCs to cater to learning which is collaborative and multimodal.



This limited conception of openness is also visible in the rather limited number of subjects which are most commonly instructed through MOOC platforms; a recent analysis suggests that the large majority of MOOCs are delivered in a relatively-limited number of subjects, straying business and technology (Shah, 2018). This thus reflects subjects that may ‘fit’ most-closely with individualised and scaled learning, with a potentially-reduced role for the instructor. Other disciplines, particularly those which do not translate easily to such a scaled concept, due to the resource-intensive nature of providing feedback or instruction, may be far less prevalent or more challenging to adopt to a MOOC context (such as the humanities in general, see Evans and McIntyre, 2016). Lambert (2019) notes from those MOOCs designed with core principles of social equity and student inclusion across a range of subject areas and in a range of languages that they were built from scratch using multidisciplinary teams and with many involving external and community partners.

### **Cultural learning online**

Learning about another culture is a goal which, it may be said, is of critical importance both socially and economically, yet the relation of such learning to MOOCs is also a matter of some debate. This critical importance is recognised across a range of national and international bodies, such as UNESCO and the European Union (EUROPA, 2019), and is central to the United Nations Sustainable Development Goal No. 4, including a specific target that:

By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including.....promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development.

Given the wider discourse relating to openness and that increased technological progress is a means of doing so, it follows that the internet may be a core method by which learners might learn about other cultures which interest them. This is particularly the case for those in distant areas or not easily accessible to learners. Despite this potential, formal examples of such MOOCs appear to be relatively-limited, and we therefore explore this conception of learning using Irish 101 as a case study of cultural learning.

### **The Course**

Irish 101: An Introduction to Irish Language and Culture, is a four-hour per week, four-week course which is delivered through the FutureLearn platform. The course had approximately 10,000 registered users on its initial run, from more than 130 countries worldwide. This diverse nature was useful in enabling the exploration of various types of learners, and various types of learning. The course was developed as part of the Welcome Online project developed by Dublin City University. The project aimed at delivering on objectives of the Twenty-Year Strategy for the Irish Language and was co-funded by the Irish Department of Culture, Heritage and the Gaeltacht with support from the Irish National Lottery. The course was developed by a multidisciplinary team of language experts, learning designers within input from community and partner organisations.



## Methodology

As part of a forthcoming research project, a large dataset of learner comments (totalling 24,000 approximately) were analysed which encompassed a wide range of experiences, thoughts and interactions on the part of course learners. Given a general paucity of research into specific case studies of MOOCs using qualitative data analysis (Eriksson, Adawi and Stohr, 2017: 134), this corpus was analysed using a lens of critiquing the notion of openness and considering how it could be elucidated in (and from) such contributions. We drew three core themes from this analysis, focused on providing a definition of cultural learning, of exploring the intrinsic reasons which often underpinned sustained participation and how this type of learning can be conceptualised using openness as a fruitful lens. These themes were not exhaustive, but reflected the tensions and commonalities found throughout the learner contributions.

## Findings

### 1. Defining cultural learning within the MOOC

A prevalent feature within learner responses was the sheer enthusiasm with which the course materials were greeted by respondents. Though nominally a language course, perhaps the more interesting aspect of participation was that it was often underpinned by a much broader sense of curiosity towards Irish culture, and Ireland as a place:

Dia duit, X is ainm dom [trans: Hello, my name is X], I live in California, I started learning to play the bagpipes when I was in high school. But was always curious what the names of the tunes meant since they were in Gaelic. Im travelling to Ireland and Scotland this year and hope to play my pipes with other musicians. I am taking this course to understand translations, and maybe speak with the locals. – Extract 1.

This type of learning was only very-rarely expressed in concrete or functional terms, or tied to specific goals which drove learners over a longer timeframe (though these goals did often exist, they were rarely contextualised in great detail). Far more common was a desire to appreciate, understand and experience elements of the culture of Ireland for its own sake, and as a means of enriching one's own understanding of the world more broadly (which we will relate to intrinsic learning below). The types of targets and proficiencies in the target language that learners sought also varied greatly, from full fluency:

Dia daoibh! X is ainm dom . [trans: Hello, my name is X]. I live with my husband in Colorado, where we are hoping to become fluent in Irish and teach the language to our future children. We both have Irish heritage, and want to be a part of keeping Irish alive! – Extract 2.

To a simple understanding of the language for an array of personal purposes (such as travel):

All of my great grandparents were from Ireland. They were proud of their Irish heritage and passed down stories and traditions. I am fascinated and intrigued with Irish history and culture. I hope someday to visit Ireland and the counties and towns from which they came. – Extract 3.



Given this goal multiplicity, the nature of what a successful ‘outcome’ to the MOOC is may be in many cases something quite intangible, such as further engagement with the culture, or a gradual increase in fluency over a much longer timeframe. These types of goals may be measured best, if it all, not through any form of quantified engagement but rather through considering the learners own rather more subjective goals, a topic to which we will critically reflect upon in our discussion. The core element of this contribution however was to note that for many learners, this enthusiasm was what drove participation.

## 2. Learning for intrinsic purposes

It followed that a clear trend was visible in the types of learners present on the course; the demographic skew was considerably older than average, and many learners made reference to wider narratives, such as that it was clear for many, learning was something which they enjoyed doing for pleasure, and had a long track record of doing so, in both formal and informal contexts:

I love learning languages and also love Irish music and culture. That's why I'm trying to learn a bit of Irish. – Extract 4.

Studied Irish at school many years ago, but never kept it up as I got older. Now I need a serious refresher course. Hopefully, this is my way back in. I have no excuse really, as I live not far from the Donegal Gaeltacht! – Extract 5.

This often narrowed to a more specific interest in languages, particularly in cases where respondents had no affective or heritage links to Ireland:

I like learning languages, since I have an interest in the Irish culture and history, it made sense to try to learn Irish! – Extract 6.

I've thoroughly enjoyed reading these posts, and although I have no Irish ancestors, I do have an Irish friend. She and I were pen pals when she was a Girl Guide and I was a Girl Scout. We finally met in person when we were in our early thirties. I would love to visit Ireland, especially Galway, where she grew up. I love learning languages and thought it would be fun to add Irish to the list of languages I've studied. – Extract 7.

An important framework which may provide some illumination in this light is that of Deci and Ryan’s self-determination theory, and in particular the concept of intrinsic motivation. They have defined intrinsic learning as ‘the inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore and to learn.’ (2008: 70). Intrinsic learning, due to the inherent pleasure it provokes for those who are learning, requires no further justification, as it is the act of doing the activity which is itself pleasurable. In a sense, intrinsic learning is therefore the ‘gold standard’ of motivation, and appears central in continued or sustained learning, including within a MOOC context (Barak, Watted and Haick, 2016: 53-54). Supporting such intrinsic learning may be critical in encouraging learners to continue, but it’s fruits are often diffuse, and intrinsic motivation is difficult to provoke, given its strongly-internal roots (Deci and Ryan, 2008: 71). Where such intrinsic learning is present, however, the role of instructors may well be to nourish and to enable it to grow and adopt, through providing appropriate pedagogical interventions, well-designed



materials and giving learners the opportunity to gradually build and broaden their experience using the language.

### 3. Openness to other cultures and cultural expression within responses

Perhaps most importantly, many learners specifically referenced the role of culture as a defining motivation, not merely to experience or to understand Irish culture in particular, but also as something valuable in its own sake and worthy of preservation and protection:

Dia duit! X is ainm dom. [trans: Hello, my name is X]. I am from the Chicago area. I am interested in learning Irish to preserve and pass on the language of my ancestors. – Extract 8.

Finding grants for adult learners is a challenge since most are directed to current college students. I hope Irish language schools will continue to flourish as well. I think it is important to hold on to the language and customs to preserve national identity as well as honor the past. – Extract 9.

And an intriguing note was the means by which the cultural openness that others presented appeared to inspire other respondents once they had seen it:

It is so lovely to see all the people around the world with or without Irish roots wanting to learn our language. I know the meaning of a lot of words but am very poor at constructing sentences, and would also like to converse better (without feeling like a wally haha). – Extract 10.

Interestingly, some learners drew direct equivalence between languages with which they had more experience, and Irish. This included reflecting on these similarities in an empathetic manner and contrasting their own social context with that of Irish:

It's up to you to find a way to preserve your culture. In the 1970's Hawaiian was dying. Hawaiian Educators started the ball rolling by opening up Hawaiian speaking preschools. Now, there are dual language immersion schools all over the islands. – Extract 11.

This ability, to analogise and to draw equivalence, demonstrated a transferrable element of cultural learning, and that at its core it involves a very social product; learning to walk in the shoes of another.

### **Discussion – Supporting Cultural Openness and Learning in a MOOC Environment**

The vibrant debate and discussion that was found within this MOOC demonstrates that even within a single run, a course should be considered dynamic, social and evolving. Though designers will build, assess and review MOOCs using a range of criteria, the subjective and often-personal nature of learning about culture and cultural exploration is often more difficult to assess and highlight in such a manner. This is especially the case given an inherent tension; though learning about other cultures may prove enriching and valuable to the respondent, it may be rather difficult to quantify. Where MOOCs are primarily viewed as 'successful' based on whether particular levels of completion, certificate purchase or institutional monetary return, they may





naturally fail to account for those outcomes, and risk reducing learners to ‘roaming autodidacts’ (Veletsianos, Reich and Pasquini, 2016: 7).

An alternative perspective, which we have also adapted from self-determination theory, is to reflect not a focus ‘on the varying strength of the needs but instead focus on concepts resulting from the degree to which the needs have been satisfied versus thwarted (Deci and Ryan, 2008: 183), from the perspective of the learner. In other words, respecting the diverse types of learning outcomes that MOOC learning potentially empowers must naturally focus on the contextual and learner-specific nature of what a successful outcome may be perceived as, and how it may vary greatly. There is some evidence that this type of subjective measurement has become more prevalent as a consideration within the literature on MOOC motivation (see Henderikx, Kreijn and Kalz, 2017: 364), but moving beyond this in a theoretical sense also requires an institutional appreciation of the potential importance of these diffuse aims in designing courses. Crucially, it is unlikely that a focus on quantified outcomes can enable such learning to flourish, and fostering a sense of possibility and growth in this context may require a view of learner success as both more holistic and broad than the currently-dominant narrative.

## Conclusion

This paper provided a brief overview of the types of questions which are likely to confront designers, instructors and learners of MOOCs with a cultural focus, including the ways in which this learning must be contextualised within wider conceptions and understandings. We have critically-reflected, using our own MOOC, Irish 101, as an example of a course which may be somewhat unusual, on the types of learners that are present and the types of engagement which are visible. We have made use of learner contributions to give voice to participants, and as a means of elucidating the varying means by which openness may be conceived, in addition to highlighting the vivid life present on any individual course. This analysis is far from exhaustive, yet points to several tensions and avenues for further research, both for those designing courses, and for those aiming to improve the learning experience.

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## Design and development of online learning resources to foster academic writing skills in an ESP flipped classroom context

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### Abstract

Language instructors in ESP (English for Specific Purposes) contexts face a challenging process; teaching a foreign language to the students of highly specialised disciplines (Krajka, 2009). Moreover, scientific and technical fields move towards a much greater specialisation of knowledge. This challenge is even more evident due to the lack of appropriate language learning resources based on undergraduate students' specific professional and academic needs and interests. Other relevant features concerning the implementation of online resources in an ESP learning context are students' autonomy and time-flexibility (Mungra, 2009), two relevant competences in higher education. The flipped or inverted classroom approach is a pedagogical method that moves some parts of the lecture content outside of the classroom, typically online, and allows for a more active learning environment in which students have the opportunity to engage more extensively with the instructor and other participants (Storer, 2016). It has been proposed as a way to address some of the challenges and changes higher education has to face, including both increased student diversity and the way technological advances have changed the educational landscape (Goedhart et al., 2019). This research in progress is framed within an Educational Innovation project aimed at fostering undergraduate students' writing and listening skills. More specifically, our article analyses the steps taken to redesign the practice of academic writing in the fields of Biotechnology, Food and Agricultural Engineering. Moreover, it investigates in detail what the flipped classroom approach is able to offer in terms of online pre-class preparation and in-class activities and how the different online writing tasks and explanations have been organised. In so doing, we have studied similar contexts and explored suitable activities that would also play an effective role in this particular context. The resulting resources will be included in one of the units of a face-to-face English for Professional and Academic Communication course at a Spanish technical institution. Additionally, we have designed an initial questionnaire in an attempt to learn more about students' perceptions, knowledge and previous experience regarding the flipped classroom concept. The responses provided by 45 undergraduate students in the academic year 2018-19 are also being taken into consideration during the design and development stages. Preliminary findings have revealed that some effective resources are instructional videos, recorded lectures and other remotely-accessible pedagogical materials (Goedhart et al., 2019). One of our aims is to convert the validated resources into an internationally accessible Massive Open Online (Language) Course (LMOOC).

**Key Words:** Flipped classroom, flexible learning, English for Specific Purposes, academic writing, materials design.



## Introduction

English for Specific Purposes (ESP) could be defined as “an approach to language teaching that targets the current and/or future academic or occupational needs of learners” by focusing mainly on “the necessary language, genres, and skills to address these needs” (Anthony, 2018, p. 6). The approach also refers to the importance of assisting learners in meeting these particular requirements “through the use of general and/or discipline/specific teaching materials and methods” (Anthony, 2018, p. 6). Moreover, scientific and technical fields are currently moving towards a much greater specialisation of knowledge, which implies teaching a foreign language to students of highly specialised disciplines, thus making the process even more challenging to the instructors working in ESP contexts (Krajka, 2009). This is one of the main reasons why language teachers explore and try to find new ways, formats, scenarios, methods, typologies of exercises, and techniques capable of fostering an integral communicative competence and making the entire learning process more dynamic and attractive (Gimeno-Sanz & Martínez-Sáez, 2016).

The challenge is even more noticeable as it is usually hard for the instructors to find complete, appropriate, and effective language learning resources based on their undergraduate students’ specific professional and academic needs. It has been noticed among engineering learners that the linguistic features and components analysed, explained and followed in a foreign language course are not normally regarded as their primary focus of interest. Therefore, bringing a combination of general and specialised linguistic resources predominantly and clearly connected with their specialisation area is usually deemed very positive in the field of ESP.

When thinking about making the language learning resources even more appealing, as they are integrated into an engineering context, it is necessary to bear in mind the concepts of autonomy and flexibility (Mungra, 2009), two key and very relevant features in higher education. Therefore, the online channel within the field of linguistic practice could be seen as an alternative path able to foster students’ motivation as well as a means of increasing time and flexibility for the learners to study and focus on their engineering subjects’ specific content. The same reasoning could be applied in the case of our “English for Professional and Academic Communication” (EPAC) course, and in particular to writing practice, by analysing and implementing the advantages and benefits of supplementary online learning resources and the methodology known as “flipped classroom”.

In order to enrol in this EPAC course, students are required to certify an upper-intermediate level of English, B2 according to the Common European Framework of Reference for Languages. It is a compulsory subject (6 ECTS) at the Technical University of Madrid (Universidad Politécnica de Madrid, UPM), Spain. This highly comprehensive face-to-face English language course is focused on the development of a series of common competences and skills, “i.e. note-taking; writing CVs and formal letters; analysing and producing written reports; or familiarising oneself with the situations, tools and guidelines for academic and professional oral communication, for instance, oral presentations, job interviews as well as meetings” (Martínez-Sáez, 2018, p. 141). This high level of comprehensiveness in just one semester encouraged us to try to explore and find new methods and solutions, as two two-hour sessions per week have proven not to be enough for some of the students to acquire and develop all the writing skills needed in an academic and professional context.



The article consequently illustrates research in progress framed within an Educational Innovation project aimed at fostering undergraduate students' listening comprehension and writing skills. More specifically, it analyses how the flipped classroom method contributes to the practice of academic writing in the fields of Biotechnology, Agricultural Engineering and the Food Industry and what it is able to offer in terms of online pre-class preparation and in-class activities. This pedagogical method consists in moving some parts of the lecture content outside of the classroom, typically online, and allows for a more active learning environment in which students have the opportunity to engage more extensively with the instructor and other participants (Storer, 2016).

In so doing, we have studied similar contexts and explored suitable activities that would also play an effective role in this particular context. Additionally, we designed an initial questionnaire in an attempt to learn more about students' perceptions, knowledge and previous experience regarding attitudes towards the language learning process, listening comprehension, writing skills, and the flipped classroom concept.

### **Practising academic writing online through the flipped classroom method**

Academic writing is defined as "writing which is done by scholars (students or academics) for other scholars to read" (Van Geyte, 2013, p. 9). In approaches based on discursive and cognitive aspects of writing, this skill can be seen as a "form of problem-solving in which the writer faces two main tasks", which are "(a) generating ideas in language, and (b) composing these ideas into a written structure adapted to the needs of the reader and the goals of the writer" (Hamp-Lyons & Heasley, 1987, p. 1).

The assumption that writing and reading are closely associated is common among linguists. According to McCarter & Jakes (2009), in an English for Academic Purposes (EAP) context, a branch of ESP, language teachers will need to learn the types of writing and reading assignments that are common to the particular subject areas of their students and familiarise themselves with the specific texts that they have to read. They also highlight how important it is for EAP instructors to keep themselves "up-to-date with any changes that affect their students", as we work in fields which are subject to constant change. Moreover, it would be necessary to remind our students that we are not subject specialists and that specialist conventions/procedures for validity must be checked (McCarter & Jakes, 2009, p. 10). In addition, these authors point out that the writing and reading that we teach also "need to fit the academic purposes of our students" (McCarter & Jakes, 2009, p. 9), i.e.:

- "carrying out a needs-analysis to evaluate our students' competence in English;
- carrying out a needs-analysis to find out what our students want/need to learn;
- easing students into the programme;
- demystifying academic writing/reading assignments, like reports and argument essays;
- teaching students to think, write and read critically, to read at speed and to do research."

Nowadays, addressing diversity in students' learning styles and motivation challenges could lead teachers to search for the approaches and methods that could allow each individual student to achieve optimal performance (Goedhart et al., 2019). In so doing, alternative methods such as blended learning, i.e. learning



style based on the combination of face-to-face and computer-mediated/online instruction, have been proposed. O'Flaherty and Phillips (2015, p. 85) consider that “blended learning has become increasingly popular in higher education globally, forming the cornerstone of curriculum design” and providing new opportunities. That is also the case of the flipped or inverted classroom method, which is currently gaining more attention among university lecturers. According to these authors, “most descriptions of the flipped classroom suggest that multimedia lectures be recorded so students can view them out of class and at their own pace (homework)” (O'Flaherty and Phillips, 2015, p. 85).

Therefore, this method could be regarded as an asynchronous approach which is able to “free up in class time for student centred synchronous learning activities” (O'Flaherty and Phillips, 2015, p. 85). In the context of higher education, it has been suggested that “class time should focus on knowledge application” and that it would be able to foster “student ownership of learning through the completion of preparatory work”, which would enable them to adopt a more interactive role during actual class time (O'Flaherty and Phillips, 2015, p. 85). This feature is particularly relevant since “class time is limited when reviewing all the required language structures along with teaching the writing process” (Pavanelli, 2018, p. 16). In addition, the flipped classroom model has been thought to refine this situation because it is a model which “reverses the traditional teaching procedures and uses online instructional videos to deliver course content outside the classroom” (Pavanelli, 2018, p. 16). Students would thus be able to “control their learning style and pace of learning by pausing, rewinding, or fast-forwarding the lectures”.

## Method

In order to determine which resources would be more relevant and convenient to foster the academic writing skills, we conducted a bibliographical study, including book and journal publications as well as textbooks and online practical resources. We combined this initial step with an analysis, mainly based on our own experience in the field, of the parts of the lecture content that could be moved outside of the classroom. We paid attention to the type of exercises, their adaptability to the online variant or the way in which these could be connected with students' fields of specialisation and interest.

Furthermore, following the theory that a needs-analysis would help narrow the language-learning path for our students and make the whole process less ambiguous (McCarter & Jakes, 2009), a questionnaire divided into five main sections was designed in order to be able to take students' responses into account during the design and development stages. Part (A) addressed students' attitudes towards language learning, whereas the second one (B) was aimed at revealing the role of technology in their English language courses in the past and how familiar they were with these tools in a language learning environment. The main body of the questionnaire comprised two sections, i.e. listening comprehension skills (C) and writing skills (D), respectively. The fifth and last part (E) was called “Flipped classroom”.

In the case of the present study and in order to delimit our research, we would just focus on the most relevant items in parts (B), (D) and (E). Section (D) was designed in an attempt to know more about learners' perception of the importance of the writing component; whether they considered that they needed to improve their writing skill or not; if the time spent in the classroom so far practising writing skills was



adequate and some other items that will be displayed in the following section of the article. Section (E) focused on the flipped classroom concept and students' degree of familiarisation with the method.

The online survey, in which most of the items are based on a 7-point Likert scale (1: strongly disagree - 7: strongly agree), was administered through Google Forms and voluntarily responded by 45 students at the School of Agricultural, Food and Biosystems Engineering, UPM. The participants had already completed some of the most relevant listening comprehension and writing sections of our face-to-face English language course (academic year 2018-19) before being granted access to the online questionnaire and evaluating what changes could be made and which parts could be improved in the context of our Educational Innovation project.

## Results and discussion

As it has been previously said, one of the main goals of the present study was to take the first steps in the design and development of online learning resources in an attempt to foster academic writing. Based on previous research, we might state that academic writing is very often associated with the following assumptions: (a) "reading, writing and thinking are interrelated activities"; (b) "to write well, writers must engage with their ideas" and find concepts that interest them so that they can connect these with their knowledge and experience; (c) "writers must be aware of the context in which they are writing" and "understand the expectations of academic audiences". They might also take advantage of "explicit discussion and analysis of methods of development and strategies that English-language writers use in academic discourse"; (d) "fluency in writing is not to be confused with grammar accuracy". However, students would need to pay attention to both of them (Ruetten, 2012, prologue) in order to fully develop their ability to write in English.

With regard to the first theoretical contents and based on the study that we have carried out, some instructional videos are going to be recorded in order to explain the main components of the written module of our EPAC course in each and every bachelor's degree involved in the project; scientific publications and most significant genres as well as the guidelines and methods for writing a proper summary, an abstract, or an introduction to a paper. Moreover, some of the most relevant, outstanding, useful, and repetitive linguistic patterns found in authentic texts would also be analysed in order to make our face-to-face sessions more dynamic, interactive, and collaborative and devote more time in the classroom to practising and applying some of the notions previously explained through the videos. Further explanations would be recorded and supplementary exercises designed and developed in order to cover more specific content, i.e. punctuation, register, grammar, common errors, coordinators, transition words, subordinators, revising and editing, giving background information, supporting with specific details, cohesion, coherence, etc.

Regarding practice, we have also analysed the types of exercises that could be included in our online repository and how the different tasks would be carried out and assessed in an online environment. For this reason, it is very important to highlight that in the case of a flipped classroom approach to academic writing, students should also "receive sufficient feedback about their errors and be able to revise and reflect on their own academic writing". Apart from practice, writing instruction should include "collaboration and self-



correction after receiving teachers' feedback" (Pavanelli, 2018, p. 16). Furthermore, we have explored what Moodle, the open-source learning platform used at our institution, has to offer as a Learning Management System in terms of synchronous and asynchronous feedback (<https://moodle.org/?lang=en>).

Before starting to design, develop, implement, and validate the resulting learning resources, 45 students took part in the questionnaire designed in an attempt to learn more about their main perceptions and interests (Biotechnology, including an exchange participant who is currently studying Molecular Biology): 46.6%; Agricultural Engineering: 26.7%; Technology for the Food Industry: 17.8%; Food Engineering: 6.7%; Agroenvironmental Engineering: 2.2%). Regarding students' responses to the online questionnaire, we might say that the presence and role of technology in their previous language courses had not been as relevant and noticeable as we expected, since approximately a third of the participants pointed out that these tools had not been used on a regular basis in the past. When asked if online tools and resources are more motivating than traditional language learning materials, the evaluation provided was very positive, since 84.5% of the participants supported the three most favourable options within the 7-point Likert scale (35.6% rated 5, 37.8% rated 6 and 11.1% rated 7). In addition, 77.8% of the students (17.8% rated 5, 40% rated 6 and 20% rated 7) agreed that an online learning environment is less threatening and intimidating than a face-to-face scenario.

With regard to writing, 89% of the students deemed this component essential when learning a language (17.8% rated 5, 35.6% rated 6 and 35.6% rated 7) and 82.3% thought that they needed to improve their writing skills, which reinforces the relevance and importance of finding new ways for theory and practice both in and outside the classroom. A low number of participants considered that we had spent too much time practising writing skills in the classroom (8.9% rated 1, 20% rated 2, 24.4% rated 3, 31.1% rated 4, 4.4% rated 5, 11.1% rated 6 and 0% rated 7). As a consequence, we find that we should increase the number of in-class sessions and online recordings and tasks focused on this component. 84.4% of the participants (28.9% rated 5, 33.3% rated 6 and 22.2% rated 7) agreed that we should practise writing skills at home, whereas 75.5% of the students supported the three highest options within the scale (31.1% rated 5, 20% rated 6 and 24.4% rated 7) when asked if it would be more convenient to combine homework and classwork.

Moreover, students were requested to select the best way to practise writing skills in the classroom (See Figure 1) and out of the classroom (See Figure 2).

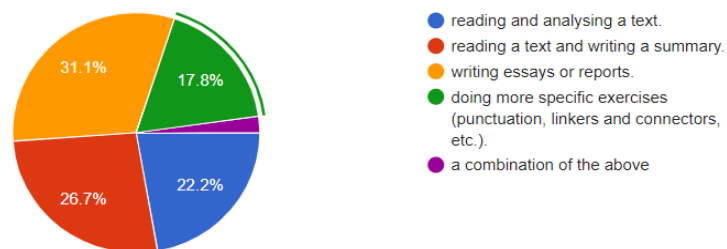
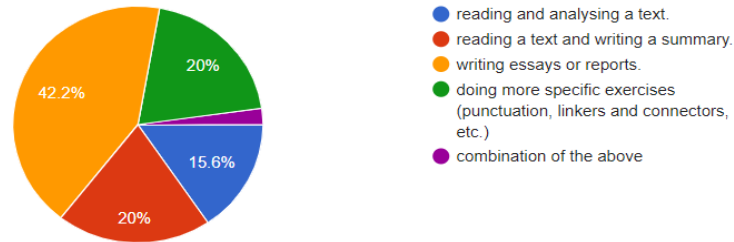


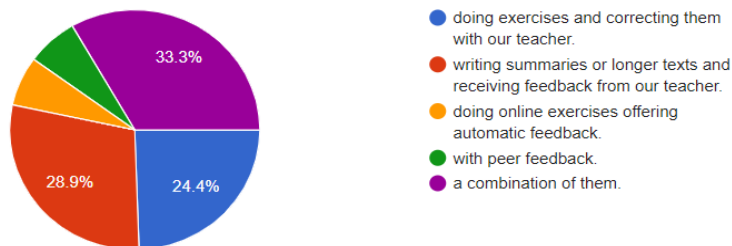
Figure 1: Question 11 (Section D): The best way to practise writing skills in the classroom is ...



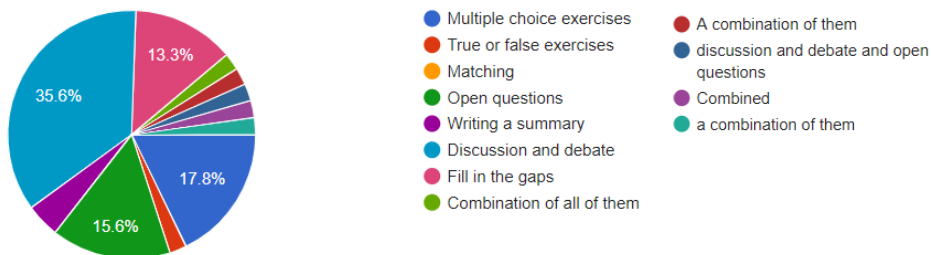


**Figure 2: Question 12 (Section D): The best way to practise writing skills out of the classroom is ...**

Two more questions illustrated students' perceptions concerning the best way to correct our writing exercises as well as the best type of exercise for practising writing skills (See Figure 3 and Figure 4).



**Figure 3: Question 13 (Section D): The best way to correct our writing exercises is ...**



**Figure 4: Question 14 (Section D): The best type of exercise for practising writing skills is ...**

In connection with the degree of specialisation of the content, we could observe how the participants showed a favourable attitude when asked if all the materials used for improving their writing skills should be focused on or adapted to their own degree or field, almost 70% (28.9% opted for option 5, the same number for option 6 and 11.1% rated option 7). However, the responses were not so clear when they had to evaluate the following item: "Only a part of the materials used for improving my writing skills should be focused on or adapted to my own degree / field of specialisation". In this particular case, 2.2% rated option 1, 6.7% went for option 2, 20% in the case of option 3, 17.8% had no opinion ("neither agree nor disagree"), 26.7% rated option 5, 17.6% rated option 6, and 8.9% shared the most favourable view. We could then say that students



show a positive attitude when asked about making the resources relate to specific content directly connected with their own fields. Some of them are also interested in learning more about other branches and disciplines.

In the last part of the questionnaire, which dealt with the flipped classroom concept, we were able to see two clear trends, as 51% of the participants seemed to know the method (option 5: 13.3%; option 6: 22.2%; option 7: 15.6%), whereas 44.5% of the students were not so familiar with the approach (option 1: 20%; option 2: 17.8%; option 3: 6.7%). We could also see how the trend was much more positive after reading a brief definition of flipped classroom. 63% considered that this method would be able to offer us a more active learning environment, whereas 19.3% had no opinion and 20.9% shared a negative perception.

Their responses were very varied when they were asked to indicate which parts of our lecture content should be moved outside of the classroom. The predominant ones were related to our listening comprehension tasks, analysis of longer texts, and some theoretical explanations.

Regarding pre-class preparation by accessing online instructional and explanatory videos recorded by the instructor as a way to enrich our English language course, 42.2% rated option 5, 22.2% rated option 6 and 11.1% rated option 7, which shows a very favourable general attitude. However, the most positive percentages were not so high in the case of question 5 (“I think watching at home instructional videos and recorded lectures in which the teacher explains the theoretical parts would allow us to have more time for practice in the classroom”). In this particular case, 60% of the participants supported the three highest options, whereas 22.2% had no opinion. The students also indicated that watching at home instructional videos and recorded lectures explaining the theoretical parts would be a good way to enrich our English language course (options 5, 6, and 7: 73.3%).

## Conclusion

The first steps taken in our study of the design and development phases have shown that the creation and implementation of tailor-made online learning resources could play a very positive and effective role in the practice of academic writing. Examining students’ needs and perceptions, before implementing the resulting materials, has proven to be very helpful when trying to reduce the level of ambiguity that language instructors encounter when they design their own learning resources.

Preliminary findings have revealed that instructional videos, recorded lectures and other remotely-accessible pedagogical materials aimed at fostering the writing skills could be seen as effective resources and how pre-class preparation could free up class time for more meaningful tasks. The flipped classroom method could also provide ESP in general and academic writing in particular with the necessary tools to make our language learning context more dynamic, attractive, flexible, and effective. This approach to the language learning process would also enable us to redesign the rest of the sections and think about other innovative ways of addressing listening, speaking and reading in specialised contexts.



Students' responses to the online questionnaire allowed us to start to confirm that they see academic writing as an essential component and also to analyse the advantages, limitations as well as possible impact of the application of the recent model of blended learning known as flipped or inverted classroom. In this specific case, the online channel in general and the flipped classroom method in particular could be regarded as a way of adapting to specialised fields immersed in constant change, providing students with up-to-date solutions, remodelling the materials and resources on a more regular basis in order to meet the requirements set by each specific learning context, covering all the sections of a very comprehensive syllabus, and adding flexibility to language learning practice in technical and scientific scenarios. It would also allow language learners and instructors alike more time-flexibility to cover all the units and learning goals of our comprehensive English course.

As for the directions for future research, it will be a must to validate the resulting learning resources and the new method of implementation so that more conclusive evidence can be obtained. In order to respond to two other primary goals, we would also need to observe the role that the flipped classroom method can play in the field of listening comprehension and the reorganisation of the whole syllabus to provide our students with adapted resources based on their specialisation fields. Additionally, another aim and possible application would be to convert a selection of the validated resources for the practice of listening comprehension and writing, which would emerge from our UPM's Educational Innovation project, into an internationally accessible Massive Open Online (Language) Course (LMOOC).

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## Distance Learning in Higher Education in Brazil

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### Abstract

Distance Education has been undergoing significant changes in recent years in higher education in Brazil, both due to new legal documents published, as well as the increase in the number of face-to-face learning centers and the diversification of courses and institutions that offer the modality. The purpose of this article is to provide a mapping of this scenario and to reflect on the future of distance education in higher education in the country. The methodology centers on the analysis of the new Brazilian legislation on DE and its social impacts. The text initially presents an overview of the history of distance education in Brazil. Next, it discusses the history, characteristics, and challenges of the Open University of Brazil. Among the changes introduced by the new legislation, the following are highlighted: a 40% increase in the possibility of offering distance activities in face-to-face courses; the permission for the accreditation of a higher education institution exclusively for the provision of distance education courses; the permission for higher education institutions to open learning centers abroad; greater flexibility and agility in the legal process of opening learning centers; admission of a partnership between accredited distance learning institutions and legal entities, including professional environments, for the operation of the learning centers and the performance of mandatory classroom activities; permission for digital collection of essential and complementary bibliographies for the courses, that is, digital libraries; possibility of distance courses without face-to-face activities and final exams; and the authorization to offer masters and doctorate courses at a distance. The discussion includes the reflection that the Open University of Brazil is neither a university nor open, and that it faces a problem concerning the institutionalization of the works of its tutors. These changes introduced by legislation tend to significantly alter the scenario of higher education in Brazil, which can already be observed by the rapid growth in the number of face-to-face learning centers. However, these changes have also generated reactions from some sectors of society, such as the Health Councils. The article concludes that the challenge for the expansion of access to higher education in the country through distance education is quality control so that this control does not prevent the growth of the sector.

**Keywords:** Distance Education, Higher Education, Legislation, Learning Centers

### Introduction

Tait and O'Rourke (2014) discuss the relationships between online distance education and social justice. The concept of social justice involves the rights of both individuals and society. Distance Education (DE) is naturally associated with expanding access to education. Thus, the provision of access to groups to whom



such opportunity has traditionally been denied would be an essential contribution of DE to social justice. However, the modality also faces criticism, for example, regarding the de-contextualization of the teaching and learning process, the distance between the participants, and the profits obtained by the companies that work in the area, which would not be reverted to society. In this sense, one must remember the high dropout rates of DE courses, when compared to face-to-face education (Woodley & Simpson, 2014). Rumble (2014) draws attention to the pricing of distance learning courses in developing countries where the costs of imported technologies are high and, in many cases, even access to the Internet is limited. There would, therefore, be a large gap between rhetoric and reality: “The fact is that in poor countries, many of the students who would most benefit from access to e-learning simply cannot afford it.” (Rumble, 2014, p. 208). After all, distance education contributes to or detracts from social justice?

Tait and O'Rourke (2014) point out the importance of quality control in distance education, so that learning materials, resources, services, and administrative and support systems meet acceptable standards. The authors then propose a framework to guide social justice audits in DE, including aspects related to quality control. Distance education has undergone significant changes in recent years in Brazil, mainly due to new legislation. The problem addressed by this paper is: In what ways is this new legislation affecting the scenario of DE in the country? This is an exploratory and documentary research. The methodological procedures involve the analysis and discussion of the new Brazilian legislation on distance education in Brazil.

## Results

In 1996, the National Educational Law of Policies and Bases officially introduced distance education in Brazil, which was however only regulated by Decree No. 5,622 (Brazil, 2005), revoked by Decree No. 9,057 (Brazil, 2017c). The accreditation for the Brazilian higher education institutions to deliver distance education courses begins in 1999. Ordinance 2,253 (Brazil, 2001) authorized the delivery of disciplines at a distance up to 20% of face-to-face courses load, which contributed to the development of DE in the country, since many higher education institutions initially offered distance disciplines in face-to-face courses, before offering full courses at a distance. Ordinance 2 defined the concept of face-to-face support learning centers (polos de apoio presencial), an essential characteristic of DE in Brazil: “the operational unit for the decentralized development of pedagogical and administrative activities related to disciplines and courses offered at a distance” (Brazil, 2007). Several attempts to create an Open University have failed in Brazil for decades. In 1972, for example, two years after the founding of The United Kingdom Open University (UKOU), a group of educators was sent to England by the Brazilian government. This group, however, produced a report with a negative view of the English initiative.

Only in 2006 Decree No. 5,800 (Brazil, 2006) was approved, creating the UAB System (Open University of Brazil). According to CAPES — (Coordination for the Improvement of Higher Education Personnel (SISUAB, 2019)), a foundation linked to the Ministry of Education that coordinates post-graduation in Brazil, the UAB System included, at the beginning of 2019, 97 public educational institutions offered around 800 courses. The system is maintained in collaboration with states and counties. The function of the learning centers is to guarantee academic, technological, and administrative support for the activities coordinated by the higher education institutions.



Ordinance 1,428 (Brazil, 2018) extended the possibility of offering disciplines at a distance in face-to-face undergraduate courses from 20% to 40% of the course load. One of the relevant changes introduced by the new legislation is the permission for the accreditation of a higher education institution exclusively for the delivery of undergraduate and certificate courses at a distance. Previously, the legislation required that, for the accreditation to offer higher education courses at a distance, the institution needed first to offer face-to-face courses. The concept of a distance education learning center (polo) was redefined by Decree 9,057 (Brazil, 2017c) and modified by Decree 9,235 (Brazil, 2017b). The distance education learning center is the decentralized unit of the higher education institution, in Brazil or abroad, for the development of face-to-face activities related to courses offered at a distance. The centers shall maintain physical, technological, and personnel infrastructure adequate for the pedagogical projects of the courses or the development of the institution. From then on, higher education institutions can create learning centers abroad. Until that time, however, the institutions were only allowed to open learning centers in Brazil.

Decree 9,057 (Brazil, 2017c) and Ordinance 11 (Brazil, 2017a) sped up the process of opening learning centers. Previously, higher education institutions needed to request to the Ministry of Education and await the visits of evaluation commissions and the publication of the authorizations, which could take years. During this period, however, the centers could not begin their activities. Under the new legislation, higher education institutions are autonomous to create learning centers, no longer depending on the evaluation or permission by the Ministry of Education to authorize its operation, needing only to communicate the action to the Ministry. However, the number of learning centers that a higher education institution can create per year is limited, depending on its evaluation results: 50 centers per year (grade 3 or still pending), 150 centers (grade 4) and 250 (grade 5).

Another amendment proposed by Decree 9,057 and Ordinance 11 is the admission of partnerships between educational institutions and other organizations, such as professional environments, for carrying out the mandatory face-to-face activities. Another change introduced by the new legislation was permission to use digital libraries. Previously, the learning centers needed were required to have a physical collection of books with many copies, reproducing the structure of a physical library. The new legislation also mentions the possibility for proposals without face-to-face activities and final exams, until then a requirement.

The new legislation also introduces essential changes in postgraduate studies in Brazil. The higher education institutions accredited to offer undergraduate courses at a distance are automatically authorized to offer certificate courses at a distance, which do not even depend on any authorization from the Ministry of Education. Ordinance 90 (Brazil, 2019), in turn, regulated the postgraduate programs such as Masters and Doctorates at a distance. Even in these cases, in which the student is more mature and could be considered more apt to organize his studies at a distance, the Brazilian legislation maintained the requirements for the accomplishment of several face-to-face activities. It is important to emphasize that Ordinance 90 allows the submission of associative proposals for Masters and Doctorate courses, that is, courses offered collaboratively by more than one institution, which may, therefore, include partnerships between Brazilian and foreign educational institutions.



## Discussion

It is notable that the Open University of Brazil is not a university (such as the Spanish UNED and the British Open University), but a system composed of several public higher education institutions. As this system is based on face-to-face universities, it naturally inherits the problems and vices of face-to-face education. However, the Open University of Brazil is neither open, since, for admission, candidates must have completed primary education and pass tests. Besides, UAB's project was not born or developed with the mindset of the movement of open educational resources (OERs) and open education. It faces a lack of OER policies and repositories, as well as conceptual and practical difficulties regarding aspects such as licensing and Creative Commons (CC) licenses; materials were created without procedures or licenses to allow openness; and one finds informal and isolated practices related to difficulties regarding UAB and DE institutionalization, limited technical and financial support for collaboration and resource reuse, and lack of government and institutional policies for sharing and reuse of resources (Amiel, Duran, & Costa, 2017; Heredia, Moraes, & Vieira, 2016; Soares & Amiel, 2017).

Seeking to correct this course, Resolution 1 (Brazil, 2016a) states that higher education institutions and other public organizations that finance or foster distance education, shall ensure the creation, availability, use and management of open educational technologies and resources, by means of free licenses, to facilitate the use, revision, translation, adaptation, remixing, distribution and free sharing by citizens, while protecting the pertinent copyrights. In the same direction, Ordinance 183 (Brazil, 2016b) now requires that the resources produced for the Open University of Brazil be licensed as open. Besides, one hopes that resources already produced for UAB are converted to open educational resources. EduCapes ([www.educapes.capes.gov.br](http://www.educapes.capes.gov.br)), for example, was born in 2016 to compile resources produced for the Open University of Brazil with public resources.

In addition to these discussions about the Open University of Brazil, the new elements introduced by the new legislation should significantly change the scenario of distance education in Brazil. For instance, the possibility of now offering 40% of disciplines at a distance in face-to-face undergraduate courses tends to increase the demand for content for DE, tutors and instructors, which should generate a new cycle of growth of the modality in the country, after the expansion verified because of the development of the Internet, in the years 2000. Another change that tends to contribute to the expansion of the distance education market in higher education in Brazil is the fact that, now, educational institutions can offer distance learning courses without the need of previously offering face-to-face courses. Thus, prominent international educational groups in DE, for example, could establish themselves in Brazil without the obligation to offer face-to-face teaching. The new legislation also expands the universe of potential distance education students, since Brazilians residing abroad can participate in face-to-face activities in the countries where they reside.

Another trend, which can already be measured, is substantial growth of the learning centers. The new distance education legislation in Brazil made the process of opening learning centers more flexible, which led to an explosion, making it clear that there was a repressed demand. From 2010 to June 2017, about 9,900 learning centers were accredited in the country. With the Decree and the Ordinance of 2017, more than 15 thousand new learning centers were accredited. This growth, associated with the possibility of using professional environments for face-to-face activities and the introduction of digital libraries, tends to





generate significant changes in the scenario of DE in Brazilian higher education. However, the Ministry of Education has recently announced the possibility of reviewing the accreditation processes of new poles as a result of this astonishing growth, to assess and ensure the quality of the DE courses offered in the country (MEC, 2019).

On the other hand, the Health Professional Councils have questioned in an orchestrated way, the feasibility of undergraduate courses at a distance in the area, the quality of the face-to-face learning centers and the evaluation capacity of the Ministry of Education. This movement involves other Health Councils, such as Physical Education and Social Work. The Federal Council of Veterinary Medicine, for example, prevented the enrollment of students from distance courses at the beginning of 2019, which in practice made their professional performance unfeasible (Dayrell, 2019). Soon after, the Councils of Architecture, Pharmacy, and Dentistry followed the same path (Pinho, 2019).

Finally, at the postgraduate level, the opening of distance masters and doctorates will allow, for example, those living in the North and Northeast of Brazil not to abandon their families and/or their jobs and move to the South and Southeast regions, where the offer of these face-to-face courses is broader and presents higher quality. In this sense, DE will be contributing to social justice, as advocated by Tait and O'Rourke (2014).

### **Conclusion**

In this paper, we outlined the scenario of distance education in Higher Education in Brazil, analyzed the reactions of some sectors of society and anticipated the consequences of growth in the area. In the horizon of Brazilian DE, innovation can be a driving force, including the design of blended courses, combining active teaching and learning methodologies with innovative technologies and distance and face-to-face activities. Even in higher education courses in the health area, for example, or in others whose councils have been questioning the validity of distance education, such as Architecture, it is possible to conceive that some activities are carried out at a distance, without dismissing practical activities in laboratories and other professional environments. In any case, as we have seen, there is the concern by segments of society (such as the Health Councils) and the Ministry of Education itself, regarding the quality of courses offered at a distance. The intense growth observed in the area in the last years, therefore, needs to be accompanied by an evaluation by the government and even other sectors of society. In this sense, one should remember that Tait and O'Rourke (2014) propose that DE evaluation be carried out in a participative way, involving the various stakeholders who are affected by the process of teaching and learning at a distance or interested in it. It is possible, therefore, to take into consideration its proposal of social justice audit to project the future of distance education in Brazil.

### **Acknowledgements**

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## Mixed Media: Dual Online Methodologies for a Complex Audience

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### Abstract

Clinical Research Development Ireland (CRDI) is a partnership of six universities, focused on collaborative research and education. CRDI has a major interest in online learning as a means of interacting with our widespread audience. This work, addressing an established need for training to deal with major change in the regulatory requirements for medical devices, takes us beyond our core audience of postgraduate and postdoctoral researchers towards broader research teams in academia and in industry. These considerations have led us to couple formal eLearning delivery with an interactive online portal concept, utilising common materials but catering to different needs in our audience. MedTech is important to the Irish and EU economies with the sector contributing €115 billion in 2018. With some 500,000+ devices on the EU market, the variation in their complexity and risk profile makes the regulation of their safety, and consistency of performance, challenging. To address this, and to ensure the enforcement of harmonised regulation across EU member states, the EU Medical Device Regulations were implemented in 2017. Significantly, a paucity of regulatory science training has been recognised at EU level as a key barrier to successful research translation with the potential to impact patient access to innovative devices. CRDI has partnered with CÚRAM, the SFI Centre for Research in Medical Devices, to produce eLearning and innovative online resources to address this skills shortage. An online course, 'Fundamentals in Medical Device Design and Regulation', has been developed to include interactive components and video case-studies pertinent to device development and the EU medical device regulatory framework from the perspectives of academia, industry and national regulatory agencies. Successful completion of this module results in the award of a digital badge (open badges compliant) to accompany the formal ECTS credit. In tandem, we have developed an interactive 'MedTechTranslate' web portal that provides regulatory guidance linked to a stage-of-device-development framework. This is designed to be interrogated by those active in medical device design and development to gain an understanding of what they need to do in pursuing regulatory compliance for their particular device type. Our stage-of-device-development framework will facilitate understanding in other areas key to successful medical device development and commercialisation. Phased updates of the MedTechTranslate portal will incorporate access to specialist clinical advice, as well as quality and standards, clinical trial design and health economics support.

**Keywords:** eLearning, Online Portal, Open Badges, Clinical Research, Medical Devices, Regulation



## Introduction

### *Regulatory Knowledge in Research – A Need for Sectoral Upskilling*

The EU, in its H2020 Coordination and Support Action, identifies, in part, the lack of medical device regulatory training in the field of medicine as a significant reason for the failure of researchers to incorporate regulatory strategy in their work, thus hindering its translation for market and ultimately depriving patient access to the latest technologies and advances in care<sup>5</sup>. A new EU medical device regulatory (MDR) framework, adopted in 2017, will be fully enforceable in Europe in 2020<sup>24</sup>. The MDR is designed to enhance and strengthen the existing regulatory system whilst supporting innovation and growth in the sector. It will, when fully applied, influence and shape the entire device development process from product ideation through to market. The transparency and ongoing evaluation of clinical data and conduct of clinical investigations are central to its requirements<sup>11</sup>. The MedTech industry is estimated to be worth €118 billion to the EU economy with the EU market second only in size to the US worldwide. Ireland figures prominently in the sector as it has the highest number of personnel per capita employed in healthcare technology and ranks second as the largest exporter of medical devices in the EU<sup>22</sup>. For Ireland, and Europe, to continue to drive innovation in this sector it is crucial that researchers and developers of devices are versed in the requirements of the MDR, and appreciate the importance of clinical engagement in device R&D.

A collaborative, multidisciplinary approach, involving key stakeholders, was taken to respond to this need. The work was coordinated through a partnership between Clinical Research Development Ireland (CRDI) and CÚRAM. CRDI is a long-established not-for-profit partnership comprising Irish six academic institutions whose overarching mission is to advance patient care and health service delivery through clinical and translational research. Part of this work is to support research translation through collaborative, multidisciplinary educational and training resource development and delivery. CÚRAM is the Science Foundation Ireland Centre for Research in Medical Devices. CÚRAM's work focuses on medical device research in collaboration with industry with a remit to develop innovative device-based solutions for global chronic disease and to drive sustainability of the MedTech sector in Ireland by training future innovation leaders. In support of this work CRDI benefits from close links with the national clinical research infrastructure as it hosts HRB Clinical Research Coordination Ireland (HRB CRCI), whose remit it is to support collaborative clinical trials activity through the infrastructure and resources of its partner clinical research facilities/centres in Ireland.

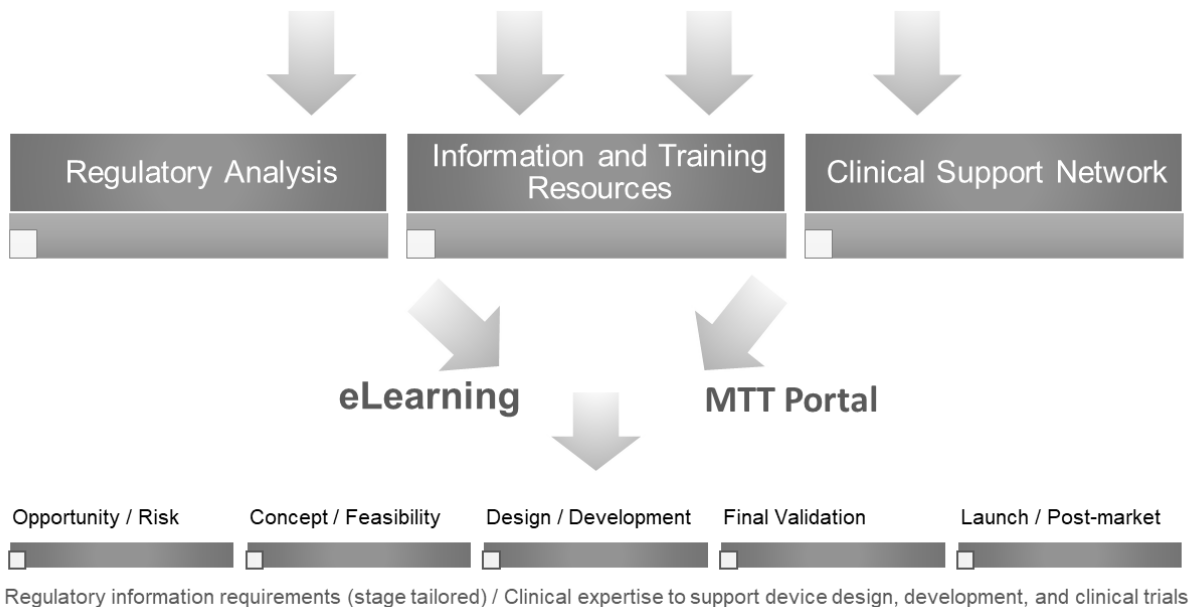
Project regulatory knowledge requirements are reinforced by expertise provided by the Irish national competent authority, the Health Products Regulatory Authority (HPRA) and the National Standards Authority of Ireland (NSAI). The NSAI, a designated notified body, is responsible for the medical device market approvals process within the parameters of the EU medical device legislative framework. The HPRA is responsible for oversight of, and control of, the performance and activities of notified bodies operating in its jurisdiction as well as the safety and performance of medical devices in Ireland. The perspective of industry is provided by Aerogen Ltd., an Irish aerosol drug delivery company which develops nebulisers for use in diverse clinical settings.

CRDI and CÚRAM have assessed and reported on how the introduction of the MDR will affect medical device research nationally and Europe-wide<sup>2</sup>. In combining expertise across the sector (Figure 1), we aimed to



develop an appropriate set of resources and training provision which could be offered to all relevant stakeholders, including researchers in academia and industry. In order to reach such a diverse audience, the most practicable strategy was to provide such training online. The two principal challenges in such work, however, are: (a) how best to convey the salient content of the MDR in an engaging and easily understandable manner so that it makes sense, in the context of research translation, for a non-regulatory-expert audience; and (b) how best to maximise the impact of project outputs to meet the differing regulatory training needs and expectations of our audience (industry and academia; diverse roles and stages of career development). Furthermore, rather than simply ‘delivering training’, we wished to ensure that we could take the learning experience beyond the classroom and marry it to the device design and development process.

**HPRA, NSAI, Industry, HRB CRCI, Academia, Clinicians, Multimedia  
Expertise, Resources, Case Studies**



**Figure 1. Collaborative stakeholder engagement and project resources used to underpin and inform the design and development of e-Learning and online information and training resources, the MedTechTranslate (MTT) portal and clinician expertise database.**

**Methods**

*Development of Courses & Materials*

Two specific approaches were taken. Firstly, a multimedia-rich, online course, entitled ‘Fundamentals in Medical Device Design and Regulation (FMDDR) was designed and comprised two modules: ‘Principles of Medical Device Design’ and ‘EU Regulation of Medical Devices’. Supported by expert-led workshops, these appeal, in the main, to our academic (PhD and Post-doctoral researchers) audience in that they address in a global sense concepts central to device design and regulation alike, whilst also providing formal academic recognition through ECTS. In addition, we use ‘digital open badges’ to provide both a flexible, transferrable, digital form of credential and to signal formal endorsement of the programme by CRDI. Secondly, targeted at a broader audience beyond the classroom, we are developing an interactive regulatory guidance and



information portal, 'MedTechTranslate'. This focuses on providing regulatory content to users who are engaged in current device development projects, and will, on completion, also house a clinician network database, offering access to relevant clinical expertise and specialist trials support.

Importantly, much of the regulatory content, interactive resources and video case studies are suitable for use in the development of both eLearning and portal platforms. Combined, these outputs are designed to be attractive to a diverse audience in that they incorporate through formal teaching channels the fundamentals of device design and development, introduce the MDR, its requirements and processes and equally, through the portal, enable those actively involved in device development to consider key regulatory requirements and pathways pertinent to their needs.

*Design Considerations & Framework*

There is increasing recognition of the value in taking a design-oriented approach to the development of courses and curriculum. Indeed, Laurillard (2012) has argued that teaching should be considered as a 'Design Science', by which she means that it "builds on design principles and the heuristics of practice, [using] what has gone before as a platform or inspiration for what it creates<sup>21</sup>". Rather than simply constructing a curriculum on the basis of content lists, effective course design requires the adoption of a design framework and careful evaluation of a range of different types of learner activity and engagement. We adopted the 'ADDIE' instructional design model' (Figure 2) to develop the online resources. This 5 step model (Analysis, Design, Development, Implementation and Execution) allows for an analytical needs-driven approach to content delivery for targeted audiences<sup>10</sup>.



**Figure 2. ADDIE e-Learning structure mapped to design, development, implementation and evaluation activities for project regulatory resource generation. Adapted from: Ghiardini, B. (2011) E-learning methodologies<sup>10</sup>. Instructional Design: ID; Higher Education Institution: HEI**



Use of ADDIE principles was combined with the well-established model of device development (Stanford Stage Gate Process of Medical Device Development) to produce MedTechTranslate. The stage gate model describes a five-phase 'go-no-go' framework starting from product ideation through to launch and beyond (Figure 3)<sup>25</sup>. This structural design is key to its purpose as an interactive online research support tool to aid decision making. Resource design and development was undertaken by BigTop Multimedia, in collaboration with CRDI, using Moodle as the eLearning platform and WordPress (with Google Analytics enabled) for the portal. A range of industry standard packages and tools were used for content design (including Adobe Illustrator, Photoshop, After Effects, and Final Cut Pro) and video materials were hosted on Vimeo Pro. Given the particular needs of our target audience(s) and the specialist nature of the field, we incorporated a number of distinctive features and content types into the eLearning modules and the portal offerings based on consultation and evaluation.

## Results

The target audience with respect to the eLearning modules includes, in the first instance, Irish biomedical researchers, clinician academics and those outside academia requiring a generalised introduction to the MDR. Conversely, the MedTechTranslate web portal, as a public facing resource, is being executed with an eye to broader application for relevant audiences involved in early-stage innovation including MedTech accelerator programmes, enterprise supported high potential start-up companies and clients of HRB CRDI.

### *Analysis*

Having identified our target audience and established the sectoral regulatory knowledge and skills gaps we next focused on identifying the eLearning and portal resource requirements. This primarily centred on developing a means to enable target audiences to easily access and readily assimilate complex regulatory concepts delivered at a level and pace suitable to their stage of career or pertinent to their stage of device development. Regulatory content was sourced from published legislative documents<sup>6,7,24</sup> and a number of pertinent regulatory databases and resources, including those of the EU Commission, the National Competent Authority and industry representative bodies<sup>9,12,18,19, 23</sup>.

## Design and Development

Next steps involved the delineation of: (i) learning objectives; (ii) the design approach for eLearning and MedTechTranslate; (iii) the digital open badge

### *(i) Learning Objectives:*

In broad terms the learning objectives of both the eLearning and web portal are similar in that they should enable learners/users to describe and understand the MDR and its requirements from the perspective of the medical device design and development process. To appeal to the diversity of our audience, a blended/multimedia-enriched learning approach underpinned all resource development and project activities.





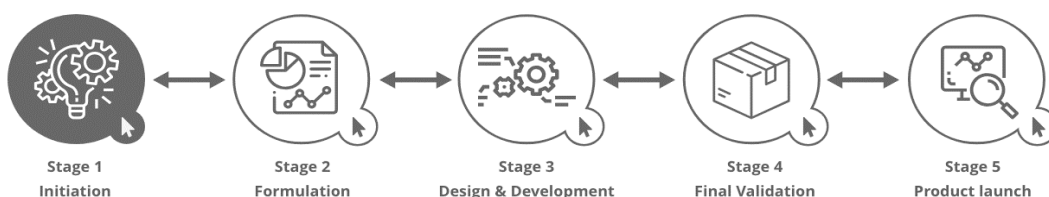
*(ii) Design Approach for eLearning and MedTechTranslate:*

**EU Regulation of Medical Devices Module:** Introduces the MDR, describes the market approvals process, and discusses the importance of balancing early access to innovation with the need to uphold standards of safety and quality. The design strategy for ‘EU Regulation of Medical Device’ centres on the creation of content focusing on the concept of regulation as an integral whole life cycle process, impacting device design and development from concept to commercialisation. The content was sub-divided into ‘bite-sized’ topics and sequenced to progressively build knowledge and understanding. Elements included discrete interactive HTML5 components and used cartoon-like graphics to promote engagement. Key messages are reinforced by video case studies (straight to camera pieces), iteratively and collaboratively developed, from the perspective of industry (Aerogen Ltd.) and the regulatory authorities (NSAI). Supporting resources will include access to the relevant legislative and supporting interpretive/guidance documents and an expert led case study based workshop.

**Principles of Medical Device Design Module:** This is a pre-existing module developed by CRDI and CÚRAM to meet earlier partnership training objectives. Principles of Medical Device Design is designed to speak to the central tenets and methods of engineering and how they integrate with the biological sciences. As such it describes the design process and in support of research translation discusses how devices are tested for market. Content is delivered by online video lectures based on the contributions of world class medical device researchers. Supporting resources include relevant academic literature and an expert-led problem-based workshop designed to critically analyse real world examples of research focused device design projects.

**Fundamentals in Medical Device Design and Regulation:** We combined Principles of Medical Device Design with EU Regulation of Medical Devices to produce ‘Fundamentals of Medical Device Design and Regulation’ (FMDDR) to reinforce our overarching focus on integrating regulatory concepts into the medical device design and development process. In doing so the aim was to extend the potential, and broaden the audience base of both modules as they would, in combination, appeal to a wider audience, academia in particular.

**MedTechTranslate portal:** In contrast MedTechTranslate will, on completion (early 2020) deliver regulatory content to industry in a device related stage-of-development focused manner. As such, on interrogation portal outputs can: (a) be mapped to the medical device life cycle; (b) signpost users to regulatory organisations; and (c) provide access to pertinent resources to include access to clinical support. Importantly, speaking to the cross-over capability of project resources, it is also envisaged that MedTechTranslate, will have the capacity to serve as a tool for problem based learning, to complement eLearning workshop activities.



**Figure 3. MedTechTranslate will be formatted to deliver regulatory concepts based on a stage-gated framework<sup>25</sup> describing the device realisation process interspersed with critical ‘go no go’ decision gat**



In addition, the portal will also host a clinical ‘expertise registry’, developed in conjunction with HRB CRI to complement their existing National Study Feasibility Programme<sup>13</sup>. Through this facility MedTechTranslate users can request clinical input, advice or support from other registered users with a background relevant to their project needs and an expressed an interest in, or experience of, supporting medical device development. In time, the portal will also include additional guidance on clinical data, quality management systems and health technology assessment requirements for medical devices.

*(iii) Digital Open Badge:*

Increasingly recognised as an effective means of recognising achievement and skills development, digital open badges can act as a complement of, or an alternative to, traditional academic credit. Properly designed, with clearly specified learning outcomes, evidence of achievement, and issued by a recognised professional body or organisation, such digital credentials are well suited to recording continuing professional development and can be shared on a number of e-portfolio, electronic CV, and recruitment platforms<sup>1,3</sup>.

A CRDI Open Badge was formulated to accompany the FMDDR eLearning course. By using the Open Badge Infrastructure standard, this digital artefact allows for the inclusion of a formal record of achievement and details of the course objectives and core competencies within the embedded metadata. It is also transferrable and shareable across multiple platforms and systems<sup>14</sup>. CRDI Open Badges are expressed in JSON-LD (JavaScript Object Notation Linked Data), a data-interchange format. Badges are issued using Moodle LMS and can be uploaded/stored or shared through ‘Open Badge Backpacks’.



**Figure 4. A CRDI Open Badge was designed to mark successful completion of ‘Fundamentals in Medical Device Design’ course requirements and support CPD for participants not eligible for, or claiming, ECTS**

## Implementation

FMDDR, formally accredited by NUI Galway, was rated at 5 ECTS at NFQ level 9, allowing incorporation within structured PhD programmes. The CRDI open badge accreditation supports CPD for course participants interested in building up their skills portfolio and to acknowledge successful course completion for those not eligible for, or not pursuing, ECTS. FMDDR was made available in December 2017. eLearning participation, progress and learning is reinforced by interactive self-testing throughout the modules, and successful completion is based on online MCQ examination and satisfactory participation in the problem-solving workshops. MedTechTranslate will also utilise interactive self-testing with user progression being reinforced

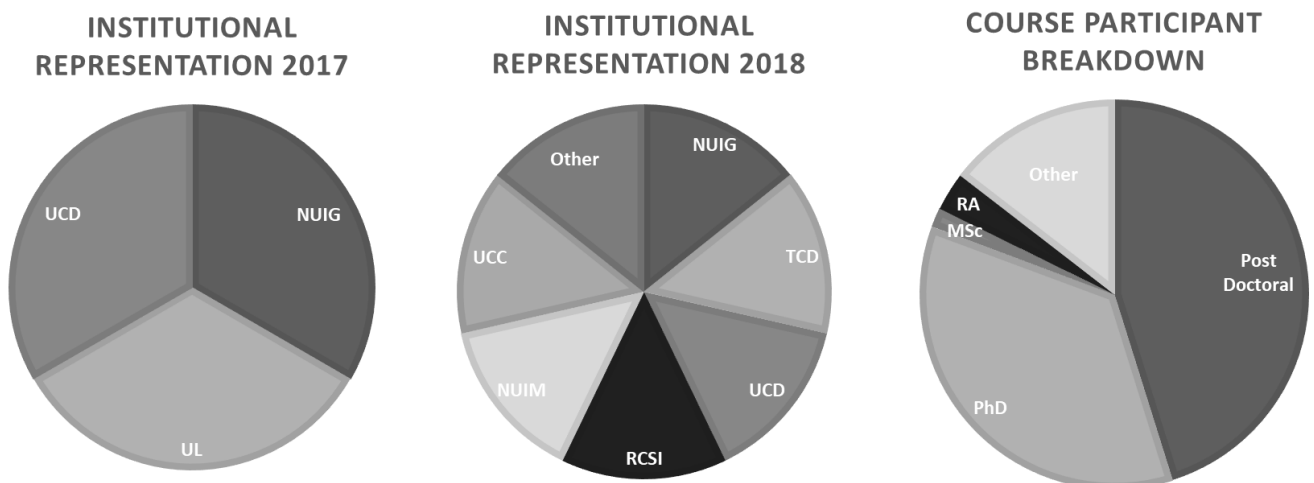


by having them consider indicative ‘go-no-go’ decision gates strategically aligned to the device development journey.

## Evaluation

Appraisal of content and approach during the design and development phases was supported by regular stakeholder meetings and end user feedback as and when required. MedTechTranslate will undergo thorough  $\beta$ -testing prior to launch by cohorts of representative users to include biomedical researchers, clinical academics and individuals actively involved in early-stage commercial device development projects. Testing will serve to establish their impressions of the ‘user experience’ as well as to establish the quality, performance, stability, security and reliability of the web portal. Annual evaluation of the eLearning courses is undertaken by online survey (SurveyMonkey) with a view to: (a) gathering course participant reaction to the module content (volume / clarity / logical approach to delivery) and its relevance to their needs; (b) to establish their expectations and levels of satisfaction with the course; and (c) to inform course improvement objectives for subsequent delivery. To date a total of 59 participants have partaken of FMDDR. All have been awarded a CRDI certificate/transcript and digital open badge.

Now entering its third year of delivery FMDDR has, since its launch, seen a doubling of course participation and a similar increase in higher education institution representation, married to a growing interest from individuals outside academia. Participants to date have varied in terms of their stage of research/career development and are of varying biomedical, bioengineering, clinical academic and industry backgrounds (Figure 5). Importantly, in the context of meeting the need for regulatory training for clinical/research audiences, some 87% of respondents to the end of year surveys reported positively that ‘EU Regulation of Medical Devices’ made a contribution to their knowledge and understanding of the topic.



**Figure 5. FMDDR course participation and university representation has increased more than two fold since its 2017 launch with a participation reach representative of the intended target audiences.**



## Conclusion

Medical devices and the MedTech industry are recognised as a key source of innovation in healthcare in Europe and a key driver for economic growth<sup>15,24</sup>. Regulation is, in this regard, central to ensuring a harmonised approach to sector growth and competitiveness<sup>8,24</sup>. However a lack of regulatory training and awareness in clinical academia and industry are recognised as holding back innovation and patient access to state of the art care<sup>5</sup>. As we identified at the outset, the three main challenges in addressing this training need are: (a) being able to deliver regulatory content in an engaging and effective manner; (b) providing access to such training to optimise participation; and (c) meet the differing needs of those in academic and industry sectors. Our approach to date has addressed these challenges effectively and has highlighted the potential of collaborative development of high-quality digital learning resources.

One of the distinctive aspects of this work is that, unlike other online regulatory training courses, our module is not targeted at those seeking a formal professional regulatory qualification, but is designed to support the dissemination of knowledge (and understanding) of regulatory concepts to research and early innovation audiences with a view to embedding this new knowledge into their work. The two-pronged approach of developing eLearning courses and the portal system, reflects the identified need to have complementary resources that allow users to navigate the regulatory system in a simplified structured way according to need or interest (Table 1). The availability of resources such as these, have been flagged by a number of national agencies involved in MedTech innovation support, including HRB CRCI, as being a vital and much needed resource for the sector, high potential start-up companies and small/medium enterprises in particular. Facilitating flexible, self-directed learning allows participants, in an online environment, to take ownership of their learning and professional development, whilst connecting them with key regulatory resources. The associated workshops reinforce learning through discussion and promote greater communication with academic, industry and regulatory experts to whom they may otherwise not have access to outside of this arena.

Resource		PMDD	EURMD	MTT Portal
1	Facilitate flexible self-directed learning / information gathering	✓	✓	✓
2	ECTS / Open Badge accredited	✓	✓	
3	Delivers primary content in video lecture format	✓		
4	Delivers primary content in small digestible 'bite size' chunks		✓	
5	Delivers content in device inked stage-of-development format			✓
6	Content delivery and learning supported by:	interactive HTML5 resources	✓	✓
		video case studies		✓
		'in person' workshops	✓	✓

**Table 1: Outlines the contrasting and shared features of the project's eLearning and portal resources. MTT: MedTechTranslate; PMDD: Principles of Medical Device Design; EURMD: EU Regulation of Medical Devices.**



The increase in course uptake since launch in 2017 and positive response of participants to their learning experience demonstrates the demand for regulatory knowledge in this sector and reflects positively on the pedagogical approach. Equally the open badges, in addition to acknowledging continued learning and motivating users to course completion, also serve to drive training delivery beyond academia into industry as device developers seek to acquire new knowledge and incorporate this into existing roles and work related activities.

In summary, the new EU medical device regulatory framework, has the potential to impact research and ambition for market. The CRDI / CÚRAM partnership speaks directly to providing 'new skills for living and working in new times' in that its work, in delivering on strengthening knowledge capacity in the sector, parallels economic, research and innovation priorities set at national and EU level<sup>15,16,17</sup>. The challenge in this instance was addressing, in an engaging and accessible way, the learning needs of discrete yet interdependent audiences. In this regard the partnership has proven to be highly effective in terms of garnering the relevant expertise and insight needed to meet project objectives. CÚRAM, in particular, as the national centre for medical device research, provides a unique ideal initial test bed for the use of these resources in that it comprises a diverse innovation focused, clinically engaged, biomedical research community. As complimentary regulatory training, guidance and information resources FMDDR and MedTechTranslate, supported by ECTS and Digital Open Badge accreditation, have broad sector appeal with the potential, through MedTechTranslate in particular, to support research innovation and commercialisation in the classroom and beyond.

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## Good Practices in Online and Distance Education Higher Education in Latin America and the Caribbean

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### Abstract

One line of strategy pursued by the Latin American and Caribbean Institute for Quality in Distance Higher Education (CALED) is to consolidate a Latin America and Caribbean team of experts in quality distance higher education, by educating academic and administrative personnel at Latin American and Caribbean universities who are interested in distance education and are offering a full range of high-quality Distance Education. In this context, it has been indispensable to develop training courses and/or programs about distance educational quality, evaluation, accreditation and degree certification, programs and/or courses in the distance or on-line modality, to generate quality improvement processes in these institutions. CALED's experience began growing in 2010, by developing the course on Self-Assessment of Virtual Courses for Ongoing Education, designed to understand and apply theoretical and methodological foundations to evaluating virtual courses for ongoing education, which has evolved through five editions. In 2011, CALED offered the course for Self-Assessment of Undergraduate Distance Programs, to share the distance undergraduate program evaluation model, designed by the Institute, with other interested institutions. This course has grown through four editions. In 2015, the International Diploma Program began on Evaluating Quality in Distance Higher Education programs, with the mission of encouraging quality in virtual settings, by educating human resources, preparing evaluation criteria, and fostering a culture of quality, through three modules. The first addresses quality, evaluation, and standards of distance higher education; the second presents the OLC-CALED Scorecard and its operation in detail; and the third lays the foundations to carry out a self-assessment project. The program has evolved through five editions, and has graduated over 200 participants from Latin American and Caribbean countries.

**Keywords:** Education, Distance, Evaluation, Quality, Criteria, Program

### Introduction

Since its outset in 2005, the Latin American and Caribbean Institute for Quality in Distance Education (CALED) has been concerned with distance higher education quality, especially and relevantly in university studies. Therefore, CALED considers it indispensable to have duly educated and trained academic and administrative professionals in areas regarding distance education, evaluation, accreditation and the regulatory framework governing it all. CALED's fundamental purpose is to consolidate a Latin American and Caribbean team of experts in distance higher education quality. In this context, CALED has considered it indispensable to develop training programs and/or courses about distance educational quality, evaluation, accreditation and degree





certification processes, programs and/or courses in the distance or on-line modality, making it possible to establish contacts, discover and share opinions about distance and/or on-line education, emerging technologies and best practices for efficient learning and also to generate ongoing improvement processes in institutions. This contributes to pursuing its lines of strategy by offering the university community an array of training programs oriented toward strengthening higher educational quality.

## Discussion

Social and technological progress has enabled the available virtual courses and academic distance and on-line programs to grow day by day over recent years. It has become a key factor in changing education, using new technologies to optimize efforts and offer a richer range of education. Therefore, a course provides a framework for the different protagonists in the educational process to interact with each other instantly, at any time and from anywhere, giving them the tools to do their coursework effectively. However, along with this growth, new questions arise about coverage, quality, and equity in educational systems, due to the lack of standards and regulations to regulate distance education, lack of planning and control over key indicators for this type of education, and lack of professionals who are familiar with evaluation of distance and on-line higher education.

In this context, in 2010, CALED continued to pursue its mission of contributing to improving distance and on-line educational quality, and fostering a culture of quality in higher-education institutions and agencies offering this type of education in Latin America and the Caribbean. CALED began a new experience of developing the course on Self-Assessment of Virtual Courses for Ongoing Education. This course's purpose is to understand and apply the theoretical and methodological foundation for evaluating virtual ongoing education courses. This training program reviews major topics providing participants with the basic elements of virtual courses, overall considerations for evaluation, the self-assessment model, self-assessment records, and final reports.

The course has three units:

- Unit I: Foundations of Virtual Courses, a general review of the most significant characteristics of e-learning from different authors' viewpoints, considerations for pedagogical design of virtual learning environments and finally reflection on several models to design and offer virtual courses.
- Unit II: Evaluation of Virtual Courses for Ongoing Education begins with a general review of fundamental aspects of quality in general education, and concretely virtual educational quality, reflecting on evaluation of virtual courses, different approaches of, and models for, evaluating virtual education.
- Unit III: Self-assessment of Virtual Courses uses CALED's Evaluation Guide for Virtual Ongoing Education Courses, based on the Potential Regulatory Framework to Offer Virtual Courses by the "Virtual Center to Develop Quality Standards for Distance Higher Education in Latin America and the Caribbean" Project. The Guide describes the self-assessment process, its phases, and setting up teams; the methodology to use in completing the self-assessment records, as the basic instrument, and writing the final report. Here is where students analyze and practice the self-assessment model for virtual ongoing education courses, applied to a course in their own institution.



The course methodology is totally on-line, with numerous teaching strategies and creative learning activities through a Virtual Learning Environment (VLE), including: Reading documents thoroughly, participating in forums, conducting self-assessments, performing distance activities, and submitting distance evaluations. Therefore, this is a course providing a framework for the different protagonists in the educational process to interact with each other instantly, at any time and from anywhere, giving them the tools to do their coursework effectively.

An analysis of students' places of origin, in the five editions of the course, lists participants from the following places: Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Spain, Guatemala, Mexico, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela. Illustration No.1 shows the details of these courses on self-assessment of virtual courses for ongoing education:

EDITIONS	DATE	No. PARTICIPANTS	PARTICIPATING COUNTRIES
First	2010	24	Argentina, Mexico, Brazil, Ecuador, Chile, Venezuela, Chile, Spain
Second	2011	32	Puerto Rican Distance Learning Association (APAD-Puerto Rico)
Third	2011	33	Dominican Republic
Fourth	2012	29	Peru, Venezuela, Chile, Guatemala, Argentina, Panama, Mexico
Fifth	2013	37	ESVIAL Project – Galileo University, Brazil, Guatemala, Spain, Portugal, Uruguay, Peru, El Salvador, Paraguay, Venezuela, USA.
Sixth	2014	9	Argentina, El Salvador, Brazil

Figure 1. Course: Self-assessment of virtual courses for ongoing education

For the next year, 2011, considering that evaluation must be an ongoing practice of reflection, analysis and looking forward in all areas of a course, program or institution, involving active, committed participation by all parties, CALED offered the Self-Assessment of Distance Undergraduate Programs course, so interested institutions could learn about the undergraduate program evaluation model designed by the Institute. The model initially provides a guide for those distance higher education institutions that wish to go deeper into, and more systematically explore, this type of processes, to subsequently spread their usage in general, to assess strengths and weaknesses for decision-making that will enable ongoing improvement of their educational quality. Accordingly, the course is oriented toward training self-assessment teams at institutions that wish to certify their programs with the “Virtual Center to Develop Quality Standards for Distance Higher Education in Latin America and the Caribbean” Project Model. The course reviews the theoretical and



methodological elements of the evaluation model, the instruments and procedures necessary to understand that process's directions and stages, and to use the e-portfolio.

The course is structured in three units:

- Unit I. Self-assessment Model for distance programs This Unit identifies the model's structure, and analyzes in detail the standards, criteria and indicators it comprises.
- Unit II. Self-Assessment records for distance programs. These records are a support instrument enabling self-evaluators to gain an overview of the process at hand.
- Unit III. Preparing the final report. This is a detailed, precise explanation of the steps leading up to the Final Evaluation Report.

The course has been given four times, with students representing various Latin American countries. Illustration No. 2 itemizes this information:

EDITIONS	DATE	No. PARTICIPANTS	PARTICIPATING COUNTRIES
First	2011	44	Venezuela, Peru
Second	2012	12	Ecuador
Third	2012	29	Argentina, Chile, Colombia, Ecuador, Guatemala, Mexico, Panama
Fourth	2013	14	Participants in the Educa Colombia 2013 Virtual Congress, from various countries.

Figure 2. Course. Self-assessment of Distance Undergraduate Programs

Experience has accrued from the courses given through 2013, and with joint work by universities and international agencies such as the Online Learning Consortium (OLC), the Consortium Network of Distance Education (CREAD), the National Distance Education System of Mexico (SINED), the National Autonomous University of Mexico, the Private Technical University of Loja (UTPL) and the Latin American and Caribbean Institute for Quality in Distance Education (CALED), who all share the mission of fostering quality in virtual environments, by educating human resources, preparing evaluation criteria, and encouraging the culture of quality. On this basis, the first edition was offered in 2015 of the International Diploma Program on Evaluating the Quality of Higher Education Distance Programs, to provide the theoretical, methodological and practical elements to evaluate the quality of distance higher education programs, in the context of Mexico's regulations.

This was a special edition of the diploma program, focusing on this one country's context. Considering the importance of the topics covered in the diploma program, and based on analysis and interest demonstrated by participants from different regions of Latin America, the team organizing the diploma program considered



it necessary to offer a second edition of the diploma program, going beyond the context of Mexico to cover the regulatory framework of distance education throughout the region. Accordingly, five editions of the diploma program have been offered to date.

The diploma program comprises three modules:

- The first addresses quality, evaluation and standards for distance higher education, enabling participants to study issues of quality and evaluation of distance higher education and then develop the skills to advocate for and value distance education program quality and evaluation. The topics of this first module begin by covering the basic foundations of distance higher educational quality, indicators and criteria for quality in distance education; and considerations regarding assurance of higher education quality. Then this first module specifically studies distance higher education: basic concepts, program evaluation approaches, and methodological criteria regarding techniques and instruments, data analysis, and reporting.
- The second module presents the OLC/CALED Scorecard in detail and how to use it operationally. The Scorecard is an instrument designed by the joint Latin American and Caribbean Institute for Quality in Distance Higher Education (CALED) and Online Learning Consortium (OLC) team, and analyzed on a consensus basis by international agencies such as the Consortium Network for Distance Education (CREAD). The Scorecard has been designed under the precepts of promoting the culture of evaluating quality in distance and on-line higher education. This enables participants to prepare guidelines and instruments to evaluate, accredit and certify courses, programs, and educational services, as well as to establish quality recognition mechanisms based on identifying criteria, standards and indicators to administer and improve on-line programs. This module enables participants to apply what they have learned and evaluate cases proposed, in order to analyze and assess elements of quality in on-line higher education programs, measuring and quantifying each quality indicator located in pre-established categories.
- And the third module prepares a self-assessment plan based on the OLC/CALED Scorecard, designed to conduct in the participant's own educational institution. This begins with a general overview of the basic concepts of projects, their components and phases, from formulation through implementation and evaluation. The second part offers the experience of two real-life cases of self-assessment in two educational institutions that were evaluated and, in the third part, participants team up to prepare the self-assessment for their educational institutions.

Diploma program participants have come from higher education institutions, representing both academic and administrative personnel involved in quality assurance for distance education programs, as well as researchers in evaluating educational quality. If we consider the fact that quality has been assessed in different ways since its historical conception and in each period since then, it is now necessary to adopt not only a new concept, but find ways to materialize it. The diploma program offers this possibility to everyone who wishes to get training and apply an evaluation instrument in their own institutions that can guarantee the quality of each program analyzed. Illustration No. 3 below outlines the editions offered of the diploma program.



EDITIONS	DATE	No. PARTICIPANTS	PARTICIPATING COUNTRIES
First	April 2015	75	Argentina, Mexico, Chile, Colombia, Panama, Honduras, Peru, Dominican Republic, Ecuador
Second	April 2016	12	Mexico, Ecuador, Paraguay, Guatemala, Argentina
Third	August 2016	52	Argentina, Chile, Ecuador, Mexico, Panama
Fourth	May 2017	44	Mexico, Canada
Fifth	August 2018	22	Mexico, Chile

Figure 3. international Diploma Program: Evaluating Quality in Distance Higher Education Programs

If we consider distance and on-line education as a challenge emerging in our present-day context, there is also keen concern about the quality of programs offered under this study modality; about whether there are any mechanisms or models to evaluate the quality of distance higher education programs; and about duly qualified professionals trained in distance and on-line education.

## Conclusion

In this context and oriented by the working strategy of the Latin American and Caribbean Institute for Quality in Distance Education, to “consolidate a team of experts in quality of Distance Higher Education”, we see the need to develop this type of training programs, to build capacities in everyone already comprising the higher education system, and incorporate new professionals who are interested in distance education quality, in evaluation, accreditation and degree certification processes, in programs and/or courses in the distance or on-line modality, i.e., in each of the particular features and needs of distance education. Evaluation and accreditation agencies must have professionals trained in the specific field of distance and virtual education, to perform effectively. Quality is defined not only by quantitative criteria, but also in terms that facilitate university education evaluation and accreditation and ensure their transparency.

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## Microlearning in Health Area: Successes and Limits in the Yellow Fever Vaccination Course

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### Abstract

The internet allows you to offer online courses, usually free, to promote continued education or lifelong learning. This online education model is predominant in Brazil (Mattar, 2014). In this paper we explore the possibility of using the principles of micro-learning to create online courses in the area of health. The first course created was the micro course, Yellow Fever Vaccination, offered by Fiocruz/UNA-SUS, in November of 2018. The course was part of a partnership between Fiocruz, Open University of the Unified Health System (UNA-SUS) and the Virtual Campus of Public Health (CVSP / PAHO). The goal of this partnership was to promote public health education in order to address the yellow fever epidemic that had reached southeast Brazil, in 2017. There were 3877 registrations for the pilot course, and 1669 participants finished the course. The satisfaction survey, that was completed at the end of the course, showed that more than half of the participants really liked the new format and that 98.2% would take a course in micro-learning format again. Despite of the positive answers, one-third of the respondents made improvement recommendations. The results confirm the positive attitude towards the mobile format, already noted in the literature. In addition, the opportunity to offer more courses in these formats is identified, including the possibility of creating training programs with a set of micro courses, that complement each other. In the production process, the main barrier is the recontextualization of microtexts. It is important to note that this study focused on the perception of the students with regard to the course. It did not evaluate learning or test the application of knowledge.

**Keywords:** Microlearning, Lifelong learning, Yellow Fever, Training Health Workforce

### Introduction

Yellow fever has been present in the Amazon region since 1932. It is considered endemic in parts of South America, including the Brazilian Amazon, located in the northern region of the country. Since 2016, there has been an outbreak of yellow fever outside the Brazilian Amazon, mainly in the states of Minas Gerais (MG), São Paulo (SP) and Rio de Janeiro (RJ), in the Southeast region. Between the end of 2016 and May 2017, Brazil recorded the worst outbreak of yellow fever in the last decades. There were 792 confirmed cases in humans and 274 deaths, located mainly in the southeastern region of the country (Cunha et al., 2019). In June 2018, the Brazilian Ministry of Health data indicated that almost all of the confirmed cases of yellow fever were in the southeast states - Minas Gerais (38.9%), Rio de Janeiro (20.5%) and São Paulo (40.3%) (Ministério da Saúde, 2018).



The epidemiological scenario of the outbreak increased the risk of disease re-urbanization (Possas et al., 2018). Some of the contributing factors were the temperatures increase and summer rains (with increasing density of *Aedes Haemagogus* mosquito species), degradation of natural habitats and reduction of wild animals. To confront this scenario, the Oswaldo Cruz Foundation (Fiocruz) has developed a Guide for Clinical Management of Yellow Fever for Health Professionals (Brasil, 2017). Fiocruz, part of the Brazilian Ministry of Health, is one of the most important institutions of science and technology and health education in Latin America. It is composed of 16 technical and scientific units, focused on teaching, extension, research, innovation, assistance and technological development in the field of health. The National Institute of Infectology (INI), part of Fiocruz, was responsible for the Guide, along with the Health Surveillance Center of the Brazilian Ministry of Health.

Fiocruz Virtual Campus, the Open University of the Unified Health System (UNA-SUS) and the Virtual Campus of Public Health (CVSP / PAHO), with the aim of promoting permanent and continuing education actions to combat yellow fever, partnered to produce courses on yellow fever. The SUS, Open University System, part of the Brazilian Ministry of Health, is a collaborative network of 34 higher education institutions that offer distance learning courses. UNA-SUS has already surpassed the 2 million mark, reaching 98% of the country's municipalities. The Virtual Campus of Public Health, a technical cooperation tool of the Pan American Health Organization (PAHO), is a learning network in the Americas region, with individuals, institutions and organizations that share education courses, resources, services and activities, information and knowledge management in training, to improve workforce skills and public health practices.

In the first phase of this joint work, courses were developed for health professionals from the Brazilian Unified Health System - with a national reach (thirteen times the area of France) - Brazil has more than 56 thousand health teams (Brasil & Ministério da Saúde, 2019). To attend the second phase of the work, the course was produced with open standards, to facilitate the translation and location of courses for other languages. The scenario and the requirements presented led to the studies the production of online and open resources, for quick offer, in the format of MOOCs (Massive Open Online Course). By exploring the possibilities, in the context of this sanitary emergency, it was possible to produce the MOOC, available in the form of microlearning on vaccination in yellow fever. The purpose of this paper is to present the considerations about the possibilities and limits of the application of microlearning as an alternative to health education, based on the above-mentioned experience.

### Online Education and Microlearning

The changes promoted by the Internet in the social context have created new online manifestations of identity, language use and the form of social integration (Friesen, 2007). In the aftermath, the evolution of digital technologies influenced the information and knowledge structures, forcing the rethinking of the forms of divulgation and dissemination of information. New concepts and strategies have become necessary to support learning and educational processes (Job & Ogalo, 2012). Educational challenges needed to be addressed in issues such as the transformation and mediatization of knowledge and the consequent change in the learning culture; the changes in relationship with the media; and the challenges of lifelong education and digital inclusion.





E-learning is already an essential part of the courses, including in the health area (De Gagne, Woodward, Park, Sun, & Yamane, 2018). In particular, self-instructional courses have been one of the most viable resources for the rapid dissemination of knowledge about arboviruses and their clinical management. The research results showed the potency of this type of course in the qualification of health professionals of the Brazilian Unified Health System for coping with the disease (Nascimento, Moraes, & Sandim, 2017).

Microlearning, microcontent, and micro knowledge studies (Hug, Lindner, & Bruck, 2006) have emerged in parallel to the technological innovations of online education in increasing the presence of the mobile. As the strategy for planning e-learning is different from planning for mobile learning (m-learning) (Nordin, Embi, & Yunus, 2010), microlearning has been considered a way to treat and optimize content delivery and interaction with which could improve the usability of m-learning (Bruck, Motiwalla, & Foerster, 2012).

Microlearning does not have a precise definition. For Gagne et al. (2018), microlearning refers to small units of content and quick activities designed to teach or reinforce information. Hug et al. (2006) argue that this form involves small and objective learning units with only the necessary information. Although it is characterized by the size of its content (microcontent), the concept is also linked to learning time, to "learn fast" (Hug, 2005). In its structure, the learning in small units breaks with the divisions and rituals of traditional e-learning (lessons and courses / opening, setting, exercises section and closing) (Kerres, 2007). However, it requires a recontextualization whose objective is to maintain the balance of the educational context with reduced granularity (Friesen, 2006).

## Method

For the production and offer of the course in microlearning format, first a bibliographic search was necessary to align the concepts and identification of use cases in the national context and health; then the alignment of educational and learning objectives within this new conceptual basis; and, finally, the production of the resource and supply of the MOOC, following the DEAO framework (Petit, Mota, Botelho, & Alves, 2018). The MOOC pilot in microlearning was offered in November 2018 and featured a self-perceived satisfaction survey with the format and intent to repeat the experiment.

As a theoretical basis, the group of articles organized by Hug (Hug, 2007) was chosen, which brought in a single publication answers to most of the concepts. Regarding the application in the Brazilian context, from the research in the Google Scholar base, by the expression [microlearning AND health], between 2017 and 2018 (until July), no applications or evaluations about this format were found. In the international health context, we used the PubMed database (<https://www.ncbi.nlm.nih.gov/pubmed>), where the research was conducted with the term microlearning, in articles published since 2016. Because it is a specific basis of the health area, any other search terms were dispensed. Only one article was found. The search in the databases was without depth due to the time constraint of the project.

As an educational initiative, open technologies and standards of development for the production of open educational resources (OER) were adopted. The educational objective defined in the DEAO-Strategy plan was to provide information on vaccination against yellow fever, focusing on critical or adverse situations. The defined public were the health professionals of the Unified Health System in Brazil.



The DEAO-Scope plan was designed to meet the learning objective: to identify and guide action in specific or contraindicated cases on yellow fever vaccination. The pedagogical context was organized as a quiz, with a sequence of reflective questions about real situations followed by feedback. The text produced by the experts was reconceptualization. The copywriting has condensed information and knowledge into small learning segments, with a maximum of 300 characters per screen. The size restriction was defined according to readability for mobile access.

The DEAO-defined structure plan was the card format, with linear navigation and complementary readings available in the hamburger format menu. The illustrations were chosen as the complementary visual input - contributing to the memorization and contextualization of situations (DEAO-Surface Plan).

The satisfaction survey, semi-structured, was available for participants to navigate all cards. For the structured questions, the Likert scale (1932) with five options was used. Its systematization was done a posteriori, in two stages. In the first, 18 categories were identified. In the second, the list was condensed into six: (1) Deepening the subject; (2) Inclusion of audio / video resource; (3) Inclusion of clinical cases; (4) Graphic design enhancements or use of digital technologies; (5) Inclusion of formal evaluation; and (6) Offer more courses in this format.

As an alternative to the dissemination of the course, it was created adapted images to share in social medias. The images were distributed along the course e contained relevant information to the health professionals and to the society.

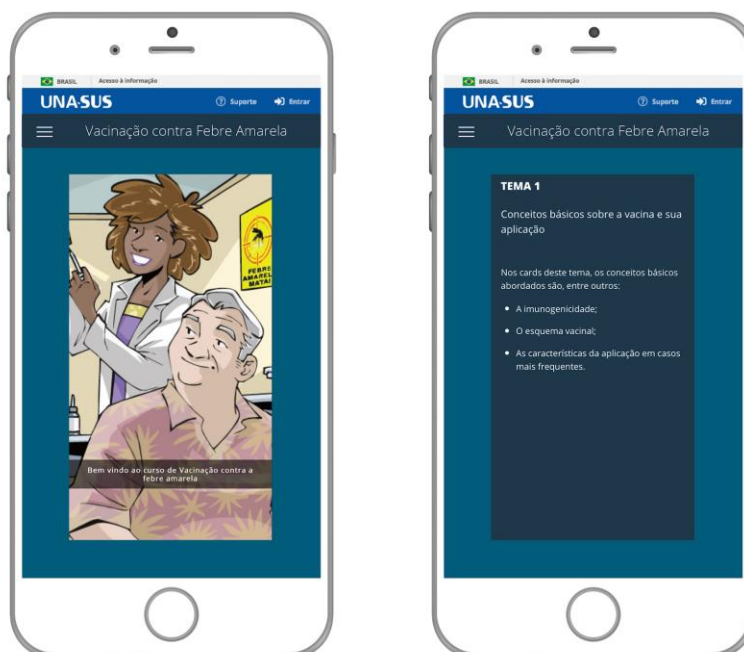


Figure 1: Course entry screen



## Results

The course "Vaccination against yellow fever" aired in November 2018. 3877 students enrolled on the course "Vaccination against yellow fever" between November 2018 and March 2019. Among them, 1669 students completed the course - a completion rate of 43%. The majority of the students who registered for the course were women (74.6%) and had average age of 24 years old (22.9%). São Paulo (SP), Rio de Janeiro (RJ) and Minas Gerais (MG) are the states with the highest number of registrations (14.6%, 14.2% and 9.1% respectively). These states are from the southeast area of Brazil. The majority of course participants were students (39.0%). Technical nurses and nursing assistants, who are responsible for vaccination rooms, accounted for 36% of the registrations. Doctors were 5.7%, other health professionals were 10.5%, and non-health professionals were 8.8% of enrolment.

Among the participants, 1855 people responded to the self-perception survey. Most respondents were women (77%), up to 24 years old (24.9%). More than half of the students are under 30 years old (53.0%). Only 16.9% are over 40. The students from Minas Gerais (MG), Rio de Janeiro (RJ), and São Paulo (SP) states represented the largest number of enrolled, counting 39.6%. Paraná (6.2%) and Rio Grande do Sul (6.0%), two states of southern Brazil, had more than 100 registered in the period. Bahia, in the Northeast, recorded 97 students (5.2%).

The course was considered "pleasant" by 65.2% of respondents [Did you enjoy doing a mini course in card format?], 98.2% responded that they would do other similar courses [Would you do other courses in this format?] and only 13 (less than 1%) people would not recommend the course to a colleague [Would you recommend the course of "Vaccination about yellow fever" for your colleagues?].

Despite high rates of positive responses about the course, 640 respondents filled the field on improvements. The main improvement pointed out was the deepening of the subject, which represented 39.4% of the categorized indications. Design and Technology (24.3%) and the inclusion of audio/video resource (23.4%) completed the list of the most cited improvements. Another two categories, with elements commonly present in the Online Health Education, were also considered: the inclusion of clinical cases (6.1% of the indications) and formal performance evaluation (4.1% of indications). Further on the improvements pointed out by the respondents, 2.7% indicated the offer of other courses in the same model. Some respondents used the space to ratify their approval (66.6% of comments) and some used it to show their disapproval (1.2%) of the cards format.

The social media images had an engagement of 2.7 thousand single users on Facebook. Even though the course had a two-hour workload, it was identified a return of 8.7% of users to cards, a week after the first access.

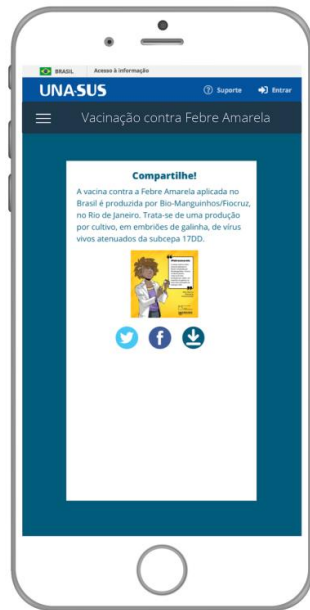


Figure 2: Cards for social networks in the course and in Facebook sharing (authors' production)

### Conclusion

In addition to the incorporation of microlearning, a part of the innovative process from the field of Distance Education, EaD in Brazil, in the health area was the experiment of the instructional-educational transition. The question-reflection-feedback-links structure for more knowledge broke with the instructional design, which, by default, delivers to the student a step by step, a manual (Mattar, 2014). This structure prioritized learning through thinking about a real and possible situation. The existing manual (Brasil, 2017) was incorporated as an indication of deepening in all stages of the course.

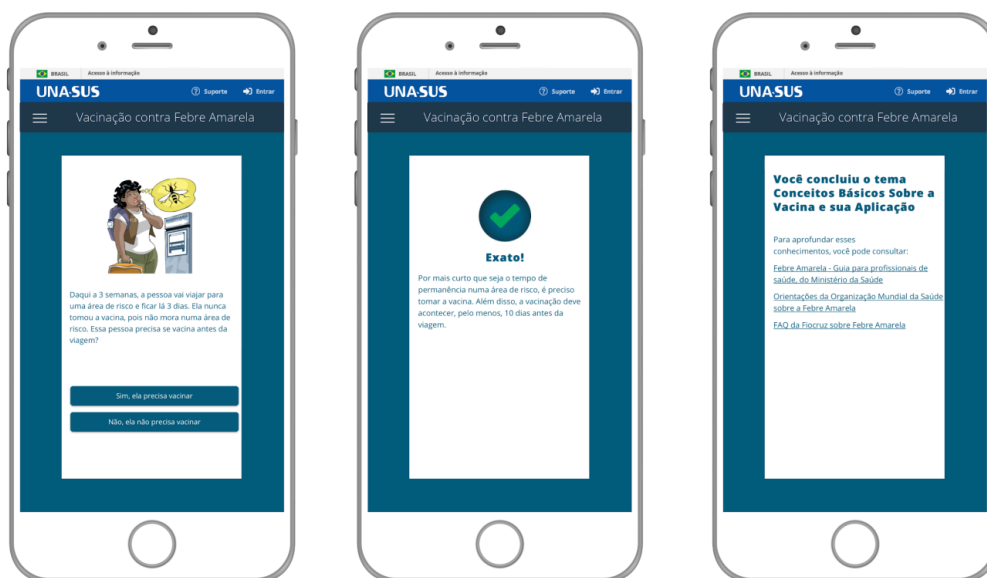


Figure 3: Question-feedback-links structure in the course (authors' production)



One of the barriers to the production of this content was the reconceptualization of micro-learning (Friesen, 2006). The microcontents, screen to screen, needed to guarantee the guidelines of Eibl (2007). In the defined format, each screen was composed of texts and/or images that initiated and concluded a concept and/or an explanation. The restrictions required intense training from the editors - both specialists and educational designer. By presenting a sequence of questions and feedback, the course did not carry out a traditional evaluation. Even so, some users pointed out the need for this knowledge measurement mechanism. It is possible that this is an indication of the instructional-educational transition process.

The findings in the survey on the need of to deep of the contents corroborate the ideas of Bruck et al. (2012):

The microlearning does not require separate learning sessions but is integrated with other activities of the learner. In addition, microlearning is good for some types of learning environment, where content can be designed on smaller objects, just-in-time learning and Web 2.0 learning. It may not be appropriate for all forms of learning and, therefore, it complements (it does not replace) other forms of learning. (Bruck et al., 2012, p. 530).

Together with the indication of the existence of more courses in this format, it's possible an opportunity to offer a set of micro courses that are complementary to each other. The location of most students in states with the highest number of yellow fever cases - confirmed or under investigation - has shown the interest of health professionals from endemic areas in qualifying for Vaccination Against Yellow Fever. Finally, the responses have ratified the positive attitude towards learning in a mobile format (Koohestani, Soltani Arabshahi, Fata, & Ahmadi, 2018), and inspire the production of more resources in this formation. It is important to mention that these results were limited to the self-perception of the student in relation to the format and content of the course. Learning and application of the knowledge acquired have not been evaluated.

### **Acknowledgments**

We thank UNA-SUS and the Fiocruz Virtual Campus for the technical support and support team that made this pilot course viable.

This educational action is in line with Fiocruz's commitment to Sustainable Development Goals (SDGs), more directly to SDGs 3 and 4 respectively – “ensuring a healthy life and promoting well-being for all, at all ages” and “ensuring inclusive and equitable quality education, and promoting lifelong learning opportunities for all” (UN, 2015, p. 18–19).

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## Creative Approaches to Curriculum Design: Overcoming Barriers to Translation of Health Subjects into Fully Online Formats

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### Abstract

Living in a digitally enabled society has driven educational institutions to re-assess learning models that leverage digital technologies to meet contemporary demands for flexibility, access and control. Online learning is a way to provide a flexible mode of attendance, enabling students to balance multiple priorities in their lives. Furthermore, online learning environments have been shown to alleviate issues around large-scale teaching and help address limitations with physical facilities. However, online learning presents significant challenges for academic staff, particularly in disciplines where practical skills are core competencies and physical settings still play a significant role in teaching. Traditionally, in undergraduate health education, face-to-face didactic teaching formats with lectures and instructor-led demonstrations are used. Students undertake subsequent activities to develop practical skills, often with a focus on demonstration reproduction rather than critical application. Additionally, complex theoretical subjects are traditionally content heavy, which leads to an overreliance on memorisation and recall of information. Consequently, academic staff may find it challenging to engage students in their learning using traditional teaching methods. Placements and research projects are another key characteristic of health education that facilitates practical and research skill development. Logistical challenges, low student to supervisor ratios and inconsistent supervision creates significant workload for academic staff and is considered a key barrier to online adoption, scalability and teaching sustainability. This paper investigates the development of two undergraduate health subjects, one that is complex and content-heavy and the other utilising a project-based approach into fully online formats. In particular, the shifts that took place in curriculum thinking to facilitate sustainable teaching practices, better development of graduate skills and higher levels of student interaction and engagement will be explored. Underpinned by design thinking and change management principles, a synergistic, team-based approach introduced a creative and transformative process to curriculum design. Subject components such as practical skills-based activities, project-based research and content-dense topics were deconstructed, re-evaluated and re-imagined to produce fully online, scalable and sustainable offerings. A scenario-based, real-world approach was adopted to address complex health topics through authentic learning, with an emphasis on advancing student critical thinking, evidence-based research skills and independent learning. The approach involved front-loaded design and development, resulting in far greater flexibility and targeted subject content delivery. Presenting student and staff feedback through an auto-ethnography and critical retrospective reflective lens, this paper explores the transformative, disruptive shifts of online learning and the changing face of health education in the contemporary digital age.

**Keywords:** Online Learning Design, Health Education, Student Engagement, Online Teaching





## Introduction

Within the higher education context, online learning has experienced hyper-growth over the past five years, with a plethora of companies offering fully online program management emerging as frontrunners in the online educational market. Online learning offers many advantages over traditional face-to-face learning, including greater flexibility, accessibility and choice for students who are unable to attend physical classes for a range of work or personal reasons (Gordon, 2014). As such, the popularity of online learning has grown substantially, with an increasing number of students electing to undertake fully online degrees (Daymont, Blau, & Campbell, 2011; Greenland & Moore, 2014). With the ubiquity of the Internet and rapid developments in digital technologies, distance, place, time and access are no longer barriers to learning. As a result, online education has contributed to the democratisation of learning opportunities, from the explosion of free, open educational resources (OERs) to massive open online courses (MOOCs) and specialisations, to small private online courses (SPOCs), nanodegrees, and fully online postgraduate degrees (Dillahunt, Wang, & Teasley, 2014; Hornsby & Osman, 2014; Kaplan & Haenlein, 2016). Alongside the growing demand for online education comes the mounting challenges experienced by students, academic staff, curriculum developers and education administrators. Online learning relies on a student's ability to self-regulate when, where and how they access and engage with learning materials (Wang, Shannon, & Ross, 2013). Furthermore, the substantial effort of developing online programs still remain an obstacle for many institutions, with factors such as lack of strategic direction, complex platform infrastructure and maintenance, technical support, online design expertise, and the high cost of digital content production, proving to be ongoing issues. Additionally, challenges for academic staff ranges from high workloads and time constraints to unfamiliarity with online pedagogies, perceptions of low quality and resistance to online teaching (Horvitz, Beach, Anderson, & Xia, 2015). Undergraduate, domestic enrolments in health degrees are on the rise in Australia, alongside an exponential increase in multi-modal and off-campus study (Norton, Cherastidtham, & Mackey, 2018). However, a search on Australia's largest online higher education organisation has found of the 290 undergraduate degrees offered, only six were in the health study area (Open Universities Australia, 2019).

This paper aims to discuss the development of two undergraduate health subjects into fully online modes.

## Methodology

An auto-ethnography and retrospective reflective lens will be used to describe the translational development of two undergraduate health subjects into a fully online format. These allow the researcher to be an active participant and influencer in the research itself through retrospective and collaborative self-interrogation (Adams, Jones, & Ellis, 2015; Chang, Ngunjiri, & Hernandez, 2016). As such, the subject re-imagining design process and accompanying challenges will be described in line with relevant qualitative student feedback, staff experiences and reflections on future improvements and directions as written from a researcher's perspective will be discussed. Ethics from the La Trobe University Human Ethics Committee and head of department approval was obtained for a waiver of consent to use anonymised data from Student Feedback on Subject (SFS) surveys (HEC19194).



### *The Design Model*

The design process to re-conceptualise the subjects and its curriculum, structure and delivery were underpinned by three key aspects: the collaborative design process; development of front-loading content and an activity-based approach. The collaborative design of both subjects consisted of academic staff and expert clinicians, where appropriate, and learning design and content production expertise from a third-party provider. A visual, learning design approach was adopted to facilitate a collaborative, 'sharing of vision' and joint decision-making, based on pedagogical intent within a specific learning content rather than simply content (Conole et al., 2008; MacLean & Scott, 2011; Lockyer, Agostinho & Bennett, 2016). Learning design, in this context, is the collaborative process of mapping the arrangement and structure of learning resources, activities, and assessments over an entire semester. Once an effective learning design model is in place, it can act as a framework for establishing pedagogical patterns and applied or adapted to multiple subjects (Agostinho, Bennett, Lockyer, Jones, & Harper, 2013).

The design process started with a series of collaborative workshops, facilitated by the learning designer using a socratic-like questioning method to deconstruct preconceived notions of online learning, identify environmental or curriculum challenges and disconnect historical attachment or vested interest in existing practices. While this first stage is sometimes perceived to be confusing and non-productive, the disorienting dilemma is crucial to enable critical questioning of staff's own assumptions and beliefs of online learning design, and to creatively consider new opportunities and perspectives. Additionally, the role of the learning designer was to provide overall project management and challenge preconceived ideas of traditional higher education including potential solutions to barriers such as embedding sustainability and scalability into the online subject. Staff brought their expertise of the subject content and purpose and an understanding of how the subject ran in previous iterations.

Subsequent workshops followed key design thinking principles, starting with the creation of an online student persona to help empathise with student learning needs and situations. Learning designs were represented visually as a subject 'roadmap' to help staff holistically understand the subject structure (Crespo García et al., 2012). Visual subject roadmaps also help to capture the collaborative decision-making between the educational expertise of the learning designer and the discipline expertise of the academic staff (allied health, in this case), and represents a pedagogically informed, shared design language. The subject development process involved two key aspects: front-loading of content and activity development, and a shift from a content-focussed to an activity-focussed subject model.

### *Front Loading Development*

Unlike face-to-face delivery, content development for online delivery involves the engagement of a technology and media production specialist to create assets for the online environment prior to student interaction. As face-to-face content, these would be lectures or tutorials delivered within the classroom environment. In an online environment, much of the teacher-student interaction is asynchronous and designed for flexible engagement. Often, this means that content needs to be captured beforehand and front-loaded prior to the start of the subject. As a result, students are able to progress at a pace that suits their circumstances and self-manage their engagement with content and activities.



### *Activity-Based Approach*

Digital technologies have changed the way we find information and develop new knowledge (Beetham & Sharpe, 2013). Online students are able to engage in learning regardless of their physical location and time zone within formal educational contexts, as well as informal social environments. With the emergence of online social platforms and rapid developments of socially-enabling functions in learning systems, online learning offers a new context for constructivism. Constructivism, based on the notion that socially situated learners build new knowledge by relating it to familiar, real-world contexts and experiences, generally opposes the objectivist idea that knowledge can only be gained through its transmission from expert to learner (Schell & Janicki, 2013). The constructivist philosophy encourages students to take control over their learning process and develop capabilities that support lifelong learning, which is reflected in the nature of online learning due to increased requirements of self-regulation and activities that are not time or place dependent. Therefore, an activity-based approach was adopted into the health subjects' redesign to encourage a shift towards a constructivist philosophy and a focus on collaborative interaction, real-world applications, structured reflections and "learning by doing".

## **Results and Discussions**

### *Subject 1: A Scalable Project-Based Design Approach*

The first subject presented is a final year core, project-based subject of a three-year allied health undergraduate degree. In 2018, two offerings of this subject were available. The first and second offering had 6 and 18 students enrolled, respectively.

In previous face-to-face iterations, students worked in pairs or groups of up to four to complete a research project at external placement sites over a 12-week semester. Students were expected to attend placement alongside lectures on campus, along with lectures and tutorials for other subjects. Additionally, the concept of placement often detracted students from the subject's core learning objectives, which was to understand and experience the research process. Consequently, students would prioritise their time for attending placement, which led to poor attendance rate for on campus lectures. Furthermore, placement and project organisation held many logistical challenges for staff. Due to small supervisor to student ratios and depending on placement site and supervisor capacity, up to 20 projects needed to be sourced for students. As such, sustainability and scalability of the subject was limited as placement availability and supervisor capacity were often in a state of flux. Additional staffing through external placements were also costly as some supervisors requested remuneration for taking on students. Having a mix of placement sites, projects and supervisors also resulted in a lack of consistency in supervisory styles and different expectations from staff and students, which was a source of frustration for students.

### *Subject 1: Re-Imagining the Online Subject*

Due to the variability of physical location for online students, the feasibility of sourcing external placements is limited. The challenge then was to develop a subject that would allow for a similar level of skill development as the face-to-face placements. Through the collaborative design process, research projects were therefore developed to allow for completion by students within their own home or community environment or wholly online that fall within three broad themes or research domains. As data is collected within the student's own environment, this minimises the risk of plagiarism due to the variance in data sets collected and used.



Additionally, students have the flexibility to modify their project to suit their interests. The combination of flexibility and self-driven data ensures the sustainability and scalability of the subject.

While some students enjoyed the projects they selected and were allocated to, others would have preferred the ability to self-select their topic and project as reflected in the SFS qualitative feedback, “Being able to choose a research topic that you are interested in would have been better than being assigned one. I understand that you can't have everyone doing the same topic, but that would be preferable to researching something that is not of particular interest.”.

To bring the subject's focus back to the research process, redevelopment of the subject resulted in breaking down the research process into seven stages of 1) project proposal and research skills revision, 2) project familiarisation, 3) project planning, 4) data management, 5) data analysis and interpretation, 6) research dissemination and 7) report writing. Each stage contained broad themes relevant to most research projects that students would undertake. Each stage comprised of a combination of font-loaded content, critical discussion questions and learning activities to gain a better understanding of core concepts related to the research process. Qualitative student feedback from the SFS survey reaffirmed the usefulness of breaking down the research process into smaller concepts, “The stages are a great way to organise a subject like this.”.

Academic staff provided weekly signposts to guide students' progression. As students' progress through each stage of the subject, online video conferences, called 'Live Sessions' are held as additional opportunities for discussions. During Live Sessions, content is summarised, staff have the ability to check on student progress and students are provided with an opportunity to connect with their supervisor or subjects coordinator in a personable way. Live Sessions are recorded for students unable to attend. Live Sessions allow for staff to tailor information to students in a way that is relevant to their current discussions that may not have been captured in pre-recorded content.

An activity-based approach was used for assessment development as reflected in its formative nature. Assessments were based on the student's research projects and reflect key research activities in the real world, such as developing a research proposal, research dissemination through a five-minute multimedia presentation and submitting a 3000-word written report similar to a manuscript to a scientific journal. As assessments are formative and based on each student's research project, they act as another checkpoint for their learning and progress. For example, from the first assessment, academic staff are able to identify students who need additional support and provide this through emails and one-on-one video-conferencing sessions. Feedback provided at each submission point then enables students to apply those learnings into subsequent assessments and relevant activities. Overall, students enjoyed the formative assessments as it enabled them to integrate their learning into practice as highlighted in qualitative feedback from the SFS survey, “I loved how we only had three assignments, and they built up to our final assignment, so we (were) able to really focus on one research topic which helped me to gain a solid understanding of the three tasks.”.

Critical discussion questions were another example of how an activity-based approach was used in this subject. Responses allowed academic staff to understand student's thought processes related to their research project and enabled independent learning by posing probing questions to assist students with problem-solving. Often, discussion forums are not utilised as some students felt their questions were too



specific for a public space and preferred direct email communications with academic staff instead. Additionally, some students were only interested in content directly related to their project as highlighted in qualitative student feedback from the SFS survey, “Everyone chatting on the same forum about different things that were not relevant to your topic was confusing and time-consuming reading through stuff to find something of interest.”.

#### *Subject 1: Staff Experiences of Delivery*

Staff have found that assessments were key to understanding student’s progress throughout the subject. However, as with an activity-based approach, students must show initiative to approach teaching staff for guidance. Students who recognised this and asked for additional support did much better than those who did not seek further help. Setting these expectations upfront reinforces the importance of independent learning, which reflect skills treasured in the real-world. Furthermore, this process highlights the positivity of student-led learning as students who do engage and ask more questions often felt more satisfied with the subject as highlighted by qualitative feedback from a student via the SFS survey, “The guidance and help offered by the subject coordinator/supervisor was the best aspect of this subject. I don't believe it would have been as enjoyable knowing you were unable to reach your supervisor as they were busy. The subject was very enjoyable, especially seeing how close this undergraduate study project was compared to real life research out there. It was an awesome experience and I believe all of the learning outcomes offered by this subject were personally met.”.

#### *Subject 1: Future Improvements*

Due to growth in overall enrolments it is anticipated that student numbers in this subject will continue to grow exponentially over the years. To manage this, casual staff will be recruited to lead one of three research domains offered and the students allocated within them to allow for scalability of the subject. Such an approach would also mean that students would require additional logistical and technical organisation of dedicated discussion forums and separate Live Sessions relevant to their research domain.

Additionally, the development and use of a video conference briefing session for all research domain supervisors will assist with consistency in supervision expectations and student management. Casual staff will also have regular meetings with the subject coordinator to discuss student progress and any potential challenges they are facing.

#### *Subject 2: An Authentic Case Study-Driven Design Approach*

The second subject to be presented was developed into a 12-week online final year elective of a three-year allied health undergraduate degree. Two offerings of this subject were available in 2018. The first and second offering had 20 and 23 students enrolled, respectively.

The subject expands upon skills and theoretical content derived from previous subjects and focuses on complex knowledge suited for further professional development. Due to the complexity of content, the key design challenges were to move away from a didactic content-led delivery, increase and maintain a high level of student engagement, while ensuring pre-capturing of content would maintain relevance to the profession, whilst being sustainable and current.



### *Subject 2: Re-Imagining the Online Subject*

As this subject did not have an equivalent face-to-face comparison, the first collaborative design meetings focussed on conceptualisation and subject structure through the mapping of subject intended learning outcomes. Undertaking this process allowed for the identification and linking of necessary current knowledge with skill development to enable independent continuous professional learning in the workforce. Key concepts and sub-topics were then established, followed by the development of supportive resources and engaging learning activities to embed student's learning across formative assessments. These planning meetings occurred weekly or fortnightly across two months, with each spanning three to four hours in duration. While the time investment required to develop front-loading content challenged the academic team, it significantly reduced the time required for content development during the semester and allowed staff to focus on subject facilitation. For students, front-loading content provided them with flexibility in learning, which required high levels of self-regulation and autonomy.

An authentic, case study-driven design approach was used, where students followed a constructed single case study that detailed a character's changing health condition. Throughout the case study, key topics were presented to students with a video 'episode' that describes the character's current health scenario. Each episode was accompanied by one or more two to four-minute commentary videos by academic staff designed to contextualise the health scenario and introduce students to the underpinning concepts. Once the case study storyboards and scripts were drafted, the learning design team outsourced video content production that included an actor to play the character to ensure authentic case study interview scenes. The total filming time for the case study and associated commentaries was approximately 20 hours. Prior to filming, necessary waivers and talent arrangements were made between the University, third party and video production company. The final high-quality video content was appreciated by students as evidenced by qualitative feedback from the SFS survey, "very impressed by the audio-visual presentations as well as the case study."

Following each case study and commentary video, accompanying learning activities were developed to further student's knowledge building in enquiry and research components. Assessments and learning activities were designed as critical reflective pieces with one of the two written assessments being a large portfolio submitted at the end of the semester. Prior to their final portfolio submissions, students had the opportunity to submit smaller segments, framed by one or more stimulus questions, over the semester for formative feedback, which allowed them to monitor and regulate their own learning and performance (Nicol and Macfarlane-Dick, 2006). Additionally, this process served as a check-in for academic staff on student's learning progress. Overall, students enjoyed this assessment design as per qualitative SFS survey feedback, "...a really brilliant assessment idea..." and "...an extensive yet manageable amount of content to keep students like myself occupied.". Students were also impressed with the level of feedback from academic staff described in the SFS survey as, "feedback received was amazing", "provided extensive feedback where necessary". However, some students reported feeling overwhelmed by this design stating, "The constant necessity to complete portfolio responses meant I often felt I needed to rush through the weekly content."

The clinical and professional relevance of the case study topics enabled students to draw from their personal experiences and relate to the character. Particularly as case study stories were based on the clinician's examples, and deliberately filmed to allow students to view the case study as both a patient or a nutritionist



(i.e., reverse classroom). Utilising this approach captured the student's attention to help them understand new concepts by relating it to an example they are likely to experience in their future professional work, an approach described in theory by Brookfield (2017). Additionally, the case study scenarios provided examples of clinical application of issues students will likely encounter in the workforce, such as critical analysis of media or health messages, evidence interpretation, and translation to clinical health prevention and management. Student feedback expressed an appreciation for the delivery of the content in the SFS survey such as, "(the) subject itself is extremely relevant to today's nutrition field that it should become an integral part of the degree", "...the access to a variety of upcoming concepts and their current research. I found all modules relevant and interesting" and "the topics were fun, and the content was engaging". In contrast, some students reported concerns around scope of practice with feedback from the SFS survey stating, "(a) case study like this will make some students think we are qualified to talk about some of these topics with clients".

### *Subject 2: Staff Experiences of Delivery*

Front-loading of content from the start of semester has made subject delivery more flexible and allowed students independence in time management. Regardless, academic staff guide students through each topic with weekly announcements and provide ongoing detailed feedback through segmented portfolio submissions, critical discussion questions and learning activities. Although development of front-loaded content challenged the traditional ideas of teaching practice, it enabled the delivery of a complex health subject to a higher level that can also be easily rolled over each semester.

A potential barrier to continued sustainability may be that clinical guidelines may change, therefore the case study videos which involved rich production and investment may need updating for future offerings to maintain currency. Regardless, this approach ensures the subject remains relevant for the student's future, therefore increasing the relatability for students and their engagement in subject content.

Interestingly, despite the low number of enquiries from students during Live Sessions and discussion forums, students demonstrated outputs to a high level and have performed well in assessments with the subject's final average grade at 80% and 71% across the first two offerings, respectively. SFS survey feedback from some students provided future recommendations to "encourage more discussion from other students...(so) it would make for more interesting options and views throughout the semester". While a low level of visible engagement through discussion forums may be perceived as a dis-engaged online student cohort, learning management site analytics demonstrated silent but active engagement with front-loaded content and guided assessments. Although academic staff interaction was available, the content was well designed to be student driven, which enabled staff to focus more time on the provision of quality feedback.

### *Subject 2: Future Improvements*

Moving forward, scalability of this subject will be possible due to the design of the embedded videos and student led case study activities. Furthermore, sustainability will need to rely on an ongoing update of resources and supporting evidence. Delivery of content through a case study takes relative less teaching delivery time during the study period, which enables academic staff to spend more time in effective student interaction and feedback. As a result, teaching resources and academic staff required for delivery are able to remain small, therefore increasing feasibility of repeat iterations and scalability for large student cohorts.



Implications for future subject designs may move towards a global case study elective with internationally relevant content whilst integrating key concepts.

## Conclusion

In today's digital age, online education transgresses the usual boundaries of 'bricks and mortar', offering wider access and greater flexibility for students unable to attend campus. Development of fully online subjects requires an immense amount of resources, cost and time in addition to institutional level support to facilitate successful subject development. In this case, the introduction of third-party expertise in educational design complemented subject matter expertise, challenged preconceived notions of traditional teaching and subject design in higher education and provided diverse perspectives, which resulted in a creative and pedagogically-driven resolution. The collaborative team-based and reflective approach to both the design process and the research of the process is important to recognise in the field of learning and teaching. However, it is important to acknowledge that collaborative auto-ethnography is an under-researched and contentious method, particularly in the allied health disciplines. While student success data was limited due to low enrolment numbers in these first offers, this paper reveals the value of a collaborative approach to online subject design, resulting in effective design models that can be adapted by other subjects, sustainable teaching practices, efficacious student engagement and feedback provision and transformative learning process between diverse participants of the design process.

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## Generating Immersion Teacher Language Awareness through Online Learning

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### Abstract

In immersion education, teachers concurrently address content, language and literacy development through their students' second language. This requires significant teacher preparation and professional development. Planning for language teaching and learning within immersion instruction specifically calls for a high degree of teacher language awareness i.e. a deep knowledge about language and a knowledge of specific skills, lexicon, grammar, semantics, pragmatics, orthography, phonology, sociolinguistics and discipline-specific language. However, some scholars have noted significant gaps in immersion teachers' language awareness. These gaps constitute a significant obstacle to these teachers whose responsibility is to be proficient models of the immersion language, display a broad range of advanced linguistic skills and competences and transform this declarative knowledge of the Irish language into effective pedagogical tasks.

This paper reports on how interconnected aspects of immersion teachers' language awareness manifested as they engaged with an online learning postgraduate program. The Common European Framework of Reference principles and practices were adopted to explore proficiency needs, to review, reform and develop content of the Irish language curricula, to design, develop and exploit teaching and learning experiences and enhance quality and success in learning, teaching and assessment in Irish. Online language learning opportunities are designed to stimulate and enrich reception, interaction and production across all language competences. A diverse range of interactive online tasks (e.g. reflective blogs, fora, podcasts, e-portfolios) were designed and used in intense and multifaceted ways to foster twenty-two Irish-medium immersion teachers' language awareness. Data were collected from a variety of sources e.g. an extensive online questionnaire, individual language plans, e-portfolios, individual language advisory sessions, reflections, assignments and focus groups.

Findings suggest that the collaborative nature of online interaction was central to developing teachers' linguistic resources in the immersion language and cultivated learner autonomy, motivation and success. Digital technologies enabled learners to plan, to monitor and reflect on their own learning, provide evidence of progress, share insights and come up with creative solutions. The creation and modification of digital resources fostered teachers' digital competences but also challenged them to become proficient and autonomous users of the immersion language. Digital technologies addressed learners' diverse learning needs, by empowering them to advance at different levels and speeds, and to follow individual learning pathways and objectives. Collaboration, motivation and challenge in turn promoted self-regulated language learning.

**Key Words:** immersion, teacher language awareness, technology enhanced language learning, digital technologies, capacity



## Immersion education

Irish, or Gaeilge, is an autochthonous (indigenous) language spoken in the Republic of Ireland and in Northern Ireland. While the restoration of the Irish language has been a key policy objective of successive governments since the foundation of the Irish Free State in 1922, it is evident that the threat of language shift is intensifying in the Gaeltacht (Irish-speaking regions) (Ó Giollagáin, Mac Donnacha, Ní Chualáin, Ní Shéaghdha, & O'Brien, 2007). Teacher development is viewed as a cornerstone in the process of reversing language shift given “the critical importance of the school in influencing language awareness and behaviour - as well as in the wider society, in highlighting the cultural value and importance of Irish to the Irish people” (Government of Ireland, 2010, p.10). Irish-medium immersion (IMI) has a significant role to play in reversing language shift. IMI education is normally provided to students for whom Irish is not their first language (L1) in schools outside the Gaeltacht regions, known as Gaelscoileanna (Irish-medium primary schools) or Gaelcholáistí (Irish-medium post primary schools). Currently 5.2% of all school children attend one of the 189 IMI schools in the Republic of Ireland ([www.gaeloideachas.ie](http://www.gaeloideachas.ie)). The goal of IMI is bilingualism and biliteracy as well as extension of the minority language and culture into the community and nationally. The supply of teachers with the mandatory linguistic and cultural competencies and associated pedagogical practices is a key driver of successful immersion programmes. Immersion initial teacher education and professional development, therefore, are critical in the evolution of effective language immersion education. Scholars have argued that in addition to native or near-native proficiency in instructional language(s), immersion teaching requires a particular knowledge base and pedagogical skill set (Day & Shapson, 1996; Fortune, Tedick, & Walker, 2008; Freeman, Freeman, & Mercuri, 2005; Lyster, 2007; Snow, 1990).

## Immersion teacher language awareness

The skill set of an immersion teacher may be operationalized in a construct known as Teacher Language Awareness (TLA). TLA consists of three specific knowledge domains - language use, knowledge about language, and pedagogical expertise in terms of the target language (Andrews, 2007). These domains interact with and impact on each other in unique ways which in turn shapes an immersion teacher’s capacity to craft language goals and activities which target immersion learners’ developmental needs while simultaneously considering content area instructional goals. It would appear then that TLA in the immersion language should underpin a teacher’s instructional practices in immersion.

The first domain of TLA, the ‘User’ domain (Wright, 2002) is operationalized as a certain level of language proficiency i.e. the teacher’s own command of the immersion language. It is essential that the immersion teacher is a proficient user and model of the immersion language and displays a broad range of advanced linguistic skills and competences. The second domain encompasses knowledge about language (KAL) in the form of a teacher’s grasp of language systems and structures, as well as their knowledge of specific skills, lexicon, grammar, semantics, pragmatics, orthography, phonology, sociolinguistics, discourse analysis and discipline-specific language (Bartels, 2009; Williamson & Hardman, 1995; Wray, 1993). This domain of linguistic knowledge is often referred to as content knowledge (Shulman, 1987) and is termed the “Analyst” domain, to connote the teacher as a capable analyst of linguistic structures.



In addition to content knowledge (CK), immersion teachers also need to know how to transform this declarative knowledge of the immersion language into effective pedagogical tasks, a domain often referred to as pedagogical content knowledge (Shulman, 1987). This third domain of TLA entails an understanding of the process by which immersion students acquire languages, a comprehension of how to design instructional strategies that push language development forward and a capacity to create a meaningful and relevant context which promotes language learning and development (Andrews, 2003; Yates & Muchisky, 2003). This is termed the “Teacher” domain, highlighting the ability of teachers to make their language proficiency and KAL actionable in relation to immersion lesson design.

Immersion teachers are professionally charged with promoting academic achievement while simultaneously ensuring second language (L2) proficiency and literacy development. However, scholars note that both native and non-native teachers report the need for ongoing support for their own proficiency in the immersion language (Nic Réamoinn, 2017; Ní Thuairisg 2014; Ó Ceallaigh, 2013, 2019; Ó Grádaigh, 2015; Ó Ceallaigh, Ó Laoire & Uí Chonghaile, 2019). Thus, the challenges linked to language development and/or content mastery faced by students in immersion can be partly attributed to gaps in TLA. While it is clear that the linguistic knowledge to be acquired by immersion learners has implications for the knowledge base needed by immersion teachers, there has been relatively little research into the nature of that knowledge base. The knowledge and pedagogies needed for immersion classrooms are unique and complex. Although there is a growing body of research on immersion pedagogy, there is a dearth of research on professional development (PD) experiences that positively impact immersion teacher practices. This study contributes to the somewhat limited knowledge base on professional development (PD) experiences of immersion teachers by reporting on how interconnected aspects of TLA manifested as immersion teachers engaged with an online learning postgraduate programme.

### **Generating immersion teacher language awareness through technology enhanced language learning**

This cross-sectoral, postgraduate programme, which commenced in September 2018, enables teachers to engage at the nexus of practice, policy, and research, and develop as professional educators, researchers, and leaders who support, enrich and impact real-world policy and practice in immersion and bilingual education. They explore contemporary issues and developments in bilingual and immersion education through a complementary and diverse blend of synchronous/asynchronous online and onsite learning experiences. The explicit study of language and language development (TLA) specific to Irish-medium education therefore plays an integral role in programme analysis, design, development, implementation and evaluation. Design, development, delivery and assessment components build upon entry language competencies and develop competencies in oral interaction and production, listening, reading and writing skills.

### **Technology-enhanced language learning**

In order to seize the potential of digital technologies, for enhancing and innovating language learning, a diverse range of technology enhanced language learning tasks were designed and used in intense and multifaceted ways. Technology-enhanced language learning (TELL) allows teachers to design a more student-centered and flexible approach to language learning which stimulates autonomy, reflection and research

skills (Poon 2013). The opportunities for interaction and engagement in an online learning environment are varied and include spoken and written interaction including the use of multimedia both synchronously and asynchronously (Sharma and Westbrook, 2015). An online learning approach to L2 learning not only enhances linguistic proficiency but also promotes autonomous, self-directed learning and learner motivation (Banditvilai, 2016) and enables us to learn more about how L2 learners acquire and use language in a computer-mediated environment (McCarthy, 2016). Principles and practices from the Common European Framework of Reference of Languages (CEFR) were adopted. The CEFR is a transparent, coherent and comprehensive reference instrument which describes foreign language proficiency at six levels: A1 and A2, B1 and B2, C1 and C2. The CEFR was utilized to explore proficiency needs, to establish learning and teaching objectives, to guide assessment, to review, reform and develop content of the language curricula, to design, develop and exploit teaching/learning experiences (communicative contexts, themes, tasks and purposes in relation to a blended learning design) and to enhance quality and success in learning, teaching and assessment.

In this study, a virtual campus was designed to address learners' linguistic needs in a flexible, meaningful, accessible and inclusive manner. TELL tasks were crafted to stimulate and enrich reception, interaction and production across all language skills to enable learners to progress from B1 CEFR on programme entry to C1 CEFR on programme exit.

Through TELL, students were enabled:

1. To reflect on, critically assess and actively develop their linguistic competencies by completing an evidence-based reflective self-profile on their own experiences of L2 learning, formulating a data-driven language development plan and developing a language e-portfolio using OneNote
2. To engage in the scholarship of immersion teaching, learning and research while simultaneously becoming language aware and language informed (e.g. Podcast creations, contributions to literature circles via Padlet and discussion fora, synchronous webinars)
3. To enhance digital competencies while stimulating language production (e.g. blog and wiki development, digital poster presentations, podcast reflections)
4. To engage in collaborative language learning, cognitive processing and synchronous and asynchronous interaction (e.g. discussion fora, wikis, blogs, online quizzes, synchronous webinars, Poll Everywhere, shared technical glossaries)
5. To source, create and share language focused digital resources (e.g. Moodle discussion fora, Edchatie, shared e-portfolios)
6. To avail of targeted and timely feedback to gauge and refine their linguistic progress (e.g. online individual language conferencing, assessment rubrics utilising Turnitin, online quizzes and peer review and feedback through Padlet)
7. To develop a globally informed perspective on the mandatory linguistic competencies of teachers in Irish-medium and Gaeltacht education through Adobe Connect webinars with international immersion language experts
8. To build community and capacity to advance immersion language learning and teaching (e.g. Edchatie, Twitter, technical glossaries, e-portfolios, online annotated bibliographies)



9. To promote and embed innovate teaching, learning and assessment practices in their school contexts and transform Irish language learning for their learners (e.g. incorporation of blogs and wikis as reflective language learning tools, podcast creation for oral language assessment, digital posters design to stimulate linguistic accuracy).

### **The study**

Qualitative in nature, this study seeks to understand and observe how interconnected aspects of TLA manifested as immersion teachers engaged with an online learning postgraduate programme. Twenty-three practicing teachers with varied language backgrounds, teaching and learning experiences, needs, dispositions and learning styles participated in this study.

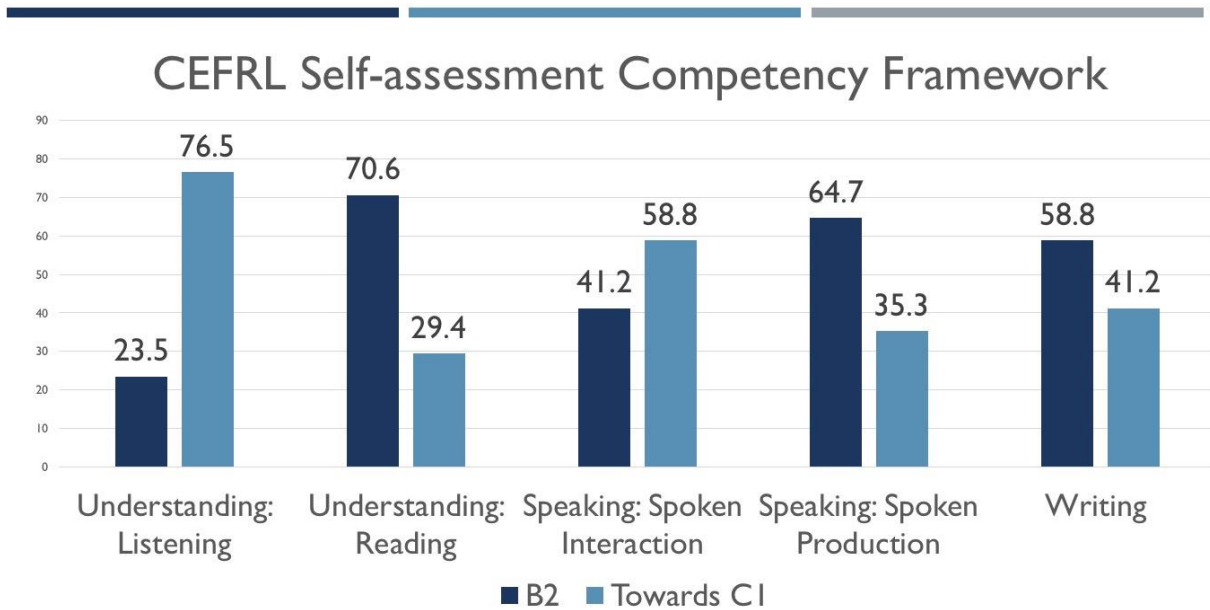
The research focused on the following research question:

- How can TELL support teachers in developing TLA in immersion education?

Data were collected from a variety of sources e.g. an extensive online questionnaire, individual language plans, e-portfolios, individual language advisory sessions, reflections, assignments and focus groups. Initially, the “raw” data were organized into natural units of related data which seemed to fit together (Creswell, 2009). These units were labelled under codes. Systematic coding was completed through reading and rereading all data. Through a succession of examinations of the relationship among existing units, some codes became subsets of others and therefore were amalgamated (Cohen, Mannion and Morrison, 2000). This regrouping process highlighted the richness of the data, as substantial relationships existed between and among units. Progressive drafts resulted in the “firming up” of themes (Woods, Boyle, Jeffrey and Troman, 2000) and finally the central agreed-upon themes in relation to teachers’ experiences and outcomes were refined and labelled. Trustworthiness of the findings was strengthened through triangulation across data sources to confirm patterns within the data set (Guba, 1981; Skenton, 2004). Findings suggest that this TELL initiative cultivated student motivation, autonomy and success, fostered community, capacity, diversity, inclusion and students’ digital competence.

### **Promoting self-motivation, self-management, self-regulated language learning and self-assessment through digital technologies**

Teachers reported that a technology-enhanced environment which incorporated multiple modes, placed more emphasis on self-regulated language learning. Individualised language learning opportunities (e.g. individual language plan, e-portfolio, targeted linguistic feedback, language glossaries, Edchatie, synchronous webinars) enabled teachers to self-direct specific learning activities to fill their knowledge gaps. This in turn provided them with a motivational orientation. Digital technologies enabled learners to plan, to monitor and reflect on their own learning, provide evidence of progress, share insights and come up with creative solutions. Teachers highlighted that learner autonomy was supported through carefully crafted TELL student-centred tasks which promoted and supported language learning, production and assessment (e.g. blogs, digital posters, podcasts and fora).



**Figure 1: CEFR Self-assessment Competency Framework**

Using the CEFR self-assessment grid, students completed a competency framework, identifying competency levels across understanding, speaking and writing skills and providing evidence of their competency. Data of self-assessment was analyzed and quantitative results show that students are comfortable at level B2 of the framework, moving towards level C1, however it varies across language skills. Figure 1 indicates that the skill where the most students are moving towards achieving C1 is understanding listening where 76.5% of student self-assess themselves as moving towards level C1 in comparison with 29.4% of students who report the same for understanding reading. Due to the academic nature of reading tasks associated with the programme, it seems that students awareness of reading at a C1 level has been heightened leading to fewer students self-assessing at this level in their competency framework. Likewise with speaking, a greater percentage of students reported moving towards level C1 in terms of their spoken interaction (58.8%) than their spoken production (35.3%). Students opportunities to interact and engage through oral language are accommodated through both online and onsite delivery of the programme leading to a greater volume of students perhaps being more comfortable with spoken interaction. Although opportunities for spoken production are awarded to students through presentation assessments and podcasts etc., 64.7% of students assess themselves as being at level B2 in spoken production.

Interestingly, a greater percentage of students rate themselves as moving towards level C1 in their writing than in their spoken production. This may be due to the higher concentration of L2 students in the cohort. In light of the linguistic gap in language accuracy identified in needs analysis, it would be expected that a lower percentage would self-assess as moving towards C1. Data shown here provides meaningful insights and informs the future design of the programme where emphasis can be placed on the skills where a less percentage of learners deem themselves to be moving towards a C1 level of competency.



## Sharing of linguistic knowledge through digital technologies cultivated community and capacity in language learning

Teachers interacted together and shared their knowledge and skills (shared e-portfolios, language glossaries, discussion fora, Edchatie, Twitter) in order to achieve specific but tailored language learning goals. Through creatively engaging with new language in this manner, teachers became more language aware and language informed. They reported that this TELL initiative has also empowered them to share language learning experiences among colleagues in their school contexts and build whole-school capacity focused on TELL/language learning through the whole school evaluation process. They also described how they have cultivated language community and capacity in their classrooms to foster their learners language awareness, transversal skills and creative expression through digital technologies as a direct result of their engagement in this TELL initiative.

C.: Every Monday I go to school, I have something new to enrich my own practice either in terms of technology, understandings or language. This gives me confidence to discuss my practice with staff and avail of feedback from them. This gives me confidence to try out new things with my class, to advance my language skills but especially to infuse technology into language learning and teaching...

E.: Yes – how technology was integrated into content and language learning in this course was fantastic – writing blogs, creating podcasts and digital posters etc. I have now integrated these techniques in my teaching also and shared them with my colleagues at school. We all need to do this to move forward in immersion...

(Focus Group #1, Trans)

### Catering for linguistic diversity and inclusion through authentic student-student interaction and language practice

Authentic digital opportunities for student-student language interaction, collaboration and active and creative engagement through digital technologies encouraged teachers to invest in the language learning experience, advance at different levels and speeds, and to follow individual learning pathways and objectives. This enriching experience in turn not only supported them on their pathways but also enabled them to strategically select and creatively implement inclusive digital language learning activities in their classrooms to cater for differentiation and personalization in language learning as the excerpt below indicates.

Technology provided me with the time to analyse, to reflect, to plan, to get feedback and advance at my own pace not only on my own language learning journey but also on my evolving understandings of immersion teaching and learning. This was a motivating experience for me and had definitely revolutionised my teaching. This new learning has helped me to cater more effectively for my students' different needs in terms of language and content in immersion.

(Onsite student evaluation, P., Trans)





## Facilitating teachers' digital competence through language learning

The creation and modification of digital resources (e.g. podcasts, digital posters) fostered teachers' digital competences but also challenged them to become proficient and autonomous users of the immersion language. Teachers reported that they in turn used these new digital competences to invigorate their pedagogical practices in their classrooms and enrich and transform the language learning experiences for their students (e.g. incorporation of blogs and wikis as reflective language learning tools, podcast creation for oral language assessment, digital posters design to stimulate linguistic accuracy).

As a language learner, I find that how I learn has changed dramatically since I started using more IT and it has definitely transferred to the classroom and my methodologies in teaching have definitely changed. If somebody told me a year ago that I would have my own blog, I would have laughed at them... Now I am blogging with my own class and they are becoming more aware of their language in content classes – even using the CEFR self-assessment grids...

(End-of-module evaluation, N., Trans)

## Conclusion

In relation to Irish-medium education, TLA is an area of enduring concern. Its complexity cannot be overlooked. Opportunities to research the knowledge demands of content teaching in immersion settings are limited; however, the experiences provided by such opportunities afford invaluable insights into the complexities of immersion teaching and support the development of TLA. Immersion TLA is multifaceted and understanding any element of it is a complex task. In this study, digital technologies were used in visionary, innovative and meaningful ways to motivate, creatively engage and ensure success for all language learners. Teachers' TLA was addressed in a structured, tailored approach through TELL cultivating communities of practice. Teachers' professional learning was enhanced and the use of technology for language teaching, learning and assessment was embedded in teachers' practices as a direct result of their engagement with this TELL initiative. These findings illustrate several points of access into classroom research and pedagogy and uncover core aspects of high impact TELL experiences. This study contributes to a greater understanding of TLA in immersion and provides compelling evidence of the consciousness-raising and critical language awareness potential of TELL as a pedagogical framework in immersion teacher education. Findings reveal that high-impact TELL student experiences are: authentic, relevant and meaningful, cater for differentiation and personalization, entail practical application – immediate and lasting impact (durability) and visible evidence that student learning improves, have a collaborative component and promote reflection and assessment on current practice. This innovation is still evolving based on this reciprocal learning and feedback. A clear focus at all levels on continuous improvement which is guided by a shared vision for sustainable excellence (quality of TELL provision and outcomes) and underpinned by robust processes of monitoring, evaluating and reviewing. Working together, we continue on our journey of unlocking the unlimited potential of TELL fueled by the aspiration of further enriching TLA and the language learner experience and fostering the inherent capability of all learners of achieving success.

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## A Model of Engagement for the Online Learner in the Liminal Space of Dissertation Research

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### Abstract

Online education in institutes of higher education has grown incrementally year-on-year with reports that more than 30% of all American students are enrolled on at least one distance course. Online education suits the adult-learner in particular, offering flexibility and convenience to those wishing to study part-time while continuing to work and deal with other commitments. This level of flexibility is a requirement at the present time as a significant number of occupations become automated. Those employed in those occupations need open pathways providing a flexible means to re-skill for the needs of their evolving occupation. Such flexibility and convenience has a downside. Non-completion rates online tend to be significantly higher than those for on-campus education. Research has shown that online students can and have out-performed their traditional student counterparts, but for this to happen, a strong instructor presence is required and that must be supplemented by strong instructor-student communications. Launched in 2004, the online Masters in Software Information Systems (a joint collaboration between the National University of Ireland, Galway and Regis University, Colorado) operates in part-time mode targeting adult-learners in full-time employment. Analysis of student feedback illustrated a crux-point for disengagement while the student works on their dissertation. In particular, students find the task of producing secondary-research for the dissertation to be complex and arduous. While in the process of mastering the threshold concepts within that task, students often become stuck and quit thus increasing student attrition. Using existing research, the authors have designed an engagement model for the liminal space (ELS) which has been implemented to smooth the points where the student had a tendency to become stuck. The ELS Model is based on active learning supported by:

- communication channels
- formalised support
- clear expectations and deadlines
- praise, encouragement and feedback

In this paper, the authors present the Engagement in the Liminal Space (ELS) model. In the three years prior to its introduction, the percentage of students starting and completing their dissertation averaged 53% per annum. In the two academic-years post introduction, the percentage of students starting and completing their dissertation has reached an 82% average per annum i.e. dissertation completion rates have increased by almost 30%.

**Keywords:** Online Learning, Dissertation, Engagement, Liminal Space

## Introduction

By 2030, due to significant advances in technology, estimates are that 400-800 million people worldwide may need to find new jobs (Gonser, 2018). Glaser (2017) estimates that 38% of American jobs will be at risk due to automation by 2032 while the McKinsey Global Institute (2017) estimate that approximately 50% of tasks in the workplace can be automated. Barnes et al. (2016) state that although certain occupations are likely to become automated, employees of those occupations will almost certainly be required to perform new tasks rather than become unemployed. It follows that in order to take on new tasks, new skills will need to be acquired. Those already in the workplace will require flexible-learning which they can pursue (while in employment) in order to re-skill. Higher education institutions (HEIs) are recognised as the organisations that can deliver the knowledge required to equip workers with new skills and competencies (Boden R. & Nedeva M., 2010 cited in Brennan and Dempsey, 2018). Training provision must be “flexible enough to teach new skills quickly and efficiently ... It will require a greater emphasis on lifelong learning and on-the-job training, and wider use of online learning” (“Retraining low-skilled workers,” 2017), therefore this is an area where online learning can be utilised fully.

Although “online education is one of the top industries in the world, providing support, knowledge, and jobs to a large segment of the world’s population” (Bawa, 2016, p. 1) engagement and retention remain on-going challenges (Atchley, Wingenbach, & Akers, 2013; Boston & Ice, 2011; Chiyaka, Sithole, Manyanga, McCarthy, & Bucklein, 2016; Khan, Egbue, Palkie, & Madden, 2017; Poll, Widen, & Weller, 2014). The majority of research suggests that attrition rates for online students are significantly higher than those for students in on-campus education (Allen & Seaman, 2014; Bawa, 2016; Bowers & Kumar, 2015; Croxton, 2014; Jordan, 2015; Lee & Choi, 2013; Shelton, Hung, & Lowenthal, 2017). A wide variety of factors contribute to attrition rates in online education varying from feelings of isolation (McMahon, 2013), family commitments (Evans in (Bawa, 2016) (Schweizer, et al., 2008)) and work commitments (Schweizer, et al., 2008). Disengagement is a significant challenge for online education which can lead to attrition (Beyer et al., 2017; Henrie et al., 2015; O’Dea et al., 2018; Lee and Choi (2011, in Cho & Cho, 2014)).

### **M.Sc. in Software Engineering & Database Technologies**

Launched in 2004, the online M.Sc. in Software Information Systems was a joint collaboration between the National University of Ireland, Galway (NUIG) and Regis University, Denver, Colorado. Following an agreed instructional design process and ensuring that the curriculum was grounded in real life contexts, NUIG developed and validated Software Engineering modules whilst Regis University developed and validated Database modules. Each university took responsibility for the delivery of their associated modules. This new part-time, online Masters programme, delivered a 50/50 mix of Software Engineering and Database modules. Students from both universities participated on the modules online and each University looked after the delivery of their own students’ dissertation-related content.

In 2009, the M.Sc. in Software Information Systems was re-named to M.Sc. in Software Engineering and Database Technologies (M.Sc.SED), to more accurately reflect the content and learning outcomes. This remains a flagship online programme for NUIG.

The online modules are facilitated by industry-experts who are typically experienced in the module-topic and interested in instruction. These industry-experts bring real-world expertise to the online discussions and



assignments therefore the student is exposed to real-world knowledge alongside academic content. The Masters programme operates in a part-time mode, with the typical student being an adult learner in full-time employment. An analysis of 2004-2013 student survey data by O’Dea & Brennan (2017) showed that the dissertation was a significant stumbling-block for the student, to the point that 21% of those students who started their dissertation in 2013-14 had not completed their dissertation by 2017. Furthermore, 13% of those students who had started their dissertation in 2015-16, abandoned their studies, with only the dissertation outstanding (i.e. 60 ECTS accumulated out of 90 ECTS). O’Dea & Brennan (2017) also identified other crux-points for disengagement i.e. Difficulties with the Online Medium, Variance in Quality of Module-Content, Variance in Feedback and Provision of More Practical Workshops. Interestingly, the most urgent crux-point i.e. Difficulties with Dissertation is recognised as a widespread problem; although “the number of postgraduate students is increasing, the writing of a master’s dissertation still poses numerous challenges” (Wagener, 2018, p. 1).

In addressing this challenge, the authors developed the ELS Model to support students in traversing the dissertation liminal space, starting with the liminal space of secondary-research. The authors contend that the ELS Model can be applied to any aspect of online learning with which students experience difficulty.

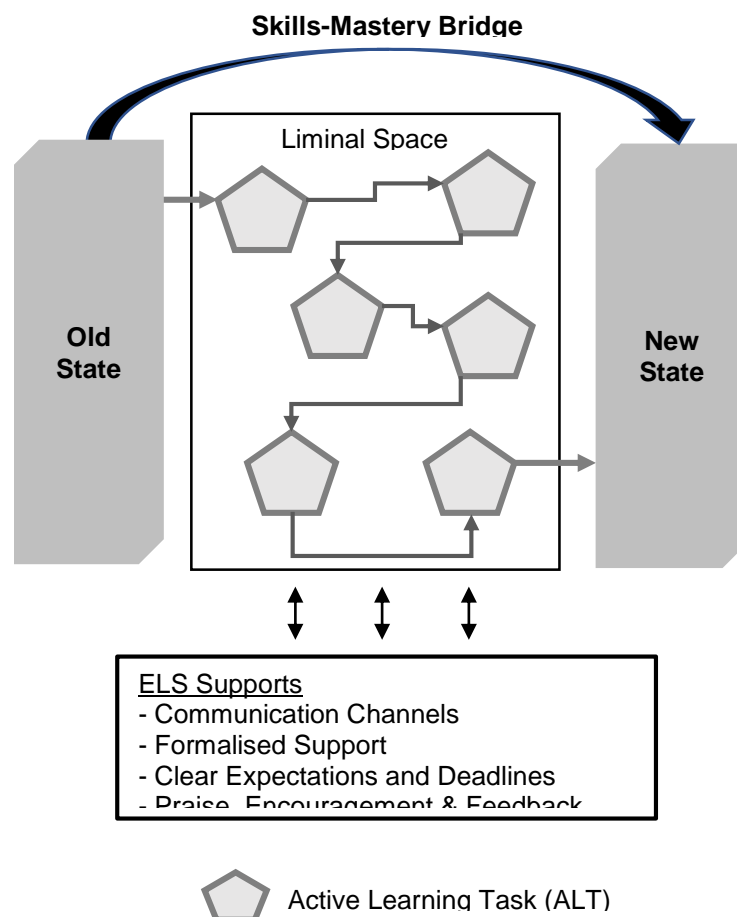
### **Model for Engagement in the Liminal Space**

Fundamental to the ELS Model (Figure 1) are threshold concepts and liminal spaces. In anthropology, liminality (from the Latin ‘limina’, meaning ‘threshold’) refers to the ambiguity or confusion that can arise during a period of transition (van Gennep, 1909). Whilst in the liminal space, the participant transitions from a previous state to a new state (van Gennep, 1909) and the stage between the previous and new state is the liminal space. Land (2014) describes liminal space as a “space of transformation” (2014, p. 200) where the transition from one comprehension of information to a new comprehension occurs in order to master a threshold concept. Åkerlind et al. (2011) explains threshold concepts as essential concepts that are troublesome and involve transformation. The threshold concepts view of learning and education design is based on the idea of difficulty in a liminal space of learning (Land et al., 2014). While in the liminal space, students are prone to becoming ‘stuck’ (Eckerdal et al., 2007; Harlow, Scott, Peter, & Cowie, 2011; Kiley & Wisker, 2009; Perkins, 2010). Eckerdal et al. (2007) contend that confidence is very closely tied to the liminal space, such that the longer a student spends in the liminal space, the more that person’s confidence is depleted. Some individuals transition rapidly while others take more time (Meyer & Land, 2005). The variety of transition-pace requires a group to be managed carefully so that those who transition quickly remain engaged while the remainder of students make that transition.

Deep learning is critical in facilitating the transition between the old and new state of knowing. Baldwin and Koh (2012) explain that deep-learning involves the student focusing on facts and then integrating these facts into a comprehensive view of the topic. Deep-learning is highly collaborative, involves critical thinking for the synthesis of ideas and facts and causes the learner to reflect on their learning (Ke & Xie, 2009). Whilst in a state of deep-learning, the student integrates learning with prior knowledge and experience to create new concepts (Filius et al., 2018). Chipchase et al. (p. 36) highlight that although “surface” instruction might be adequate at second-level education, “active and deep-learning approaches are generally required for successful university studies”. The ELS Model is underpinned by these elements of Poll et al.’s (2014) Best Practices for Online Engagement and Retention:

- “build eCommunity
- clarify online course expectations and objectives
- promote exchange of ideas and information in the online classroom
- provide timely, relevant, and actionable feedback
- create a student-centered environment”

(Poll et al., 2014, p. 57)



**Figure 1: The ELS Model**

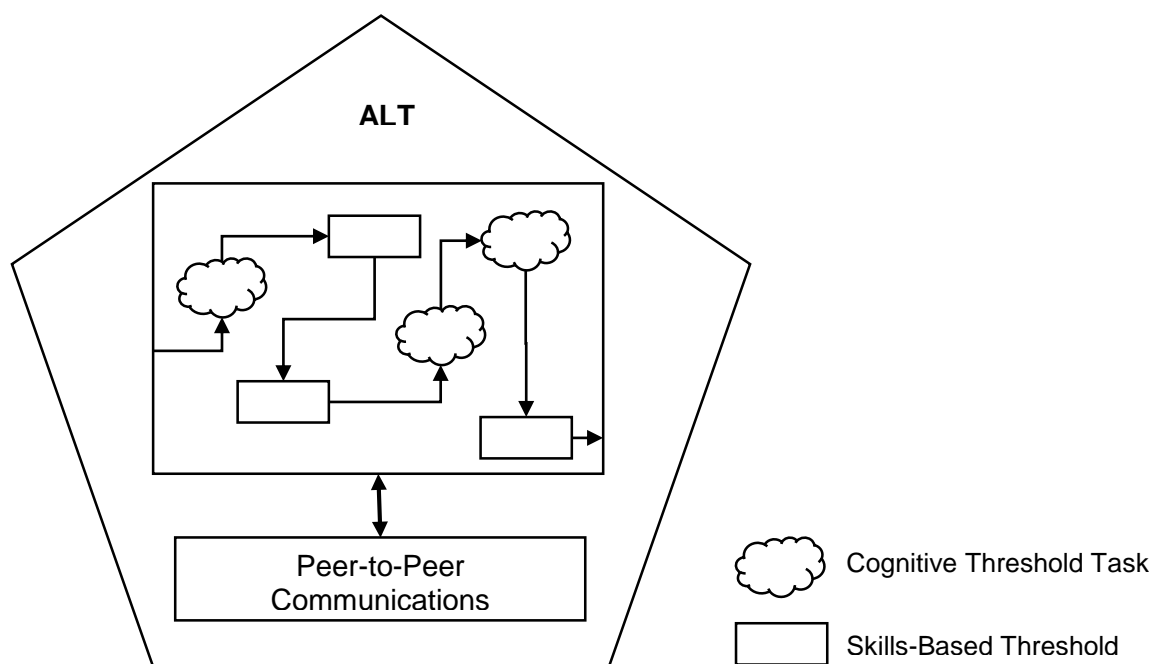
A major component of the ELS Model is the Active Learning Task (ALT). An ALT is based on Salmon’s concept of e-tivities as “frameworks for enabling active and participative online learning by individuals and groups” (2013, p. 29). Each ALT contains an online activity catering to cognitive threshold tasks and/or skills-based threshold tasks (Figure 2). ALTs depend heavily on peer-to-peer communications.

The affective domain, as defined in Bloom’s taxonomy (1956), relates to a learner’s emotions, attitudes and feelings. Research shows that activities targeting the affective domain can both engage and motivate students (Ateh & Charpentier, 2014). Maintaining student engagement (and motivation) in the liminal space is essential to the ELS model therefore ALTs are designed to appeal to the learner’s affective domain where possible.



Within the Secondary-Research liminal space of the Dissertation, the ELS Model is applied. It uses 6 ALTs to guide the student;

- ALT 1: Discuss Academic-Writing and Secondary-Research
- ALT 2: Summarise Relevant Academic Papers using Academic-Writing
- ALT 3: Send Early Draft of Secondary-Research to Dissertation Advisor
- ALT 4: Build Publications into your Secondary-Research while Structuring Content to Produce Second Draft of Secondary-Research
- ALT 5: Provide Status-Update, Continue to Build Secondary-Research and Send Third Draft to Dissertation advisor
- ALT 6: Gain Secondary-Research Approval



**Figure 2: Active Learning Task (ALT)**

These ALTs are supported by the ELS Supports. While these supports are customised to the ALT in question, they typically assume the following format;

- Communication channels
- Formalised support
- Clear expectations and deadlines
- Praise, encouragement and feedback





As an example, the ELS Supports for the ‘Summarise Relevant Academic Papers using Academic-Writing’ ALT are;

- Communication channels: These are opened through the online-discussions when the facilitator provides the student with the objectives for the ALT. The students use the discussion for peer-to-peer communications plus student-to-facilitator communications.
- Formalised Support: As the facilitator is mindful that academic-writing is a new skill for the majority of students, they remind students to feel comfortable asking any question on the topic, for example regarding searching for relevant academic publications.
- Clear expectations and deadlines: The student is requested to locate two relevant academic-journals, then summarise those using academic-writing while highlighting the relevance of the papers to their dissertation argument. A deadline is set for the students to share this with their peers by the end of Wednesday, that week.
- Praise, encouragement and feedback: The facilitator actively encourages the students throughout the week by explaining that they, the students, are not expected to know how to write academically at this point and that this is a learning process. When the student shares their work, the online-facilitator provides feedback. (In 2016-17, that was done via e-mail. In 2017-18, the feedback was provided publicly through the online-forum. This change in delivery was effected in order to re-enforce good writing and referencing practices as the student learns from the feedback that they receive personally but that learning is re-enforced by the feedback that others receive in the public-setting. Students also receive a wider variety of feedback in that way.) The online-instructor makes a conscious effort to incorporate encouragement, praise and positive feedback in order to boost performance and build confidence, thus appealing to the student’s affective domain. The feedback highlights errors but highlights good work also. Both aspects re-enforce learning. Encouragement is vital at this stage as students tend to be anxious about this task. Although there is a tendency for some students to avoid the task, those students have the opportunity to learn from the feedback shared with others in the public-forum.

## Methodology

The following are the research questions of this study:

1. Does the ELS Model aid students transitioning through the Dissertation Liminal space?
2. Did the introduction of the ELS Model impact positively on Dissertation completion rates?

In addressing research question 1, two surveys pre and post ELS Model implementation (2016-2017) are compared and contrasted. Survey 1 was distributed to 83 dissertation-students from the three academic (2013-14 to 2015-16). The response rate was 45% (n=83). Survey 2 was deployed to those students who worked on their dissertation during the academic years 2016-2017 and 2017/2018. The response rate for Survey 2 was 75% (n=44).

In addressing research question 2, completion rates from the 5 academic years 2013-2014 to 2017-2018 (pre and post ELS Model introduction) are compared and contrasted.



## Results

Descriptive statistics for both surveys are unavailable due to compliance with General Data Protection Regulation (GDPR). Results are presented thematically based on the research questions.

### The ELS Model as an Aid to Students' Transitioning through the Dissertation Liminal Space

Surveys 1 and 2 are compared and contrasted based on the ELS supports;

- communication channels
- formalised support
- clear expectations and deadlines
- praise, encouragement and feedback

Note: commentary from the students is presented in [ ].

#### *Communication Channels*

When asked for suggestions to help with the dissertation-process, 49% (n=37) of Survey 1 respondents highlighted the importance of student-to-faculty partnership. 41% (n=37) commented specifically on the importance of the student building a relationship with their dissertation advisor; [Both <advisor and student> must work together] [Some form of one to one meeting or open/less formal discussion between student and advisor could help] [Encouraging students to take a period full time with their advisor] [One mandatory conference call with <advisor> ... would help].

Other comments suggested that students were not building strong relationships with their dissertation advisor and that they needed guidance on how to do this; [I find it difficult to pick up the phone and ring my adviser out of blue. I would feel like I was making a nuisance of myself] [I got lost at sometimes and I thought I was doing the right thing where there was complete the opposite. I think <advisor> must be engaged with students] [Engaging with the dissertation advisor is the most crucial element of competing (sic) the dissertation] [Important that your dissertation advisor is on board].

After applying the ELS Model to the secondary-research stage of the dissertation, Survey 2 respondents indicated that the ALTs had helped them build stronger communications with their dissertation advisors and with other members of faculty. Only 6% (n=33) of respondents indicated that they would have liked more support from their advisor (down from 49% (n=37) prior to ELS Model implementation); [More involvement of advisors if possible] [liked more support from advisor as this would have been the first time to do a dissertation]. 18% of respondents (n=33) commented on strong working-relationships with their dissertation advisor; [<advisor> was very calm and kept me from worrying] [very pleased with the level of support and guidance] [Excellent support and guidance throughout] [advisor's advice, and quick responses were of tremendous help] [ <advisor> gave me the best assistance needed] [While securing an advisor ... I secured a very responsive and supportive one].



### *Formalised Support*

Research shows that when adult-learners are dis-engaged with their learning goals, they need instructor support (Arghode et al., 2017). Research also shows that in an ideal world, the online-student will have a strong internal locus-of-control i.e. an awareness that they are in control of their success or otherwise (Bowen, 1996 in Barnard et al., 2009; Joo et al., 2013; Martinez, 2003). Survey 1 indicated that 24% of respondents (n=37) showed signs of diminished belief in their own abilities (i.e. self-efficacy) and/or a lack of strong locus-of-control; [Without <status update requests> I would have not completed] [Without <co-ordinator's> help I'd never completed dissertation] [the problem I found was to keep up with motivation] [More help/guidance ... - an awful lot more!] [pressure does need to be applied to keep progressing]. Student comments showed a strong desire for a step-by-step pathway of support to be provided.

The ELS Model increased the level of support provided to students as they traversed the liminal-space of dissertation secondary-research by chaperoning those students through the ALTs. Comments after ELS implementation showed that the students felt supported; [Having written a masters dissertation in the past I felt much more supported this time around] [<The ELS Model is> important in that it provides a support network for the literature review] [<ALT> was great] [<discussion> provides one place to raise issues, concerns or ask for help] [Overall team were very supportive] [important in that it provides a support network for the dissertation writing process] [ It was great to have some forum to reach out for additional support]. A respondent who started dissertation-studies in 2014-15 and 2016-17 commented; [There was a definite improvement ... in 16/17].

### *Clear Expectations and Deadlines*

Survey 1 identified some issues with regard to expectations and deadlines. 24% of respondents (n=37) identified occasions where they were uncertain of what was expected of them regarding deliverables and when those deliverables were due. The only timeline the students had in mind was the dissertation due-date. In most cases, students were not breaking the dissertation down to its component parts and setting dates for delivery of each part; [I would have preferred to structure the dissertation in measurable bits, so they can be achieved on time, long term deadlines were too difficult to follow.] [try not to procrastinate] [Incremental instalments] [agree a Gantt/Dissertation timelines and aim to hit milestones] [Stick with the well-defined deliverables] [pace needs to change]. It became obvious that a process needed to be put in place to help students organise their time and provide clear advice regarding what was expected and the associated deadlines.

Each ALT used in the ELS Model had at least one deliverable with a precise deadline for delivery of said deliverable. Survey 2 responses did not reflect issues with expectations or deadlines. Only 3% of responses (n=33) wished for a greater degree of granularity of deliverable; [I think it would be better if the student had more deliverables to meet or be asked to make contact with adviser more often. I found I procrastinated when I wasn't being asked to produce.] No respondent identified a problem with expectations. On the contrary, 11% of respondents showed that the model helped them to know how they were progressing; [It <the ELS Model> help me to know what I achieved, and what was left to be done] [gave clarity and focus to my research effort]



### *Praise, Encouragement and Feedback*

Whilst comments in Survey 1 did not identify “praise” or “encouragement” as areas requiring improvement, 38% of respondents (n=37) exhibiting signs of diminished self-efficacy and/or lacking a strong locus-of-control showed that there was need for steps to build confidence and self-belief in order to increase motivation. Research shows that praise motivates students (Mumm & Mutlu, 2011; Van Houten & Lai Fatt, 1981) and is essential when encouraging and building a student’s self-esteem (Brophy, 1981 in Mumm and Mutlu, 2011). Furthermore, positive feedback has been shown to boost intrinsic motivation (Burgers, Eden, van Engelenburg, & Buningh, 2015). This research led the authors to include praise, encouragement and feedback as an ELS Support. Most ALTs in the ELS Model incorporated opportunities to provide feedback, praise and encouragement (as shown in the description of the ‘Summarise Relevant Academic Papers using Academic-Writing’ ALT).

Survey 2 results did not reflect issues with diminished self-efficacy and/or weak locus-of-control. Instead, it showed that 10% of respondents (n=33) found elements of praise, encouragement and feedback valuable; [Keep pushing the reading of papers and adding to the thesis idea] [feedback] comments were of great help [keep asking students where they are and encourage another paper review and another 30 mins on the dissertation]

### **Overall Impact of ELS Model Supports**

Students participating in the M.Sc.SED usually aim to start and complete their dissertation in year 2. Those students work on their secondary-research while participating in another module. In some cases, students postpone the dissertation to a third year in order to reduce their workload. When the cohorts in Survey 1 were asked for their experience working on their secondary-research while participating in another module, 19% of respondents (n=37) deemed the task “impossible”. This reduced to 6% (n=33) after the implementation of the ELS Model. A respondent who started dissertation-studies in 2014-15 but did not complete, returned in 2016-17 and commented; [There was a definite improvement <re: dissertation> in 16/17].

### **The Impact of the ELS Model on Dissertation Completion Rates**

In the three years prior to introducing the ELS Model (2016-2017), the percentage of students starting and completing their dissertation each year averaged 53%. In the two academic-years since the introduction of the ELS Model, the average completion rate has increased to an 82% average.

Figure 3 shows the student numbers starting and student numbers completing their dissertations for the academic years from 2013-14 to 2017-18. Immediately prior to the ELS Model introduction, the start and complete numbers for the dissertation began to converge, reaching a 64% completion-rate. This was largely due to increased status-update requests/‘prods’ (O’Dea & Brennan, 2017) which were incorporated into the Formalised Support component of the ELS Model. In 2016-17, when the ELS Model was introduced, there was a noticeable change. Dissertation completion figures reached 88%. That trend continued into 2017-18 although it was not as pronounced. The dissertation completions in that year reached 74%, giving an average completion rate of 84% post implementation of the ELS Model.

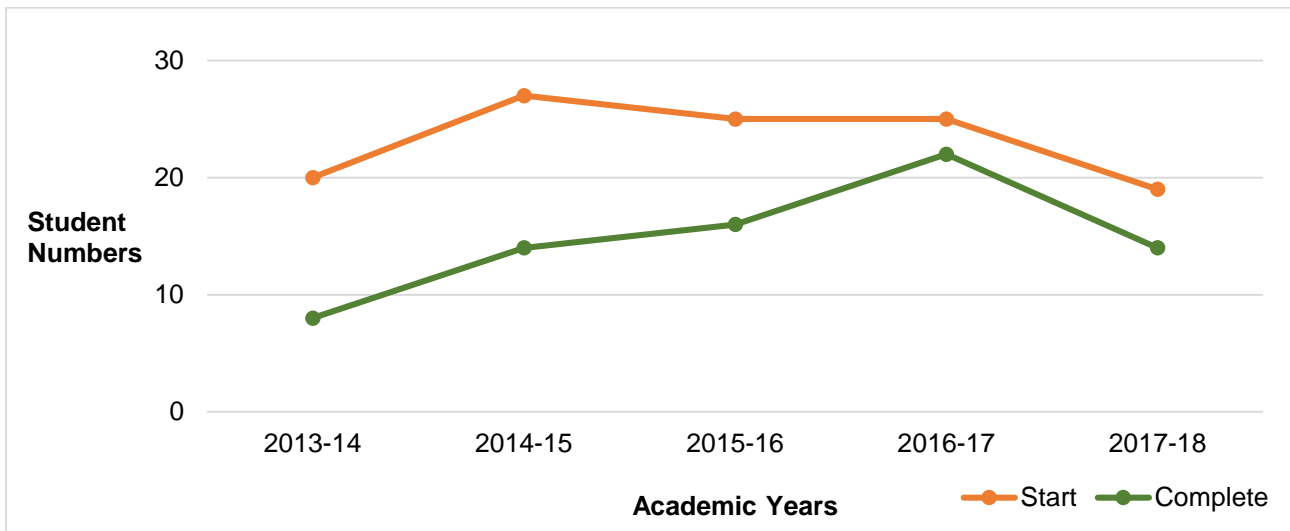


Figure 3: Student Numbers Starting and Completing Dissertation by Academic Year

## Conclusion

This study provides the ELS Model applied to the problem of student disengagement with the dissertation in an online Masters. In this research, the model is implemented to support students as they grapple with new cognitive and skills-based threshold concepts related to the area of secondary-research. These threshold concepts reside in the liminal space. Longitudinal results clearly show the effect of the model on engagement with dissertation research and the associated impact on dissertation completion rates. Data is available for two years post-implementation and that reflects a significant improvement and increase in dissertation completion rates. The authors contend that the ELS Model may be applied to any aspect of online learning with which students experience difficulty. Further research is needed to test this premise.

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## The Process of Transforming Advertising Videos into Open Educational Resources: The Case of the ‘Sifilis Não’ Project

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### Abstract

The Brazilian Ministry of Health declared in 2016 that the country was facing an epidemic of syphilis, a sexually transmitted infection (STI). In that year, there was a detection rate of 42.5 cases of syphilis acquired per 100,000 inhabitants; 12.4 cases of syphilis in pregnant women per thousand live births and 6.8 cases of congenital syphilis per thousand live births. In 2017, the Ministry of Health signed an agreement with the Federal University of Rio Grande do Norte (UFRN) to carry out the Rapid Response to Syphilis in Attention Networks Project, stimulating the diagnosis and treatment of syphilis. Popularly termed ‘Sifilis Não’ (Syphilis No), the project seeks to meet the goals of eliminating syphilis in Brazil through academic research, as well as educational and communication actions. In this context, an advertising agency was contracted to produce advertising pieces aimed at specific audiences. The agency together with the Ministry of Health and UFRN generated a web series called ‘Senta que lá vem informação’. The present paper intends to describe the work of transforming the web series produced for the national campaign into open educational resources (OER). The web series consists of an interview program that approached open themes of sexuality within specific universes, inserting syphilis at strategic moments, with the purpose of teaching subtly and effectively, as proposed by the theory of distracted learning. The interviews which consisted of 4-minute episodes and were conducted by a Brazilian TV presenter who was recognized for presenting such programs in the 1990s. The production was relaxed but objective with a bold tone. At times the language was adjusted for easier consumption and to provoke discussion. The transformation of the web series into an OER was carried out by the Laboratory of Technological Innovation in Health (LAIS) and the Secretariat of Distance Education (SEDIS) of UFRN with the support of an infectious disease physician. Evaluative questionnaires were produced, as well as videos and supporting texts that gave didactic character and a new format to the original material, characterizing it as a transmedia educational process.

**Keywords:** Open Educational Resource, Transmedia Education, Advertising Campaign, Syphilis

### The ‘Sifilis Não’ Project

The Brazilian government declared, in 2017, an epidemic situation of syphilis (Ministério da Saúde, 2017). The Brazilian Court of Audit, by the 2019/2017 judgment (Brasil, 2017), requested the Ministry of Health to carry out education and communication actions to combat this infection. Through a Decentralized Implementation Term (TED 54/2017 SVS/MS), the Ministry signed an agreement with the Federal University



of Rio Grande do Norte (UFRN) to carry out the Rapid Response to Syphilis in Attention Networks Project in November 2017.

Briefly renamed as ‘Sífilis Não’, ‘Syphilis No’ in free translation, the project was executed, in the advertising component, by an advertising agency through specific funding, also pointed out by the Court of Audit. The agency’s contracting process took place through a bid organized by the Rio Grande do Norte Foundation for Research and Culture (Funpec), a private entity associated with UFRN which is responsible for the management of external project resources.

After publication in the Federal Official Gazette, the competition winning agency was called for the first meeting to present its proposal. The agency set up the actions of production and delivery of the advertising pieces through a briefing, contained in a Technical Note from the Department of Surveillance, Prevention and Control of STI, HIV / AIDS and Viral Hepatitis of the Ministry of Health (DIAHV). According to the briefing, the objective of advertising was to disseminate information to reach specific audiences such as adolescents, sex workers and people without internet access, as well as specific messages for health professionals.

After an initial briefing analysis, the agency presented the concept proposal to guide the whole campaign, under the motto ‘Remember to take care - syphilis: test, treat and cure’. All the advertising pieces referred to the reminder of care and attention with syphilis idea. Visually these pieces were crafted based on post-its, small paper stickers used to write quick reminders. The first actions focused directly on the 100 municipalities that had the highest number of syphilis contagion cases, pointed out by the Ministry of Health. However, the reverberation of the actions was expanded to other locations. The language adopted, without use of locational sociolinguistic propositions, made speech compatible with the understanding of people in any region of the country. It is noteworthy that some pieces were published in national media.



Figure 1: Example of an advertising piece created for the campaign, developed to deal with congenital syphilis.

In addition to the traditional actions carried out in advertising campaigns of this kind, other actions, such as promotions in events with large amounts of public and structures installed at parties and points of great circulation, corroborated to obtain organic expansion to the population, as well as reverberation among



public health managers and users through the work of the 52 supporters, professionals hired by the project to provide support in the 100 Brazilian municipalities with the highest number of cases of syphilis.

In the attempt to consolidate communicative bonding, graphic materials and condoms were distributed in squares and other places with a high concentration of public, such as in the Carnival of São Paulo, an event of great importance in Brazilian culture, Vila Mix, regional festival with enormous circulation, and Carnatal, one of the biggest off-season carnival parties in the country. The agency also produced pieces of digital media aimed at the general public and others directed to relationship applications, external media with signs and advertisements on urban furniture such as bus stops and fleets, billboards and digital panels, printed materials, and local and national radio and TV acts.

According to the payment invoices analysis and the return of impact reports provided by the advertising agency, in the television pieces there was an average of 29,097,173 spectators impacted. On radios, each listener was exposed to the message 2.12 times. In printed pieces there were over 1,700,000 materials distributed. For the Internet the agency produced actions in applications, websites and with digital influencers.

Among other creations made by the agency, considered special, there were actions with famous characters interacting with the target audience - in this case the dancer Gretchen, famous for her history and her participation in internet memes, as well as a musical production with popular Brazil singers: Márcio Victor, from axé music band 'Psirico', and funk singer Mc Rita. The song was released on radios, music streaming and video clips, reaching thousands of listeners / viewers and totaling around four million views, adding impressions across all platforms.

The agency has also produced a web series called 'Senta que lá vem informação', what in free translation could be 'Sit down, information is coming', aimed at specific audiences. Initially, the material should only be shown on a video platform on the Internet and on a closed TV channel, however, given its quality and to promote a dilution of its initial cost, it was decided to broaden its dissemination potential by restructuring it into an Open Educational Resource (OER), aimed at qualifying the general population on syphilis.



Figure 2: 'Senta que lá vem informação' web series recording scene

### Web Series 'Senta que lá vem informação'

In order to contemplate the necessary contents that should be contained in the web series 'Senta que lá vem informação', the advertising agency, responsible for the management of funds and execution of



communication strategies, organized it in ten episodes lasting between one and five minutes each. The format of the episodes was structured as a talk show, with the interviewees and the presenter in an open room with glass walls showing the surrounding nature and the camera with free movements, creating a visual approach with the intended audience to be reached: young adult people with active sex life.

The interviews were conducted by Penélope Nova, a Brazilian TV presenter who was recognized for presenting such programs in the 1990s. The choice was not random. Many adults, who make up the target audience of the campaign, were her viewers. With language aligned to the target, the web series exposed information about syphilis, forms of contagion, prevention and treatment in the middle of relaxed revelations of the characters which could be applied to the audience, making use of distracted learning strategies.

Citelli (2000) denotes that in both learning and teaching individuals must create linearly, so knowledge must be a process of permanent social construction. The author identifies that even the formal school is on the path of dialogical production considered as a 'non-school' one, in other words, it takes advantage of discourses produced for other purposes as educational tools. Professionals who produce educational content 'attentive to the problems of education, having knowledge of the didactic-pedagogical mechanisms and the formative purposes, do not lose sight of the possibilities offered by communication (and its devices) and by the new technologies', affirms Citelli in Sartori (2010, p.45).

Contemporaneously, the concept of learning has also been articulated with so-called transmedia narrative strategies. Transmedia narratives have become popular in the field of fictional media production (Star Wars, Harry Potter, The Matrix, Walking Dead and others), in which the stories expand from one medium (support) to another, building a continually expanding narrative world, with fan collaboration (Scolari, 2014, p. 73). Other narrative genres have also appropriated this format, such as reality shows and talk shows (the late night shows) (Scolari, 2014, p. 74). Scolari et al (2019, p. 104) affirms that in this context is not surprising that the adjective transmedia has appeared next to the noun learning (transmedia learning or transmedia education).

We emphasize that 'Senta que lá vem informação' was also thought to be used in the form of isolated episodes, which explore a complete, beginning-half-end story, but also produce a narrative world about the complex problem of syphilis when articulating all the episodes. The transmedia process also materializes itself when all the episodes of the series migrate from the internet streaming format (in channels like Youtube) to a new support, a distance education platform, in which language, formats and supports go through adaptations and gain a dimension of self-instructional learning. The interaction and evaluation of the people, who begin to make the course in which the web series has been transformed, can lead to a new transformation of the product in terms of format and language in multiple digital platforms that are added to the televising, radio and telephone platforms (Scolari, 2013, p. 26).

As for the characters of the web series, it is important to mention that all the contracted actors were associated with the themes addressed. For the debate on male homosexual relations a young gay man was selected, for congenital syphilis a pregnant woman and a man as his partner and so on. The same happened to the character who would have the talk of a doctor. This time, instead of an actor, the call was made to an infectious disease physician to speak more properly about contagion and treatment of syphilis.



During the programs, the interviewer, for her expertise, acted naturally, with language modulation whenever necessary to stay in line with the subject being addressed. Volóchinov (2017, p. 204) explains that 'the word is oriented to an interlocutor' and we can not ignore its social construction to adapt the language in order to be understood in the best way, in other words, to be better understood, the speech must fit for whom I speak, since 'the statement is of a social nature' (Volóchinov, 2017, p.200). Thus, the presenter modulated her dialogical style (Bakhtin, 2016), choosing patterns of phrases and vocabularies according to the interviewee.

All the recordings happened in a single day and included original reports of the characters in most cases. They did not follow script and talked about situations actually lived, leaving the result of the episodes always anchored to reality, reaching the goal of production.

The ten episodes produced were: 'O elefante pelado na sala', with time of 1'37" as the series introduction. The episode brought all the characters that would be interviewed in the other chapters and presented the importance of the syphilis theme. 'Papai e mamãe', with 2'42", introduced a pregnant woman with her partner who revealed fetishes, sex in pregnancy, protection and congenital syphilis. In episode three, 'Jogar descalço, pode?', with a duration of 2'24", there was an interview with a single heterosexual young man who spoke about prevention.

The fourth episode, 'I kissed a girl', with 3'39", dealt with protection and featured a young, homosexual woman. 'Armário, tô fora', later episode, followed the line of care, protection, but focused on the young gay public. The episode 'Xii, deu ruim', with a time of 4'55", presented a transsexual woman, pharmaceutical, who brought, for the first time in the series, the scientific part, with the voice of a professional that certified the thematic worked.

Episode 7, 'Pega geral', with 4'52", had an infectious physician with important data and information on syphilis. 'Fetichê em grávida', episode 8, with 2'36", gathered young gay and heterosexual men beyond the couple expecting the baby, and talked about fetishes and protection. 'Come quieto', episode 9, time of 4'07", featured three characters: doctor, transsexual woman and lesbian woman, who talked about discretion in sex, syphilis symptoms and protection. The web series ended with the episode 'Jogo da verdade', with 4'10", with all the characters interviewed who, there, asked the interviewer about sexual experiences. In this narrative, prevention was addressed at specific moments.

The whole web series was published on the Internet via Youtube and on closed TV channel HBO. Observing the potential of the result obtained, the coordinating groups of the communication and education components of the project decided to transform the advertisement into an Open Educational Resource.

### **A New Purpose to the Web Series**

Since 2011 UNESCO has made available on its website a document in several languages guiding the use of Open Educational Resources. The document begins by highlighting the concept of OER as teaching, learning and research material in any support or media, under the public domain, or licensed in an open manner, allowing it to be used or adapted (UNESCO, 2011).



Citelli (2006) warns of the school's need, as a transformative and social environment, to expand the possibilities of producing meanings centered on properties, pluralities and interlocutions. In this last point, as the author points out, 'words in the media, coming from television, radio, newspaper, magazine, internet or the integration of several of these systems, need to receive recognition and treatment by the school' (p.165-166). The challenge widens when we talk about 'transmedia'. This strategy was also initially exploited extensively by the formats of the cultural media industry, with a broad commercial focus. However, this media culture, which is part of the texture of people's lives, although not automatically translatable to the educational context, presents the challenge of renewing the teaching-learning processes (Scolari et al, 2019).

The options for working with open and quality education also seem to be an obstacle still to be overcome, as Hilu, Torres and Behrens (2015) affirm. For these researchers, even with all the advances that have occurred in the areas of communication and information technologies, and with the flexibility and more democratic access processes, there is still a void of quality educational products (Torres e Behrens 2015, p.134).

Transforming the material initially created for the 'Senta que lá vem informação' web series into OER complemented the concept proposed by UNESCO which, in its guidelines objective, makes it clear that Open Educational Resources can be accessed, reused, modified and shared freely. If we take the subjects who appropriate these contents as producers that enlarge or expand the narratives in the form of OER, the perspective of UNESCO is, in a way, a transmedia proposal (Scolari, 2013; 2014; Scolari et al, 2019).

Another important assumption fulfilled by the proposal is what is referred to as the educommunication axis of the project to which the material is part, based on the main concept of creation and strengthening of communicative ecosystems in educational or virtual spaces, as pointed out by Soares (1999). The conversion of the web series into Open Educational Resource makes the process become another research material to be analyzed in its various possibilities of application.

The educommunication team of the Laboratory of Technological Innovation in Health (LAIS) and of the Secretariat of Distance Education (SEDIS), from Federal University of Rio Grande do Norte (UFRN), responsible for the elaboration and adaptation of didactic materials for distance education, already has a consolidated procedure for the construction of its open educational resources. Within the established protocol everything starts with the demand of the course requested. The content developers team organizes the design of the course structure to build the contents of the materials.

In the case of the web series 'Senta que lá vem informação' the process happened in reverse. Because it is ready for other purposes, in the case for the advertising campaign of the 'Sífilis Não' Project, it was necessary to create a new procedure for adequacy of the content.

A team formed by an infectious disease physician and an instructional designer devised a new educational structure that would meet the needs of this adequacy. A course plan was drawn up involving elements such as learning objectives, summary, division of content into units and methodology.

Some important technical processes were reworked so that the advertising content would meet the needs of didactic material, concluding the flow of production as follows:

- Each video was strategically positioned to promote content fluency.

- Recordings of welcome and closing videos of each module were made by a professional with authority on the subject, the infectious disease physician.
- Objective self-instructional questions were developed, with automatic feedback to the student, so that he could evaluate his learning.
- A test version was implemented in the distance education platform;
- The course was validated by the specialist, the infectious disease physician, on the test platform.
- The course was made available to the public.

It is important to note that linking a specific area specialist to the teaching materials development team was an important strategy to combine technical analysis with practical experience of practice, making the adequacy of products as well as the creation of a new material to be facilitated and efficient in contact with the student.

The work carried out by the team of production of didactic material in the conversion of the web series into an open educational resource, in a transmedia perspective, fulfills the concept that is posed by some researchers of the area regarding the importance of flexibility, adaptation and the use of resources in the areas of technology and education, without any distance between them.

### **Final Considerations**

The collaborative process of constructing the web series was marked by the participation of members of the Federal University of Rio Grande do Norte, producers of the advertising agency, health professionals consulted and the contracted actors themselves, as they brought concrete experiences to share. The first product was developed as a web series in an understanding that the media format does not end in itself nor is it a limiting of the ways in which the chapters can be appropriated and re-appropriated. It is not the nature of the medium in which it is initially conveyed that inflexibilizes a transmedia communicational product (Scolari, 2013; 2014; Scolari et al, 2019).

The web series, in its ten chapters, was designed to also be seen non-linearly, in which each episode had a complete narrative, but which was also part of a larger narrative context, marked by the everyday challenges of people in different contexts, social and sexual practices, which identify the subjects, pointing out the complexity of syphilis prevention, confrontation and treatment.

The most potent challenge from the educational point of view is the passage of narrative genre and language, in a new format and digital access platform, in which content is transformed into an open educational resource. The process also counts on the collaboration of the users themselves for better adaptation, producing the expansion of the contents and the possibility of enlarging the range of audiences to participate in the learning experience in a context of transmedia narrative.



## Acknowledgements

To develop a work of this level, whether in the production of the original content or in the conversion into an open educational resource, it is necessary that the researchers and technicians have a good support to be able to do it. Therefore, it is fundamental to thank the Brazilian Ministry of Health and the Federal University of Rio Grande do Norte, especially the Laboratory of Technological Innovation in Health and the Secretariat of Distance Education, for believing in the power of education to improve our reality.

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## Implementing Gamification to Enhance Digital Competency

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### Abstract

Assisting students to be successful in the Open Distance Learning environment, requires that educators at the University of South Africa must be proficient in utilising digital (electronic technology that generates, stores and processes data) and online (connected to the internet) educational tools. However, due to various reasons, academics are reluctant to attend training sessions and courses and then to implement the learned skills into curriculum development and their teaching and assessment strategies. To encourage educators to become fully engaged with the fast developing and changing online and digital education environment, a gamification strategy is developed to make the training opportunities more attractive and rewarding and to encourage them to use these tools in their working environments. The proposed outcome is to promote digital proficiency (knowledge and cognitive skills), digital literacy (understanding and application) and digital fluency (analysis and evaluation). Gaming elements such as challenges, fun, competition, interaction, teamwork, feedback, collaboration and rewards will be incorporated into a simple game-like structure that will be available for staff in the college of Human Sciences for a period of three months. Staff members are requested to complete a diagnostic survey to discover their personal digital competency. Hopefully the results (shown in a virtual 'tree' where blossoms will present competencies) will motivate people to sign up for the game and competition. The challenge (centre focus) of the game will be to get each person's online and digital 'tree' into full bloom. Each step (from sign-up to the reward ceremony) will include motivators such as rewards (e.g. free coffee) and badges for both individuals and teams (departments). Based on the outcomes of the diagnostic test, various training opportunities are suggested for individuals and groups to achieve this goal. Participants can focus on their preferred paths of development such as social media, LMS, mobile, audio and video or a combination of these paths. Training opportunities and courses will be provided by the Tuition Support and Facilitation of Learning team who will use both Unisa and online resources. This research will only focus on the construction of the game and does not involve implementing the game or the tests for which ethical clearance will have to be obtained.

**Keywords:** Gamification, Higher Education, South Africa. Technology-based tools, Digital Literacy, Fun

### Introduction

Globally, a number of revolutions are taking place simultaneously. We are currently experiencing the impact of the fourth communication revolution in society. The industrial revolution, in contrast to the lengthy history of the communication revolutions, only started during the 18<sup>th</sup> century and has also reached its fourth stage



– the fourth industrial revolution. The human race is currently experiencing the fourth revolution in self-understanding. All three of these ‘fourth’ revolutions are linked to and are sharing the same centre, although from different perspectives and spheres, focusing on the fusion of technologies, a revolution in logistics, and mutually connected and embedded in an informational environment, called the “infosphere” (Florida, 2014, p. 94).

Surviving and coping in the network society requires the ability to adapt to frequent, high impact changes, the skills to navigate, evaluate and choose technology that will enhance effective education and to use technology effectively in service of education. As society changes, education also changes (cf. Pokorny & Warren, 2016, p. 1), but people – mostly adults and older people – often have trouble adapting to the pace with which change is confronting them at all levels of their lives and therefore it is understandable that there is reluctance to change in education and training environments. In order to be skilled, competent educators, we must expand our educational toolkit and use the variety of tools provided by the development of technology. This implies that educators must get the basics right before attempting to train and influence others. Both educators and students need to accept, add on and use the technology, knowledge and tools that the fourth communication revolution is providing at a dazzling speed to be efficient and successful in the networking society. The same can be argued when looking at the other two revolutions: New knowledge, skills, competencies and capacities are needed to face the challenges and reach for the opportunities that are presented in the current environment.

Apart from the external obstacles such as expensive and often unavailable internet connectivity and the high cost of technology-enhanced devices such as smart phones and laptops, internal resistance to change their set ways regarding academic work seems to be the most important factor hampering South African academics in providing effective education. Higher education in general finds itself in an identity crisis (Deem, 2012) and it needs to re-establish itself if it wants to take up a leadership role in moving society into the technology-based, network society. Sadly, the educational paradigm shift seems to happen so slowly that it is barely noticeable. Some of the methods and models of teaching, learning and assessment that were introduced when universities first developed, like lecturing, are often still used as the only tuition strategy. At the beginning of the century, David Passmore (2000) lamented that it took overhead projectors 40 years to move from bowling alleys to classrooms. The quote by Tony Bates (2010, p. 22) of a vice chancellor who said that universities are like graveyards – when you want to move them, you do not get much help from the people inside – emphasises that the problem is not so much technology itself but rather people who do not experiment with and implement technology and new tools into educational environments. According to American research, one of the five main reasons why education is currently failing, is because technology has become synonymous with entertainment and is not implemented as a tool in education. It must be stressed though, that, in the first place, technology does not replace learning, it can only assist as a tool in the process: just as the products of the printing press assisted education for a very long time, so can technology provide support to effective education strategies. Secondly, educational change cannot happen successfully through a single technological paradigm shift. It should be achieved through the adaptation of and commitment to a process of continual change at all levels and with the help and support of constantly adding new tools and experimenting with new developments (Ice, 2010, p. 158).



This research is the first step towards developing a strategy that is founded on the principle of gamification to assist academics to use the available tools of the technology era to provide effective education that is useful in the 21<sup>st</sup> century. Next, the problem statement is provided, where after a short introduction and background to gamification is given before the actual strategy plan of the specific “game” and the expected outcomes of this project is discussed.

### **Problem Statement: The Lasting Legacy & Effect of the Past on Present Educational Systems**

The constant development and evolution of the technology-based, network society of the 21<sup>st</sup> century requires that educators must be competent and skilled to facilitate teaching, learning and assessment – the three pillars of effective education (cf. Oliver 2019) – according to the needs of society. In order to implement gamification to enhance digital competency in the South African higher education system, the following needs to be taken into account: Firstly, although the fourth revolutions have been changing the world already for a few decades, most academics and teaching staff at higher education institutions in South Africa are products of the third revolutions in communication and industrialisation. Formal education in SA is still stuck in the third communication era of the printing press. Educational systems are still geared for mass production through paced, structured, timed and passive learning while active, student-centred, lifelong and self-directed learning is freely available, but not compatible with the existing structures. This means that if higher education is making a paradigm shift towards self-determined, lifelong, technology-based education and training, both educators and students will have to be equipped and guided to embark onto a new road. They must be informed, motivated, trained, supported and encouraged to take up the challenge of implementing the tools made available by the development of technology.

Secondly, education is intertwined with everything else in society. Currently the gaps between basic education and higher education on the one hand and higher education and the world outside academia on the other hand is widening at an alarming pace that is confirmed with each year’s matric results, first-year dropout numbers and the ever-rising number of unemployed graduates. Education must build strong bridges between basic education, higher education and the corporate world that will address the social, economic and cultural problems of the country in a positive and creative way. The use of technology in both communication and innovation holds the key to accomplishing these goals.

Lastly, although educators in general acknowledge the call for Africanisation and decolonisation, and participate in the outcries and protests and debates, it is of no use to force these into the existing educational systems – we urgently need African, indigenous systems and structures and pedagogies and curricula on which to build 21<sup>st</sup>-century world-class education. We must design and create new structures and pedagogies and implement teaching and learning theories and practices that will reflect our African existence and provide a strong foundation for indigenous knowledge and skills development and enhancement through the use of current and developing media and technologies. This will ensure that African higher education meets international standards.

It is clear that the problems facing the higher educational system in South Africa are complex and cannot be solved through one or two policy changes. However, the researcher is convinced that awareness is crucial for stimulating academics to experiment with micro learning options that could lead to understanding the need



for change and eventually also implementing technology to enhance effective teaching, learning and assessment that could influence not only the education system but also the South African society at large. The concept of gamification will be utilised to create a strategy to raise awareness, encourage participation and stimulate the implementation of technology to provide effective education.

### **Gamification as Possible Solution to Enhance Effective Education**

In 2001, Marc Prensky (2001, p. 145) introduced the term “digital game-based learning” as a new learning paradigm. One year later (2002) the term gamification was coined by Nick Pelling, a British IT expert (Marczewski, 2012, p. 46; Pappas, 2014, Introduction) and it became a buzzword in 2011 (Fitz-Walter, 2013). It relies on the premise that there are certain traditional (educational) activities and learning that are inherently not interesting, and that, because gaming is fun, game-like features can be introduced to make these otherwise “dull activities” more attractive (McGonigal, 2011; Zichermann & Linder, 2010). Cognisance is taken of the fact that gamification is not restricted to education but is flourishing specifically in the corporate world.

Gamification must be distinguished from serious games, also called digital game-based learning. The term serious games (used by Richter, Raban & Rafaeli, 2015, p. 22; cf. Michael & Chen, 2006) was called “digital game-based learning” by Prensky in 2001 and defined as “any marriage of educational content and computer games” (Prensky, 2001, p. 145). This means that these are educational games played on electronic devices and aiming to assist students to learn content. Gamification, on the other hand, was coined by Pelling in 2002, and can be defined as “the use of game elements in a non-gaming context” (Deterding, 2011; cf. also Zichermann & Cunningham, 2011, p. xiv). It is an activity designed for students – inside or outside the classroom – containing game-like elements that do not require the use of electronic devices. Internationally, the utilising of both gamification and serious games are met with real success narratives; however, it is a novelty in South Africa.

Sillaots, Jesmin and Rinde (2016) identified more than a hundred game elements that are used as building blocks to create a game-like experience. They determined that the central game element is challenges and that although all game elements are considered equally important, the selection of elements implemented, depends on the kind of experience the designer wants to create. The selection should also be aligned with the kind of competencies the game environment must develop and stimulate. Game elements identified for developing this strategy include, in alphabetical order: Achievements, actions, attitudes, badges, challenges, competencies, competition, curiosity, discovery, engagement, feedback, fun, interaction, performance, players, points, progress, rewards, scoreboard, skills and teamwork.

### **The Flowering/Blossoming Technology Tree**

The goal is to get academics to use technology as an educational tool to provide effective education. The simple concept of a deciduous tree, transforming from bare branches to full bloom is used as the basic storyline. The tools listed on the university’s LMS, a number of social media platforms and a selection of multimedia tools proven as effective for educational support, will be converted into “blossoms” and the level of competency will be shown in the stage (bud, opening, full bloom) of the flowers. Academics that sign up



for the challenge will perform a self-evaluation to determine the status of each individual's tree. The challenge is to get as many as possible flowers active on the tree and then to get these flowers into full bloom within the limited time available. Successes will be rewarded, and players will also be challenged to widen their scope and search for more options (hidden within the game) to optimise their abilities and broaden their knowledge.

In order to motivate academics to sign up and participate in the project, a digital awareness campaign will be used to stimulate curiosity. This marketing campaign will run for one month prior to the start of the gamification project which is set to run for three months. The flowering tree storyline will also be incorporated in the awareness campaign to familiarise possible participants with both the projected outcomes and the challenges at hand. Rewards (like a free cup of coffee from the staff cafeteria) will be awarded for clicking onto the campaign page to ensure that when the game application is launched, academics will be motivated and eager to participate. Prizes, badges and rewards will be awarded to individual participants but there will also be team awards for departments. Although rewards will be awarded while the programme is running, the team awards and some bigger individual rewards (like the reward for making the most progress and the "flower master" rewards in each category) will be awarded at a gala event at the end of the campaign. All participants will be able to present their final technology trees as evidence of personal development and training done with their annual performance evaluations.

Although the aim is to involve all academic staff at the University of South Africa, a pilot project will first be launched within the college of Humanities. During this first pilot project, only two pathways (social media and the university LMS) will be included and made available to academics for micro-training and experimenting in the toolbox, although awareness of other options will be emphasised and encouraged.

### **Outcomes Expected from this Project**

The first stage of the project, when academics sign up and activate their "trees", will provide diagnostic stats about the digital literacy levels and competencies and levels of capabilities of academics to utilise technology for teaching, learning and assessment. The different options or pathways provided will ensure that the preferences and interests of the academics are incorporated and people are not forced to use only specific kinds of tools (such as social media) or only for specific parts of the educational process (like only for teaching or assessment measures). The interest shown by academics will also provide a guideline to where further developments and support must focus (be it on the LMS or on tools available on the internet, for example). Most importantly, academics will be motivated to experiment with technology-based tools to enhance their educational practices.

### **The Next Step**

Research is done to identify the different pathways and tools used in these pathways to bring a lifeless tree to full bloom through the use and training opportunities to use technology-based tools to provide effective education in a small, gamified project to be implemented at the University of South Africa. Before the project can advance to the next stage, the following needs to be done: A game designer must be appointed, ethical



clearance must be obtained from the University (hopefully within the next month) and sponsors must be sought.

## Conclusion

Although we are living amidst several revolutions, the lasting legacy of the printing press era is still hampering both academics and students in higher education in South Africa. This research focuses on the possible implementation of gamification to get academics interested and engaged with the use of technology as a useful tool in educational change and development. A project is developed based on the principles of gamification which is using game-like elements in a non-gaming environment, to make academics aware of technology-based tools available in the university LMS, social media and other technology-based platforms. The goal is to encourage academics in a challenging, fun-filled way to experiment and implement these tools in their educational activities.

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## Let's Play Serious Games

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### Abstract

Worldwide, it is evident that most of our students are seriously involved with their smartphones and/or tablets, either on social media or anything else these digital devices can offer, like playing casual games. As most students are so connected to their digital devices, education should use that to its advantage by involving students more with their devices, but now on an educational level by playing serious games. Serious games, initially called “digital game-based learning” by Marc Prensky in 2001, can be distinguished from casual games as there is an educational (learning/assessing) element present in the former, that is to a great extent absent in the latter. The suggestion is made that Higher Education in the 21<sup>st</sup> century should be presented in a paperless way not only at universities that provide distance education, but also at residential universities. This also applies to the Departments of Theology at these universities. The implication is that more courses should be presented online. This is arguably a transformative pedagogy which could harness the potential of online education by preparing and equipping students for active participation in the Fourth Industrial Revolution. In this presentation, a serious game is implemented on a “paper behind the glass” (online) course in Theology on an undergraduate level at a residential university. It focuses in a pragmatic way on applying the serious game to one of the biblical languages, namely Greek, as an example. The researcher proposes that this way of learning will make the study of the three biblical languages, Greek, Hebrew and Latin, much easier than the traditional ways in which they are mostly presented. As we are in an age where student-centredness is key, the question on many an educator’s lips could be whether there are any advantages of putting a course online, as opposed to traditional study guides and tutorial letters? On top of that, there may be doubt that there are any advantages of linking an online course to a serious game, arguing that “time is spilled when students are playing games while they should study”. They may also wonder: will it make the course more student-centred and student friendly? will it enhance the students’ level of knowledge? and will it contribute to lifelong learning? Oh, and what about throughput? So then, let’s get serious and put these questions to the test.

**Keywords:** Serious Games, Paper Behind The Glass, Decolonised Education, Fourth Industrial Revolution, Theology

### Introduction

Before discussing the implementation of serious games in Theology, a few definitions are given to serve as background to this essay. First the concept “paper behind the glass”, referring to when a course/module is





uploaded in its entirety on the internet (Ncube, Dube & Ngulube, 2014, p. 360). It is most useful for subjects that really need much explication and explanation, like the three biblical languages, Greek, Hebrew, and Latin.

Second, the term “serious games” (used by Richter, Raban & Rafaeli, 2015, p. 22; cf. also Michael & Chen, 2006) was first called “digital game-based learning” by Prensky in 2001 and defined as “any marriage of educational content and computer games” (Prensky, 2001, p. 145). More closely defined, serious games are “games whose primary objective is NOT fun or entertainment, rather learning or practicing a skill” (Gamelearn, 2017). This does not mean that fun and entertainment are excluded, but that they form part of the secondary objectives of these games. Abroad, the utilising of serious games is met with real success narratives; however, in South Africa it is a novelty.

Third, the term “decolonised education”: Despite firm differences on this term (cf. Staff Writer, 2019; Buthelezi, 2017), I have chosen (from a South African perspective) to utilise a definition proposed by Wingfield (2017), with Buthelezi (2017) added: Decolonised education implies that the educational authorities in a country should develop a unique set of knowledge skills, values, beliefs, and habits for schools and post-school institutions that are acceptable for and inherent to the people groups in that country, utilising “the best knowledge skills, values, beliefs and habits from around the world” (Wingfield, 2017).

Decolonised education in South Africa was incited by #FeesMustFall protests between 2015 and 2017. The students demanded a prioritisation of African studies in institutions of higher education in order to serve the African needs (cf. Staff Writer, 2019), as well as free quality education (Buthelezi, 2017). Decolonisation should not be confused with transformation, which refers to the replacement of the documents written by white/European educators – assuming that it is decolonisation. It is therefore not an endeavour of one racial group over against the other/s, but of all academics together in our country, who must design courses that are “informed by life as it is lived, experienced and understood by local inhabitants” (Cape Digital Foundation, 2019). This will inspire the academic growth of real African institutions of higher education.

Next is the Fourth Industrial Revolution, in which the world currently finds itself. According to Buthelezi (2017), the “Fourth Industrial Revolution is...impacting all disciplines, economies and industries”. This entails a revolution in the logistics of education and is connected to and embedded in an informational environment, called the infosphere (cf. Floridi, 2011, p. 228; 2014), where the participants are more and more becoming “informational organisms” called “inforgs”, interacting with other inforgs and “smart, engineered artefacts” (Floridi, 2011, p. 232). This complex situation puts pressure on educators, business entrepreneurs, students, and learners, to change and adapt accordingly and in several aspects of life simultaneously. It also opens up opportunities for radical and new research and innovation that were unthinkable a few decades ago. Buthelezi (2017) adds: “Revolutionary and unconventional teaching methods will be fundamental in innovating and carving out a new Africa”, focusing specifically on critical thinking and entrepreneurship.

Last, the term “paperless”: Higher Education courses in the 21<sup>st</sup> century should be presented in a paperless way, not only at off-campus/distance universities, but also at residential universities, including their Faculties/Departments/Disciplines of Theology. It is suggested that the dreadful “books of knowledge”, called study guides, and the tutorial letters filled with tips for the summative examinations belong to the previous century. All the information a student needs, should be downloaded on their electronic devices – most



preferably a tablet or smartphone. A course must be divided in small enough files (chunks) that can be opened on these devices.

This essay focuses on undergraduate Theology students who have to take the biblical languages, Greek, Hebrew, and in some cases, Latin, as compulsory subjects. These languages help students to read and study the Bible in the original languages, instead of using (one of) the myriads of translations available. To study and understand these languages could be quite a challenge, and therefore I suggest that a “cheap” serious game be implemented to assist the students in having fun while studying these languages. What makes serious games imperative, also in Theology courses, is the fact that most of these students, just like their peers in other disciplines, are seriously involved with their smartphones and/or tablets – either on social media or by playing games.

If an educator wants to be really smart and 1) does not like to “talk-and-chalk” (using chalk on a blackboard while explaining the content of a specific lesson/unit); 2) does not want to create tests/assessments on paper; and 3) would like to stimulate collaboration between the students in the class, then there are many free applications (apps) available for them: “Google Classroom [is] a free online learning platform, BookWidgets...create[s] tests, assignments and other fun digital exercises and Padlet...stimulate[s] collaboration in the classroom” (Renard, 2017). Smart-board is also available, which is a “whiteboard in a digital world”, used by the educator in front of the class, being connected to every student’s device, on which they are allowed to write from their own devices, while each full board can be saved as a file (Buthelezi, 2017).

### **“Educational Games”: Are You Serious?**

This question could be understood in two ways: From a negative side, people may question the use of gaming in an educational environment, arguing that games and school/academia are incompatible: “You either work or you play” was a pre-21<sup>st</sup>-century epistemology. From a positive side, this may invoke an expectation from a person knowing that most people/students are almost/already inforgs – someone who knows that globally, many people, specifically students, are playing games on their devices on a daily basis (cf. Ifenthaler, Eseryel & Ge, 2012, p. 1; Oliver, 2017, p. 2; NMC Horizon Report, 2012, p. 18). Bates calls them “digital natives” (at the hand of Prensky, 2001) who are constantly “on” (Bates, 2015, pp. 34-35). This section discusses the advantages of gaming and the responsibilities of educators.

One of the prominent advantages of playing games on a device is that one can play it whenever it is convenient and wherever one wants to play. Playing games also helps to stimulate the production of a chemical called dopamine as well as the hormone called endorphin. Together with serotonin and oxytocin, dopamine and endorphin form the quartet of neurotransmitters that are responsible for people’s happiness. It also incites learning through the reinforcement of neuronal connections (Growth Engineering, 2016). Pappas argues that, with the release of endorphins, a student retains more information, because they experience more fun and feelings of calm and well-being (Pappas, 2014a). The receiving of rewards further results in the student associating the learning process with positive emotions, thereby wanting to learn more (Growth Engineering, 2016), in this way becoming a lifelong learner. The NMC Horizon Report (2013; cf. also Growth Engineering, 2016) indicates that educational gaming has proven “to increase soft skills in learners,



such as critical thinking, creative problem-solving, and teamwork” (NMC Horizon Report, 2013, p. 21). Pappas (2014b) adds that gaming increases engagement as it creates challenges and instils a sense of accomplishment. Rapti (2013b, pp. 93-94; cf. Rapti, 2013a, pp. 255-262) indicates that all these characteristics of gaming evoke a desire from the student with reference to status, self-expression, competition, and altruism – that desire should be implemented in serious games.

With all these characteristics in mind, the responsibility of the educator is to create the optimal learning environment for the student. A serious game should therefore be a “transformative digital learning tool to support students with deep and meaningful learning” (Oliver, 2017, p. 7). As the game should be designed to support content learning, it will have to make the student curious as to what-is-next and challenge them to partake in such a way that implicit learning (where a student learns something without any conscious intent) takes place. The game must also have the ability “to create multiple types of cognitive learning strategies for the gamer, like problem-solving” (Oliver, 2017, p. 7). It should furthermore be “active, goal-oriented, contextualized, and interesting” (Shute & Ke, 2012, p. 47), within an interactive environment. Constant feedback is very important and should be attention grabbing, while the challenge levels should be well-designed (cf. Shute & Torres, 2012, p. 92), always with scaffolding in mind (it must not be too easy or too difficult – cf. Rosenshine & Meister, 1992, pp. 26-33). When playing the game, the student must constantly feel in control, not only of themselves, but also of the game. This will increase the student’s responsibility to interact even more with the game, creating a commitment for the student.

Assessment is one of the focus areas of education (cf. Loh, 2012, pp. 123-144). According to Ifenthaler et al. (2012, pp. 6-7), (intelligent) assessment must take place while students are playing an educational game, also implying that the educator should always be aware of the progress of each student. Ifenthaler (2009, pp. 83-101) elaborates on this by stating that an educator should employ multiple measurement procedures in order to make the assessment reliable and to give valid feedback to the students. The point here is immediate feedback, actively guiding the student on specific areas where they have difficulties (Shute & Spector, 2010).

### **Let’s play!**

The discussion below contains suggestions of how a serious game should operate, and what is expected of the student.

#### *Game and Application Design*

To have a designer design a serious game from scratch, costs lots of money. The internet, however, boasts with many ways in which a game can be designed “for free”. First of all, a game app should be designed. The internet supplies us with many ways in which we can create a unique app, like Apptooltester (2017) and AppsGeyser (2019). Websites helping us to design a game are, among others, Flowlab Game Creator (n.d.) and Buildbox (2018). Should the educator be unwilling to go this way, there are two other options left: First, some already existing games fit perfectly in the curriculum of specific courses, making it easy for the educator/university to come to an arrangement with the developers to use their game, for example, FLIGBY (Flow is good business for you), designed for entrepreneurs. Second, there are game developers who are willing to adjust their existing game in order to become an educational (serious) game. (I have the privilege



of having a designer who already has designed two online games and who is willing to adjust one of his games to fit into a specific theological course.)

The educator should take heed of the fact that this endeavour will take much time and effort, as well as convincing the institution of the real need for a serious game. The outcomes will, however, overshadow all the painstaking efforts to get a designer, get the (financial) approval of the institution, get/design a workable game, etc.

### *The Course*

As indicated above, for (foreign) languages, a student needs as much information as possible. Therefore, the three language courses, Greek, Hebrew, and Latin should be uploaded to the internet as paper behind the glass, in small enough files so that a student will be able to open it on a smartphone. The tutorial letter/s should accompany the other files on the internet. The students will attend classes with their devices (BYOD) and should mostly look on the device as the class progresses. Each class should start with an online assessment of 5-10 minutes, which could also be regarded as roll call, if necessary.

### *The Game*

Greek will be used here as an example, as everything said about this subject will also apply to the other two. A good game to design – it also makes the game very easy to access and to play – is a question-and-answer game (Socratic method of teaching). The question-and-answer method may sound a little dull/“boring”, but this method has proved that the kind of repetition happening while a student plays the game, helps them to retain much knowledge. Bjork (2012) calls it “spaced repetition” which is most effective, as the student learns in short bursts right through the course, and is assessed – they actually assess themselves with every game played – on a daily basis, discovering their own strong- and weak points.

The welcome screen (not shown here) of the game must already arouse the students’ excitement. This is something the educator and designer should carefully discuss. It is preferable to involve a few students to get their opinions and assistance. This screen is followed by the stats screen (Figure 1), indicating to the student their position and progression, as well as their awards. On the top left of the screen is the student’s name/nickname (the student number will reflect on the educator’s screen), and to its right is the level which the student has already reached. Levels are created on a basis from very easy to very difficult. The more the student plays, the more levels will be completed, more experience points (XP) will be gained, while the questions become progressively more difficult. The time of day appears to its right. Beneath the name is a heart, indicating the total of lives available for a student to play the game. One game equals one life (heart). However, the student can gain more lives by answering all the questions of one game correctly, or by gaining a specific amount of XP per game. Every day a student received ten hearts for free. Sometimes the game will give the student a freebee of one hour’s free play. The question mark underneath the time is an indication of the amount of hints a student has. A hint can be used when a student is uncertain of the answer to a question. When pressing the hint box, half of the answers is taken away. The student receives a total of three hints per day. The star underneath the heart is a medal awarded to the student for every 100 questions answered correctly. Every ten stars gain an extra amount of 20,000 XP. To the right of the star is a treasure chest. These chests are linked to specific difficult questions. When that question, which is not marked as a difficult question, is answered correctly (without using a hint), the treasure chest appears on the screen and



is added to the total of chests. Every ten chests gain an extra amount of 10,000 XP. The trophy on the far right indicates the student's position in the class. This is an optional extra for those students who love to compete and be informed of their position. This will also motivate and challenge the student to play ("study") harder in order to become number 1 or part of the top ten. The XP in the middle of the screen shows the student their position/degree of progression and performance on a specific level, and how far from levelling up the student is.

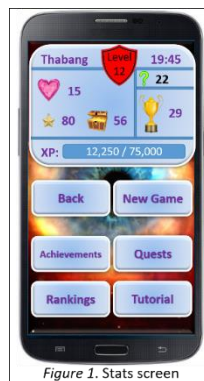


Figure 1. Stats screen

### Figure 1: Statistics Screen

The bottom four tick boxes: When pressing "Achievements", it indicates to the student what their strong/weak points are, e.g. adjectives 5, nouns 6, but verbs 1 (out of 10). When a student presses the "Quests" box, they can choose a specific topic (their weak point) and get questions only on that topic, e.g. nouns with an o-declension. This is a real assessment activity: If the student gets 80% or more for this quest of 50 questions (3 hearts used for this game), they receive a quest-star and 20,000 XP. When the "Rankings" tick box is pressed, the student sees the daily report that is sent to their educator: How many games the student played on that day, during the past week, the past month, and the total of games being played by the student; it also indicates what the student's ranking was during each of these periods. This shows both the educator and the student how diligent this student is, and what progression the student has shown. The "Rankings" screen also indicates the total of XP already earned by the student. In order to "complete" the game, a student must earn at least 500,000 XP. The amount of XP earned should count as 30% of the total formative assessment marks. Should the student's XP be the best in the class, another 10% could be added to the assessment marks, while being part of the top 10 in the class, another 5% could be added to their total.

The "Tutorial" tick box gives the student immediate access to a specific chunk of the course, without exiting the game. On the communications screen (not shown here) the student has the option to contact any other student in the class, as well as the educator – per e-mail, facebook, or twitter.

The game starts with difficulty level 1, with a question and four possible answers (see Figure 2). The content of the questions links to the lessons/modules done up to that very day. Twenty questions are screened for one game to be completed. When the student has reached 25,000 XP, they move on to the next level. Every consecutive level requires more XP before it is completed. From level 10 onwards, the options per question increase to six answers, and so progressively up to eight answers per question. The questions could be straight-forward, like, What is the praes. ind. act. 2<sup>nd</sup> pers. sing. of λύω?, with four possible answers (cf. Figure 2). Here the educator can be very innovative and think of interesting questions or statements, also short



sentences to be translated. On this screen the indicated time is on the left, showing that the student has 46 seconds left, starting at 60 seconds. XP is linked to the number of seconds left after the student has correctly answered the question. The student may use a hint if needed (already discussed). The box on the right (11/20) indicates the number of this specific question.

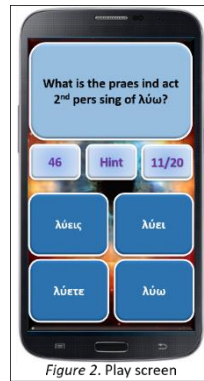


Figure 2. Play screen

Figure 2: Play Screen

What makes this game even more effective (“nice to play”), is first, that when the student gives the wrong answer, it immediately supplies the correct answer as well as the option to look it up in the online study guide; second, when the game is completed, there is an optional training session in which all the questions being answered wrongly are asked again, giving the student the opportunity to make sure about these answers – repetition. Having completed the training session successfully, the student is awarded with a bonus (see Figure 3) by choosing one of the countries of Africa to see what award is hidden behind it. After that, the student receives XP for the game and has the choice of playing another game or opting out.

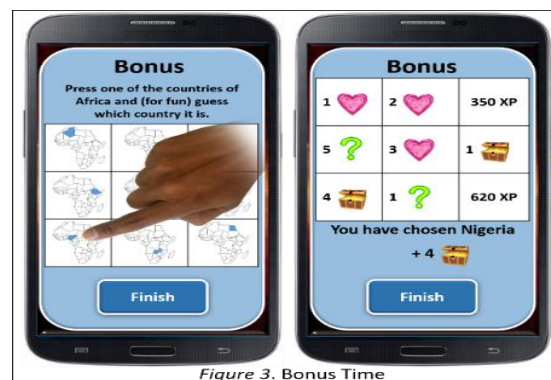


Figure 3. Bonus Time

Figure 3: Bonus Time

### *The Challenge(s)*

Nowadays, all the tools are available to create the best educational game for our students. There are, however, a few challenges that stand in the way of the “best educational game”: First of all, the educator must be absolutely persuaded that this game will fit into their course/s. Second, funding is always a challenge, especially because the request for funding will have to be preceded by an extensive time of persuasion of the top management. If this process is successfully completed, the educator needs a designer who will be committed to complete the job. If the educator has chosen an existing game, then they will have to contact



the designer/owner of the game and get a quote for using the game. This should then become step 1. After all of this is said and done, the educator will never look back and enjoy years of joyful and productive education with an excellent throughput rate, well knowing that the best possible equipped students are delivered to the next stage of education – students who will most probably become lifelong learners.

## Conclusion

Education in South Africa was for too long stuck in a colonised (Western) and Third Industrial Revolution environment, really distant from its learners and students. Having a multiracial and multicultural student population in this country, the time has come to change to a decolonised and Fourth Industrial Revolution educational system, starting already in Grade R, covering all the educational systems in the country (cf. Floridi, 2011). Serious games are part and parcel of this revolution as it is part of the lifestyle of most of the people in this country, because from childhood onwards games are the most natural way of learning things (cf. Sung & Hwang, 2013, p. 44), making us natural gamers. Nowadays the industry provides us with highly sophisticated instruments to play our games on and to interact with each other via gaming.

The Fourth Industrial Revolution does not require paper, because everything that one needs is on the device one has – a smartphone, tablet, laptop, etc. This revolution calls for a paperless society and an effective use of technology. As most of the students are using their devices almost on a permanent basis, being on social media or playing games, an educational game will not be a Fremdkörper for them but will fill their life with a meaningful engagement, having a brilliant piece of technology in their hands.

However, the biggest challenge that the current education system in South Africa has, is unwilling or ignorant educators, with funds probably being the second biggest challenge. Fact is that change is not always desired by every educator, especially in higher education – by younger educators who must complete their PhD, and by older educators who are so stuck in their “old ways” that anything new poses a threat to them – and the (older) management who should be convinced that gaming is part of the Fourth Industrial Revolution and that it needs to be implemented into decolonised education. To create a link between education and games is less easy but so important for the 21<sup>st</sup> century.

Hopefully this article will motivate or persuade one educator to change their mind, resulting in thousands of students who will receive a better education, with the possibility to become lifelong learners.



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## Chaotic by Design: Student Reactions to a Graduate-Level Leadership Course Designed with Self-Directed Learning Principles

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### Abstract

Employing a design-based research approach, this paper examines student reactions to an online graduate-level course on leadership and management principles constructed using chaos leadership theory and heutagogical learning principles. Chaos leadership theory shares characteristics with heutagogy, most importantly the emphasis on the development of learner capacity to prepare them for the complexities of today's workplace, where traditional conceptions of leadership are becoming anachronistic. To teach chaos leadership and management requires a heutagogical learning approach, where the instructor relinquishes ownership of the learning path to mature learners capable of co-creating the learning environment, from curriculum to assessment. Learner autonomy takes place in a collaborative system with a flexible curriculum and negotiated assessment. The learner-generation of content provides both the learning process and the learning product, so the curriculum is unknown and unpredictable. This level of chaos can be disorienting for students accustomed to a greater level of structure. Design-based research is the methodology of choice for technology-enabled learning because it focuses on the pedagogical design at the course level, providing validity to the research because results can be used to improve practice in the immediate context (and likely others). A mixed methods analysis of student evaluations of teaching can illuminate how students react to heutagogical learning experiences, and inform further efforts to enhance course design.

**Keywords:** instructional design, student engagement, learning analytics, online learning; leadership education

### Introduction

For too long, most leadership theory has focused on the superhero leader. Leaders must embody optimism, be passionate about the organization, and believe that learning is the key to human progress. They must be persistent, affirm the value of others, and accept the controversiality of leadership. They must be able to build an entrepreneurial culture and reframe organizational goals at the same time they hone their sense of humour as a leadership skill. Leaders must be able to identify national and local priorities, community needs, new and existing markets, understand competitors, conceive the implications of technology trends, and know where to achieve cost savings. Leaders must be able to create a vision and determine the workload and time factors, along with the costs and benefits. They must "walk the talk" and support other senior and middle managers through difficult change processes. They must reinvigorate the organization with new projects, take risks, and plan for leadership succession (Latchem & Hanna, 2001, pp. 235-240). In short, they must both rock the boat, and still the waters. To fulfill all these mandates, leaders must be truly exceptional human beings.



This is perhaps best exemplified in *The Mind of a Leader: How to Lead Yourself, Your People, and Your Organization for Extraordinary Results* (Hougaard & Carter, 2018). The authors argue that there is a global leadership crisis, a crisis which must be solved by a new model of leaders who will be mindful, selfless, and compassionate. Just like the qualities, behaviors, and tasks listed in the opening paragraph, these are all good qualities. Hopefully, everyone would agree that it is better to be focused rather than distracted; it is better to be kind and wise rather than uncaring and ignorant. It is better to be selfless than self-obsessed. There is nothing wrong with this portrait of a leader, but the leader becomes more like Christ or Buddha rather than a normal human being, with limitations and frailties, who happens to find themselves in a leadership position where they are responsible for carrying out the mission of an organization in a dynamic and rapidly changing environment. To be mindful, selfish, and compassionate is good, but it is still a reductive view of leadership focusing its attention squarely on the leader.

Teaching leadership using heroic models can be problematic because many students feel inadequate, like they just do not have what it takes to assume the responsibility of leadership. Some students recoil at the word leader, because of its connotations of power or because of past negative experiences. All of this explains why I felt the need to attempt to teach leadership from a post-heroic perspective. Year one results of the course were disappointing, and between the first and second years of teaching an online graduate-level course on leadership and management principles, I sought out a leadership theory and a teaching and learning approach that would align to support my instructional goals. Chaos leadership theory and heutagogical learning principles provided guiding lights. Chaos leadership theory is a post-heroic approach to understanding leadership that shifts focus from the leader to the demonstration of leadership throughout a system. Chaos leadership theory shares many characteristics with heutagogy, requiring a brief definition of both to illuminate the alignments before discussing how these principles were intentionally used to redesign the course. The mixed methods analysis of student reactions to the transformation between Year 1 (2018) and Year 2 (2019) concludes the paper.

### **Chaos Leadership**

Chaos is an unfortunate name because of its common associations with randomness and disorder; chaos instead accepts a complexity to the operating environment where randomness and disorder may actually reveal hidden patterns that defy prediction by known means. Chaos theory leadership rejects linear and mechanistic equations of leadership; if a leader follows this formula, success will inevitably follow. It is rarely that straightforward, and Burns (2002) highlights how chaos leadership is fundamentally different from heroic preoccupations with the leader. "Leadership is not reduced to the 'leadership' behavior of a key position holder or team of 'top' people. Leadership is conducted throughout the organization, through all agents." Leadership, as concept and a set of activities, becomes non-hierarchical and collaborative. Leadership must be broadly conducted because all the agents in a system have access to vital information from the environment (Burns, 2002). Chaos leadership theory embraces the idea of complex adaptive systems involving the agents, the interconnected relationships, the environment, and feedback to influence the evolution of the system (Obolensky, 2007; Siemens, Dawson, & Eshleman, 2018).



Obolensky (2007) describes this evolutionary system of distributed leadership as a polyarchy, where leadership is done by the many. Polyarchy:

Sees leadership as a dynamic rather than a desirable attribute or role only for the few. Polyarchy does not assume an overthrow of leaders, or an eradication of oligarchy. It is an evolutionary step on from oligarchy, even though it may seem revolutionary. If we assume oligarchy (traditional leadership) has been around for thousands of years, and this was preceded by anarchy (chaos), then polyarchy can be seen as an evolutionary synthesis of the two; hence the term “Chaos Leadership.” (p. 2).

In traditional conceptions of leadership, a person or group of people develop a vision and then inspire and persuade others to move in a certain direction. Leadership occurs when individuals use influence to create change (Uhl-Bien, 2003). In a chaotic, polyarchical approach, leaders shift from telling to asking, because “it shows followers there is an expectation for them to take the lead and challenge, for them to think through problems and generate solutions, and for them also to take responsibility for the future of the organization” (Obolensky, 2007, p. 14). This expectation that all agents in a system must take responsibility for leadership, for problem solving, and for the future of their organizations contains implications for instructional design that align well with heutagogy, or self-directed learning principles.

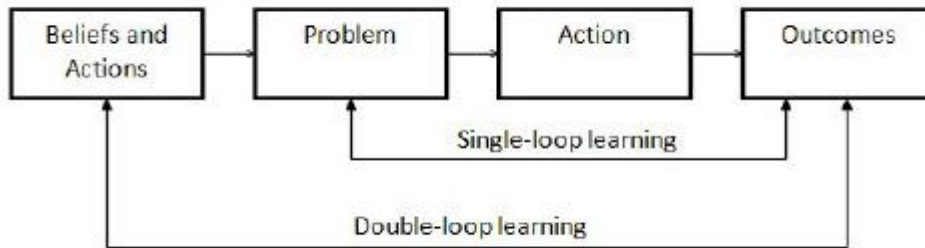
### **Heutagogy**

Heutagogy (based on the Greek for self), or self-determined learning, is a fitting companion to support chaos leadership theory because it places learner agency at the centre of instructional design (Blaschke, 2012). Much like polyarchy evolves from a synthesis between chaos and oligarchy, heutagogy evolves through a synthesis of andragogy and the new demands and opportunities afforded by technology and online learning environments (Blaschke, 2012). Just as chaos leadership moves focus away from the leader to the people interacting within a dynamic system, heutagogy also forces a shift in focus from the teacher to the learner and the learning environment. Rather than didactic pedagogical processes of content delivery, a heutagogical approach to teaching and learning places emphasis on learner capacity and capability development through highly autonomous and self-determined learning processes. Blaschke (2012) draws a major distinction about the role of instructors and learners in andragogy (Knowles’ adult learning principles) and heutagogy. “In andragogy, curriculum, questions, discussions, and assessment are designed by the instructor according to the learner needs: in heutagogy, the learner sets the learning course, designing and developing the map of learning, from curriculum to assessment” (p. 61). Heutagogy has special interest to online education because of the digital setting and modality, and it also holds particular interest to teaching leadership online because leadership is a deeply personal and relational process.

Perhaps the strongest connection between chaos leadership and heutagogy is the focus on double-loop learning (Burns, 2002; Blaschke, 2012). Double and single loop learning are terms coined by Argyris in his classic work, *Teaching Smart People How to Learn* (2008, originally published in 1991). Single-loop learning occurs when professionals apply disciplinary training to solve real-world problems, but Argyris (2000) observed that whenever single loop learning strategies went wrong, people engaged in to defensive



reasoning, screened out criticism, and blamed others. “In short, their ability to learn shuts down precisely at the moment when they need it most” (Argyris, 2008, p. 4), often when they experienced failure.



**Figure 14: Double-loop learning (Eberle & Childress, 2005, as shown in Blaschke, 2010, p. 59).**

Effective double loop learning requires the ability to re-write cognitive rules, values, and assumptions when one’s actions and behavior produce the opposite of what was planned (Argyris, 2008). Burns (2002) expands upon the concept of double loop learning, suggesting that double loop learning occurs in complex systems where members learn how to maximize and assess their performance in relation to one another to determine how well the system is performing in relation to the whole context and adjust according to that assessment. The interconnected feedback that influences the system in double loop learning becomes a core process for the acquisition of competencies and capabilities (Blaschke, 2012).

The ability to transcend the defensiveness of single loop learning and engage in a learning process when one can re-write one’s assumptions, values and metacognitive processes requires a certain level of learner maturity, as well as careful planning on behalf of the instructor. The next section outlines how I shifted the approach to teaching and learning between the Year 1 to Year 2 course design towards heutagogical learning principles. In doing so, it will also provide a more detailed description of components of chaos leadership theory and its connection to heutagogical learning principles.

### Course Redesign Elements

Heutagogy suggests placing “full control of all aspects of learning into the hands of the student, from curriculum development and instructional format to assessment,” (Blaschke, 2012, p. 66). The course redesign was not heutagogical in the purest meaning of that word because there were all of the typical course elements, such as assigned readings, discussions, assessments, and an overall course structure. Still, major instructional redesign decisions were informed by heutagogical learning principles to move the course farther in that direction and adopt Burns’ (2002) advice that “leadership educators must abandon the futile and hopeless pursuit of predictability and control promised from theories based on linear models of reality” (p. 56). The following course design elements changed between Year 1 and Year 2.

#### *Make Heutagogy Visible*

For a heutagogical approach to be successful, instructors need to change their approach, relinquish control, and let learners know what to expect in this very different type of learning design. Instructors not only must change their approach to teaching and learning, but also ensure that they explain this type of learning to their students from the very start of class. ...Instructor expectations of learners should be clearly stated: learners are responsible for knowledge creation and deciding upon the learning path (Blaschke, 2012, p. 66).



The philosophy underlying the course and instructor's assumptions and expectations for learners were clearly stated within the course syllabus. Learners were informed at the start of the course, and at the start of major course units, that successfully completing the assignments would require self-efficacy, communication and teamwork skills, creativity and positive values. This let learners know, as much as possible, that this would be a different approach than they were used to, one that was consciously designed to create a "dynamic turmoil" (Burns, 2012, p. 56).

### *Flexible Curriculum*

A self-determined learning environment enables students to define the curriculum (Blaschke, 2012). The course had four assessments. The first was defining leadership and developing a systems diagram of what successful leadership looks like. The second was a presentation on an important management topic, such as workplace harassment. The third assessment was a business case analysis to propose a new service, and the fourth and final assessment was a reflective essay on a leadership theory that outlined the students' development plan for leadership growth. All the assessments required learners to decide what they wanted to study. The first three assessments were team-based; the assessments had some structure, but they also held significant ambiguity. Students were given maximum autonomy to determine what topics they would investigate as learning groups, and therefore, at the start of the course, the curriculum was unknown. It allowed student interest to reflect the changing demands of the environment (Burns, 2002), and learning groups selected such topics as Indigenization, human rights accommodations in the workplace, risk management, workplace conduct, and recruitment and retention. Their learner-generated presentations became both the process and the product of the curriculum.

### *Collaborative Learning and Learner-Directed Questions*

Both the three team-based assessments supported a flexible curriculum approach and collaborative knowledge sharing. Each assignment requested the teams post their presentations along with a list of core resources and facilitate a weekly discussion using some of the most provocative and challenging questions they could develop. Learner-generated questions and learner-facilitated discussion served as mechanisms for learners to refine their ideas and promote group reflection (Blaschke, 2012). Collaborative learning served as the primary method for students to practice essential leadership processes, such as communication, task negotiation, emotional intelligence, and decision making, as well as demonstrating personal responsibility. It also served to remind learners that "the journey to growth is not always smooth sailing on a balmy sea" (Burns, 2002, p. 56).

### *Reflective Practice*

Reflective practice accompanied by informative feedback is essential to learning (Colby, Ehrlich, Beaumont & Stephens, 2003). Reflective practice was accomplished in three ways within the course structure. The first method was the introduction of a process observer. Each team designated a process observer who observed the process and described who exercised leadership and how was leadership exercised. The process observed needed to track how work was delegated and/or accomplished, document conflicts and how they were resolved. The process observer was also responsible for providing a final reflection on the question, "if you had to start this task over, what should the group do differently?"



The second method for reflective practice included responding to learner-directed questions in the peer assessment forums. Learners were asked to constructively critique the work of fellow learners, outlining what they did exceptionally well and what could they do better next time. Giving meaningful feedback is a skill in and of itself, and this provided an opportunity to see how other learners completed the assignment, and then provide some feedback. Viewing other student work, commenting on it and receiving feedback was a major part of the interconnected feedback designed to influence the system in double loop learning to become, for the learners, a core process for the acquisition of competencies and capabilities. They were asked to do this three times in hopes of reducing single loop learning, where they assess the entire system, and use this feedback to strengthen future performance (Burns, 2002).

The final assignment was a reflective essay on a personally relevant leadership theory, because personal meaning is the source for leadership (Irving, Howard & Matteson, 2004). “We each must understand that one thing that holds the secret of our life. Each of us lives within our own story - a narrative that defines who we are and contributes to leadership effectiveness” (Callahan & Martin, 2007, p. 49). This blend of real-life experience with reflective activity was designed to create an authentic experience of leadership (Conrad & Openo, 2018). While it was a fairly typical assignment that did not allow for much flexibility or negotiation, it did enable learner direction and relied heavily on past personal experiences.

Making heutagogical learning principles visible, allowing learners to create a flexible curriculum through collaborative learning opportunities with learner-directed questions, accompanied by multiple avenues for reflective practice were all incorporated and strengthened for the second offering of the course. How did students react?

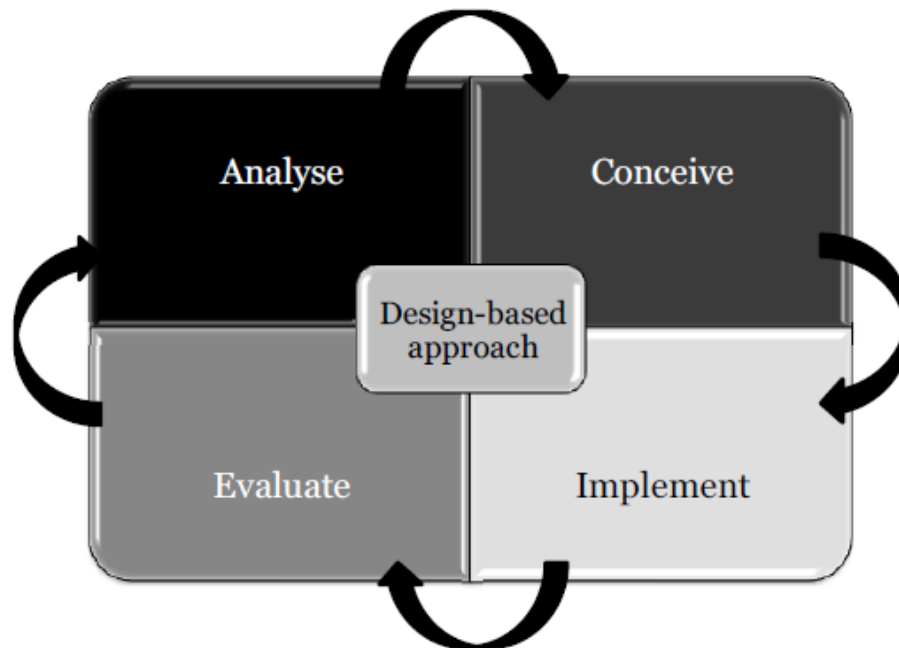
## **Methodology**

### *Design-Based Research*

Design-based research is a common research method to address complex problems of teaching and learning practice. Instructional design principles and experimentations with new technology inform the development of practical solutions to continually enhance course offerings, especially in online learning contexts (Pombo & Loureiro, 2013). The design-based research approach consists of four phases. The instructor analyzes what is not working in the course, conceives and implements solutions, and then evaluates the results.

Design-based research is the “methodology of choice” for technology-enabled learning because it focuses on the design process itself at the local level (Kennedy-Clark, 2003), providing validity to the research because results can be used to inform practice in the immediate context (and likely others) (Anderson & Shattuck, 2012). Design-based research investigates how specific instructional interventions affect student learning and student experience. This design-based research approach looks specifically at how chaos leadership theory and the integration of heutagogical learning principles affect the student experience of a graduate-level leadership course in library and information science.





**Figure 15: The design-based research approach (Pombo & Lourerio, 2013, p. 10)**

### *Context of the Study*

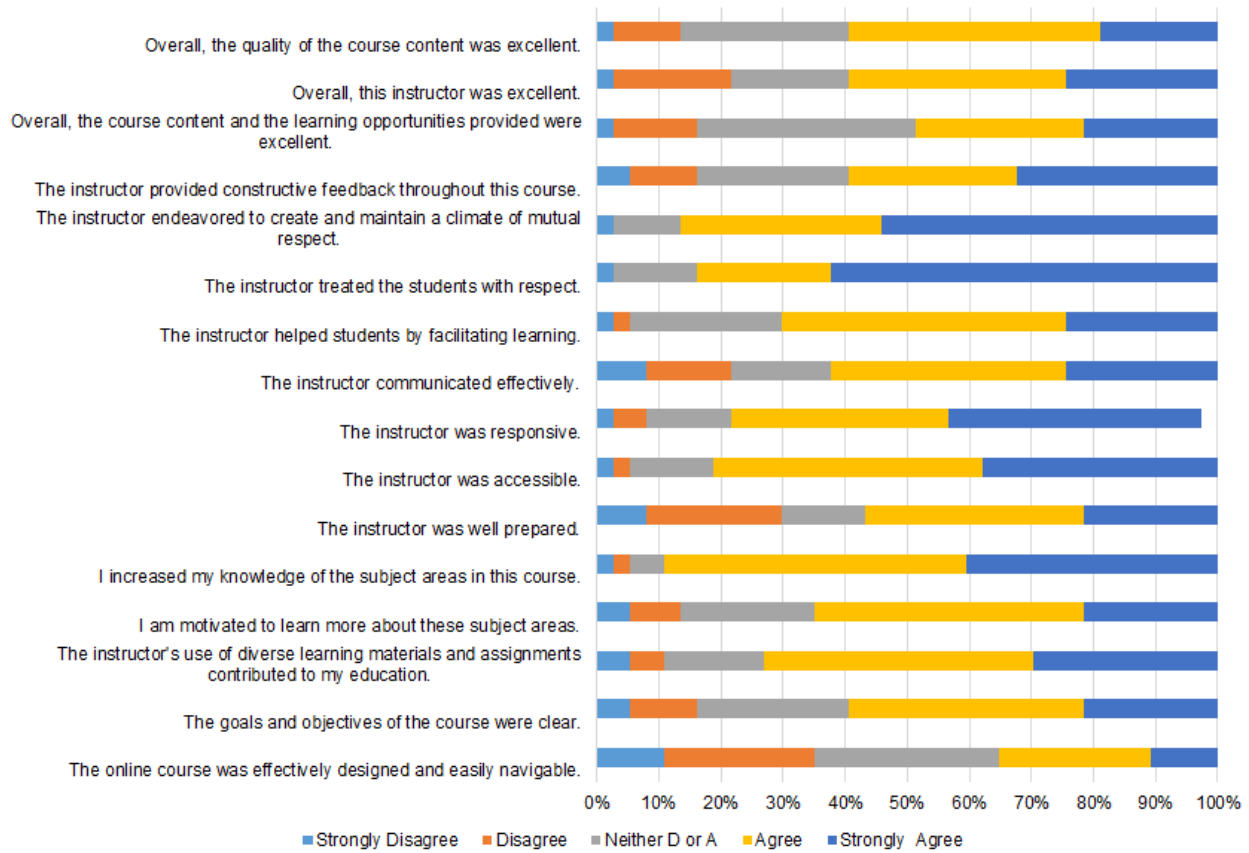
Many Master of Library and Information Science/Studies (MLIS) programs are offered online, and a core aspect of the curriculum is fostering the development of library and information professionals who will assume a leadership role within their communities or organizations (Council of the American Library Association, 2019). This aspect of the curriculum is typically covered in a required course on leadership and management principles. Teaching leadership in any context presents challenges because leadership is a hazy and confounding concept, but librarianship is also a feminized profession, whereas being a leader is often conceived of as a male-oriented construct (Richmond, 2017). There is little research on how to design online leadership courses in MLIS programs that account for these challenges, and this study contributes to closing this gap through a mixed methods analysis of student reactions to a course design informed by chaos leadership theory and heutagogical learning principles. The source of data is Year 2's student evaluations of teaching, called the Universal Student Ratings of Instruction (USRIs). The USRI also allow students to submit comments. The quantitative component of the study is a comparison of two years' of student evaluations of teaching. The USRIs are a fairly standard set of 16 questions that focus primarily on the quality of the instructor and the instruction.

### *Quantitative Analysis*

In 2018, 36 of 54 students completed the USRI. In 2019, 24 of 36 students completed the USRI, and 20 students provided additional comments. The quantitative analysis is a simple boxplot comparison between the two course offerings in Year 1 (Winter 2018 – Figure 1) and Year 2 (Winter 2019 – Figure 2).



### 2018 LIS 504 Universal Student Ratings of Instruction

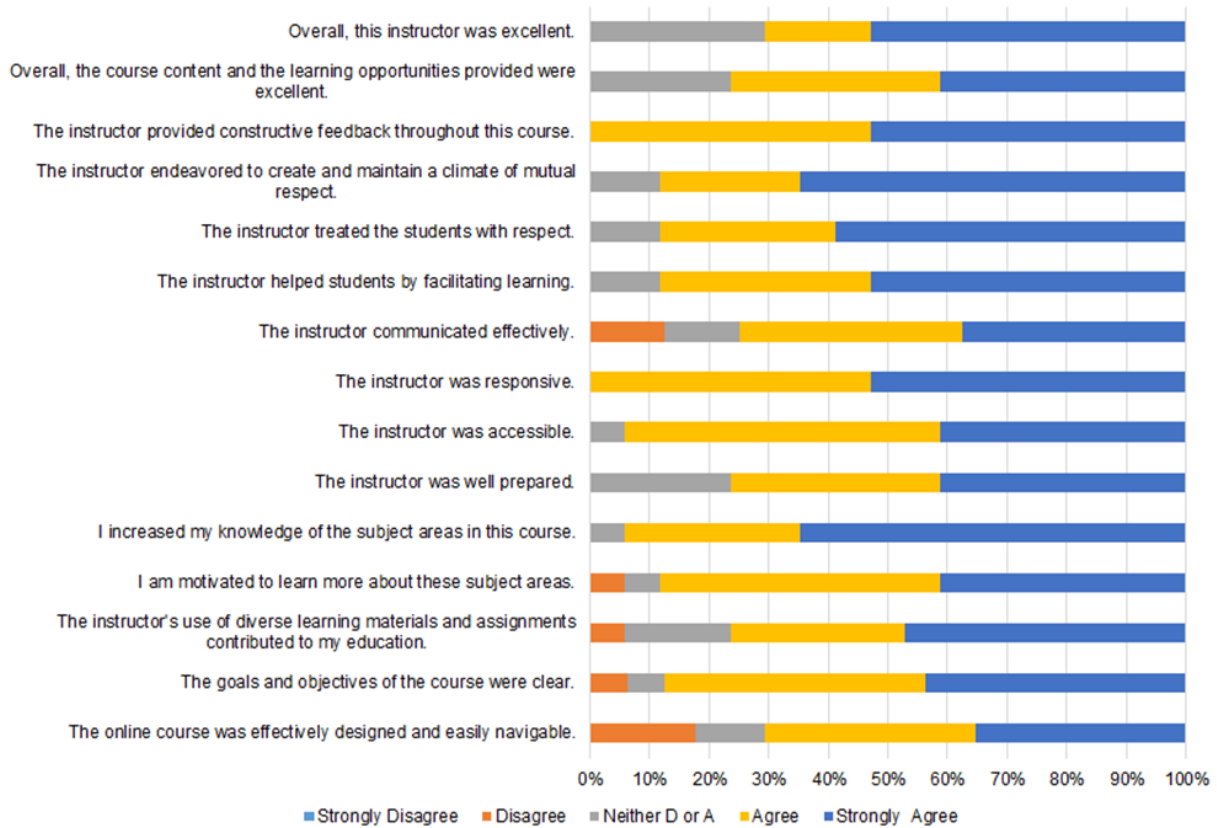


**Figure 1: The 2018 boxplot represents the first online offering of University of Alberta's Graduate School of Library and Information Studies LIS 504, Leadership and Management Principles (n=37).**

2018 shows that the course, overall, had a strong course design, with the respondents (n=37) providing strong support that the instructor provided constructive feedback, treated students with respect, and that students increased their knowledge of leadership and management principles. Most importantly, they were more motivated to learn about leadership after participating in the course. Significant opportunities for improvement existed, specifically in terms of perception of quality, learner perception of the instructor, and the quality of the learning opportunities coupled with concern about course goals and course navigation.



### 2019 LIS 504 Universal Ratings of Student Instruction



**Figure 2. The 2019 USRI boxplot represents the second online offering of University of Alberta's Graduate School of Library and Information Studies LIS 504, Leadership and Management Principles (n=24).**

As detailed in the preceding sections, between Year 1 and Year 2, design efforts focused on improving the course design through intentional integration of heutagogical learning principles in four major areas. The integration focused on clear expression of self-directed learning principles, flexible collaborative learning exercises, and the intentional introduction of reflective feedback loops to inform the evolution of the system.

Significant gains can be seen in all areas of the USRI between Year 1 and Year 2, with the greatest gains in student perception being the quality of the learning experiences. One of the most notable indicators of progress is that all 2019 student respondents (n= 24) agreed or strongly agreed that the instructor provided constructive feedback throughout the course. Increases in student perception of instructor preparation, accessibility, and responsiveness also increased. Respondents also overwhelmingly agreed that the instructor created a climate of mutual respect and treated students with respect. Students' perceived that increase in knowledge of leadership and management as a result of participation in the course, strong in 2018, also increased. Despite growth in these areas, potential growth remained in the areas of instructor communication, course goals, and the effective design and navigation of the course. To gain a richer, thicker, and more robust sense of student perception of the course, a qualitative analysis was conducted on learner comments within the 2019 USRI.



### *Qualitative Analysis*

The comments from the 20 students who were first analyzed manually using a line-by-line, highlighting method where comments were placed into three categories, positive, negative, and neutral. After manual review, the transcribed data was reviewed and further analyzed using NVivo software to apply codes and identify comments relating specifically to the course changes previously enumerated. Each finding is outlined and supported by representative excerpts below.

### *Making Heutagogy Visible*

Overall, students noticed a difference in the course design and most appreciated the chaotic, self-directed learning philosophy expressed in the course design.

I enjoyed the self-directed learning style and overall found this to be an empowering course.

I appreciate openness in regards to the course design. It made me appreciate how difficult the topic is to teach. The instructor provided ample opportunity to reflect on our own experiences and interests in the course, and I appreciated learning about actual experiences from my discussion group.

I also liked the format of the course, with its emphasis on diverse readings and collaborative work. One of the few courses in which I genuinely felt that my assignments had an application in the real professional world. I will keep them in mind for future employment.

Because of the self-directed learning style of the course, it took a bit of getting used to. The objectives and concepts, once known, were quite overwhelming. Likewise, while the readings were very informative and interesting, they were quite overwhelming as well.

I loved the collaborative nature of the group assignments and discussions, the way in which the instructor introduced and explained course content, and the self-driven nature of the course. This course really allowed me to explore my own relationship with management and leadership and gave me the opportunity to work with so many different people.

This final comment reveals a core consideration when using a heutagogical approach – learner maturity (Blaschke, 2012). Learners with more extensive life experience and maturity may be more likely to find a self-directed learning approach more engaging and interesting, but this project did not explore that connection.

As anticipated, not all learners appreciated the deliberate approach to create a chaotic, complex learning environment. Negative comments on the approach include:

At certain points, the course seemed complex for complexity's sake. A few assignments were a little ambiguous.

The instructor was clear from the beginning that he does not "believe" in lecture-style learning and wanted to provide a more collaborative learning space. This is absolutely fine,



and I can appreciate the value of collaborative learning, however, I don't feel that the way he operationalized this in the online space was overly effective.

It is impossible to determine from the comments what aspect of the course design failed for these learners, or if their comments are reflective of learner maturity, but it does show firm resistance to an untraditional approach from some learners.

### *Flexible Curriculum*

Students appreciated the level of choice and autonomy presented by the course design, and their ability to tailor their learning to their individual contexts, as evidenced by the comments below.

My own interest lies in Adaptive Leadership which draws inspiration from evolutionary biology, and is specifically about change that enables the capacity to thrive.

The most illuminating reading for me was about feminist leadership theory, which espouses values similar to those that I hold close. In my career, I have found work environments that promote collaboration, relationship/community building, and transparency. I have come to understand the careful planning that goes into creating such environments.

I think I'd gotten into the habit of just being told what to learn, what to do, and how to respond - a very 'follower' kind of mentality. But somewhere along the way my mentality began to shift. We had the freedom to explore a variety of leadership styles, to venture off to areas that spoke the most to us, and I don't think I realized the value of this until the very end.

The freedom to explore and the ability to generate and create the curriculum of the course gave students greater power, and it also seems to have brought a greater appreciation for collaborative learning experiences, something many of them admit they had grown tired of.

### *Collaborative Learning and Learner-Directed Questions*

As previously described, the three collaborative assignments each ended with the requirement that the learners direct and guide the weekly discussions on the leadership and management topics they had chosen to explore. These leadership and management topics were often informed by personal interest and experience, and were designed in hopes of preparing them for the dynamic environment library and information services organizations operate in. Learner-directed questions and discussion facilitation seems to have enhanced engagement for many of the learners.

I've often felt that forced discussion posts were not conducive to any sort of real learning as often we are all answering the same question and there is no real dialogue in these sections. In this class, however, perhaps because we relate the discussion to our own personal experience, I felt more interested in the discussion and I felt that I actually learned more.

I appreciated learning about actual experiences from my discussion group.



Many of the students were experienced professionals and experienced online learners, and they noted the importance and value of the collaborative learning opportunities.

The group projects effectively taught me a lot about teamwork and I think they are designed well.

At the start of the course, I was extremely nervous about the group work component of the assessment projects. Now that the course is over I can confidently say that having the opportunity to work with different people on different projects was an extremely valuable experience. These assignments allowed me to practice leadership in a relatively low-stakes environment. I was able to practice, or at the very least think about some of the leadership concepts we were learning about as I worked with my peers.

I was very hesitant at the beginning of this course. Now having completed it, it is one of the most practical courses I have taken so far. I would recommend this course to anyone who has a job. I thought the group work a bit excessive to be honest, but I found meaning in all of the group projects at their completion.

Collaborative learning remains, however, the bane of many students' existence in any learning context.

I love working with others, but this model has too many issues in the online learning community and it should not be relied upon. I would have gotten a lot more out of this class if I was given the option to explore these topics on my own. You need to open the option to work alone. Relying on group projects is a mistake

The many problems of working collaboratively are well documented (Conrad & Openo, 2018), and the option of allowing students to work alone instead of collaboratively will be explored in the next offering of the course because it aligns with heutagogical learning principles of negotiated assessment and giving learners control over the learning process. Still, a majority of the comments suggested that collaborative, self-directed learning, coupled with the awareness that the learning teams were responsible for building a curriculum meaningful to them, enabled learners to accept the difficulties of collaborative learning.

### *Reflective Practice*

There was a risk that the course's emphasis on group interaction and collaborative knowledge-building would diminish the time available for individual and quiet reflection by learners. Careful attention was paid to providing opportunities for reflection within the learner-directed discussions, peer assessment, and the final reflection on one's future plan to develop and grow as a leader. Students provided meaningful reflections on how they had been transformed in the course evaluations.

For far too long, I've been comfortably sequestered in a well-tread role of critical observer, which allowed me to appear engaged in the various aspects of my life without risking harm; yet, I increasingly view this as an untenable position,

Through each group assignment, I have subconsciously reflected upon my work and how my group members and I collaborated. Through each week's readings and discussions, whether it is writing up my own post or reading/commenting on others' posts, I have definitely used my critical thinking skills.

The discussion posts throughout this course had all of us spending a lot of time reflecting and learning from each other. I found this especially helpful. Sometimes I was nervous and felt vulnerable, but by the end of the course I was feeling more confident in sharing my experiences and how they've shaped me.

I've already actively started applying some of my learning in this course in my life, especially in my work life. I supervise an assistant and have been "practicing" on her to tweak my leadership style (she's aware of what I'm doing, it usually results in a lot of laughs). It's also helped in my relationships to my supervisor and colleagues as I feel I can draw on more knowledge and experiences.

Dewey (1997) suggests thought is habitual, but through intentional experience one can render individuals "more sensitive and responsive to certain conditions" (p. 37). Non-reflective experience is based on habitual thought patterns, but the learner quotes above provide support that habitual thought patterns for some learners were meaningfully interrupted through a deliberate slowing down of thought and action.

### *Feedback*

An essential part of reflection is feedback, along with increased opportunities to act on feedback (Conrad & Openo, 2018). This provision of feedback becomes the major role of the instructor because quality feedback helps clarify what good performance is, and it facilitates self-assessment and reflection (Conrad & Openo, 2018). Furthermore, feedback supports a heutagogical learning approach. The instructor in a self-directed learning environment must provide ongoing guidance and feedback to support students along their learning journey if they are to become self-sufficient, self-directed learners (Blaschke, 2012). As noted in the quantitative analysis of the USRI, all students agreed or strongly agreed that the instructor had provided valuable constructive feedback. This theme was evident in the comments, as well.

The instructor was very thoughtful and respectful throughout, and I very much valued his extensive feedback.

I have not been in a course before where the instructor took this much time to provide feedback, and it was very useful in completing later assignments.

The projects gave me the chance to understand my own behaviour tendencies in group project settings.



By providing learners with control over the curriculum, this instructor was able to dedicate the time available for instruction to feedback and guidance.

## Conclusion

This design-based research study evaluated students' reactions to a leadership course redesigned using chaos leadership theory and heutagogical learning principles. The quantitative comparison between Year 1 and Year 2 shows favourable gains in the learner experience, and the qualitative analysis of student comments contains evidence that, overall, students noticed and appreciated the major elements of course redesign. This is one group of learners in a specific disciplinary context, and universal truth claims are not warranted or made. The findings simply suggest that this group of learners reacted positively to an ambiguous learning environment that gave them control over the curriculum. As a result of many social, technological, and political changes, libraries, archives and museums are operating in a world of increasing supercomplexity (just like everyone else). An essential component of leadership development, then, has to be the development of lifelong learning leaders who possess the capabilities and competencies to assess and address novel situations in novel ways. "What today's leaders need to understand, what we need to be teaching, is that both anarchy and stability are to be feared. Stability is actually a seductive enemy that will eventually kill the organization" (Burns, 2002, p. 56). Stability is a myth of the past, and a new form of leadership education must emerge that abandons linear instructional models; models that place less emphasis on the leader and more emphasis on systemic practice of leadership involving everyone.

Chaos leadership theory, supported by heutagogical learning principles, appears to hold some promise, in this context, to better prepare students for a world of work that is increasingly supercomplex. To do so, one must invite chaos into the learning environment by explicitly inviting learners to take control. Heutagogy's orientation towards learner control contributed to a positive perception of learning in this particular leadership and management course. Chaos leadership theory suggests that the world is not predictable, and leadership cannot follow a formula. Leaders stand a better chance of weathering the turbulent storms of uncertainty if they can break out of single loop learning where learners have straightforward, predictable experiences. The instructor, too, must be comfortable with relinquishing control, and they must be creative enough to enact these instructional principles with the institutional, structural limitations of 15-week long courses and accredited grade distributions. Even so, a core aspect of leadership is directionality. Within these constraints, online leadership educators may not be able to fully embrace the value of chaotic, self-directed learning experiences, but based on this limited study, heutagogy's affinity for online learning and learner autonomy points the way forward in a chaotic future.





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## Opening Pathways for Access, Inclusion, Flexibility, and Quality

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### Abstract

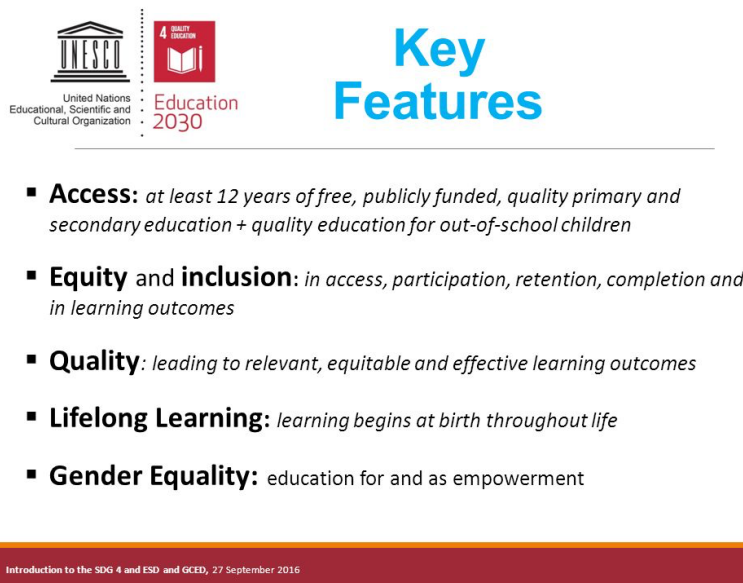
Global Open Education continues to move into the mainstream. The United Nations and UNESCO stresses the role of opening up education to achieve a number of its Sustainable Development Goals (SDGs). SDG4 highlights educational access, equity, equality, inclusivity, quality, and lifelong learning, and integrates the many elements of open education, including the use of OER to support improved access along the continuum of lifelong learning. The requirements for Open Access publication has become a formal policy in Europe. In the United States and Canada, the growth of the Community College Consortium for OER and the introduction of Z degrees based on OER student demand can be observed. Open Universities and guidelines for OER expansion can be seen in Africa. Across multiple regions, the OER Universitas (OERu) gains traction. We also witness global organizations such as Creative Commons and the Open Education Consortium bringing together activists, scientists, and practitioners from around the world to strengthen the global network. However, there has been no organised effort to document and disseminate best practices for OER lobbying and implementation in different organisations and at different levels. At the ICDE World Conference on Online Learning in Toronto in October 2017, the ICDE OER Advocacy Committee was established with global representation of higher education. The OER Advocacy Committee Advocates support the recommendations and objectives of the UNESCO OER, initially with a two-year mandate. The OER Advocacy Committee produces best practices, both for implementation and for policy-related OER advocacy concerns around the world. This ranges from the departmental or unit level to the regional, national and global level. This session will present examples of how the concepts of Open and the use of OER, including policies and strategies for OER representation and promotion, are represented in educational contexts from around the world. The session will explain the concept of Open and its many definitions and explore how to advocate for OER projects. What does it take to implement this change? What governance and policies are required to ensure a robust, open organization? Finally, lobbying work for a regional OER project is shared and examples of regional projects that have emerged from successful lobbying work are presented. After exchanging a status update on best practices and their work, the audience will be asked to provide examples of the strategies they use to promote successful open programs. The audience will be invited to contribute to areas where the Committee could have a greater impact. This session should be interactive and very participatory.

**Keywords:** Access, Diversity, Flexibility, Inclusion, OER, Open



## Introduction

This paper provides insights from the Open Educational Resources (OER) Advocacy Committee (OERAC) of the International Council for Open and Distance Education (ICDE) on the themes of opening pathways for access, inclusion, flexibility, and quality. The ICDE OER Advocacy Committee Ambassadors support the recommendations and objectives of the UNESCO OER Recommendation and align with the UNESCO Sustainable Development Goals (SDGs), in particular SDG4 on education (UNESCO 2015). Overall, SDG4 aims for social justice. UNESCO stresses the role of opening up education to achieve a number of its SDG. SDG4 highlights in particular access, equity, equality, inclusivity, quality, and lifelong learning, and integrates many elements of open education, including the use of OER. (Figure 1.)



**Figure 1: Keywords in UN UNESCO SDG4**

Although Open Education is moving into the mainstream, there are needs to move decisively from raising awareness to sparking action by governments, institutions, and individuals. This paper and symposium explore select global regions best known by the authors: China, Europe, and the United States. OERAC is mapping best practices, both for implementation and policy concerns for OER advocacy around the world. This ranges from the department or unit level to the regional, national, and global level. This paper shares examples of how the concepts of Open, and the use of OER, as well as policy and strategies for OER, are represented and advocated for, in a variety of educational contexts.

## Open Education and Definitions of OER

Open education is a generic term under which different ideas can be considered. The opening of education does not refer specifically to the opening of educational materials under an open license. It does not mean only the availability of Open Access research in repositories. Rather, it can and should include the broader concept of open education (Inamorato dos Santos, 2016). The application in terms of 5R activities - retain, reuse, revise, remix, and redistribute by Wiley (no date) - are often applied in respect to openness. Through open education, an individual can have appropriate and meaningful educational opportunities at every stage



of life and professional development. This includes access to content, courses, support, assessment, and certification in a way that is flexible and meets different needs. Barriers to entry or costs can be reduced or eliminated. Within the framework of the OpenEdu study conducted by the Joint Research Center (EC JRC) of the European Commission, open education is considered as (Inamorato dos Santos, 2016, p. 10):

... a way of carrying out education, often using digital technologies. Its aim is to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customi[z]able for all. It offers multiple ways of teaching and learning, building and sharing knowledge. It also provides a variety of access routes to formal and non-formal education and connects the two.

The term OER was coined at the 2002 UNESCO Forum on Open Courseware as educational resources open to everyone and freely offered under licenses that allow others to reuse, adapt and redistribute resources with little or no restrictions (UNESCO, 2017; UNESCO, 2019a). The 2012 OER Declaration emphasized the tenth anniversary and referred to existing declarations and guidelines on OER such as the 2007 Cape Town Open Declaration on Education, the 2009 Dakar Declaration on OER, and the Commonwealth of Learning and the 2011 UNESCO Guidelines on Open Educational Resources in Higher Education. The Declaration marks an historic moment in the growing movement for OER and calls on governments worldwide to openly license publicly funded educational materials for public use. Since its inception, the definition of OER has evolved to meet the growing needs and barriers that surround it (Ossiannilsson & Abeywardena, 2019). Recognized OER definitions by global authorities have existed since 2002. The most influential follow:

#### **Commonwealth of Learning:**

Materials that may be freely accessed, reused, modified and shared to support teaching and learning at all levels of education (2017a, p.1).

#### **Ljubljana Action Plan:**

Teaching, learning and research materials in any medium - digital or otherwise - that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the framework of intellectual property rights as defined by relevant international conventions to respect the authorship of work. OER are a strategic opportunity to improve knowledge sharing, capacity building and universal access to quality learning and teaching resources. (UNESCO, 2017, p. 1).

#### **William and Flora Hewlett Foundation:**

Teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions (2019).



### UNESCO definition:

Learning, teaching and research material in any format and medium that resides in the Public Domain or are under the copyright that has been released under an open license that permits no-cost access, reuse, repurpose, adaptation and redistribution by others (UNESCO, 2019b).

ICDE and the OERAC follow the UNESCO definition above. In addition, the UNESCO definition of an open license was updated at the Special Intergovernmental Committee meeting in relation to a draft UNESCO recommendation concluded in Paris, May 2019. This updated definition is:

Open license refers to a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the rights to access, re-use, re-purpose, adapt, and redistribute educational materials.

### China

OER has a pretty long history in China. In the 1950s, educational radio and television programs were offered in some cities, especially for teaching foreign languages in the late half of the 1970s in China. In 2003, the Chinese Ministry of Education (MOE) initiated a pilot plan to develop online courses, aiming to promote distance higher education with a consortium of universities with a total enrollment of five million on-campus students. The China Open Resources for Education (CORE) consortium was established in November 2003. With financial support for quality courses, the MOE introduced “prestigious online courses” which represented the highest level of open online courses in China. 2013 witnessed the commencement of Massive Open Online Courses (MOOCs) in China at the national, institutional level. In 2010 and 2016, the MOE put forward one ten-year development plan for ICT in education and the 13<sup>th</sup> five-year plan for ICT in education. Two national OER repositories connected with the MOE, and others were established and supported by elite universities, college/university alliances, or IT companies. The MOE proposes to start 10,000 MOOC prestigious courses and appeal to educational authorities at the provincial level to offer the similar number of online courses in 2020. Among these courses, 70% aim at full time on-campus students for credits and 30% aim for lifelong learners. These plans are considered to be relative to the western conception of OER (MOE, 2018). Consequently, the conception of OER has been accepted, defined and discussed in the academic journals.

Nonetheless, the term OER rarely appears in the official documents of MOE, though the words open and resources appear frequently in different directives or policies. Nowadays, the concept of OER is used synonymously with MOOCs. Zhang (2019) found in a research study, cooperation and collaboration among diverse stakeholders such as governments, universities and IT entrepreneurs in the development of MOOCs. This provides equal opportunities to develop an innovative educational service system for full-time on-campus university students and lifelong learners in all kinds of fields including government officials and the



military. The results revealed some characteristics in OER and OEP (Open Education Practice) in China, which might differentiate themselves from other countries. Key findings:

- governments funding
- awards for the selected quality courses
- public and private sector involvement and cooperation
- inter-constitutional collaboration
- MOOC format, open courses based
- credits for on-campus higher education and no credits/credentials for lifelong learning
- one-stop platforms
- quality first
- integration into the curricula of relevant universities

In retrospect, the secrets for success of China MOOCs format of OER rely on the following:

- Quality: good universities with good teaching staff to create good courses.
- Equity: spread quality OER to educational institutions and regions that need them.
- Learner-centric: focus on how students learn, catering to digital natives' learning needs and learning cultures.
- Teacher-created: teachers initiate the courses and organize their own teaching to create the open courses.
- Open and sharing: all courses are open on the learning platforms, with only simple sign-in needed.
- Cooperation: MOOCs integrate diverse stakeholders, including governments, universities, entrepreneurs, and academic faculties.

To further promote educational reform and comprehensive implementation of the China Education Modernization 2035, the MOE vows to build more MOOCs to provide educational services to the country and the world. The five key words offered by the MOE are: equity, sharing, service, innovation, and cooperation (Wu, 2019). These words point to how diverse stakeholders at diverse levels of governments, educational authority, educators and audience can realize the full benefits of OER infrastructure and focus more on OEP. Hopefully, the creation of OER can find its way into the more practical OEP in more diverse formats and thus integrate themselves into the secondary and higher education and lifelong learning in the near future.

## Europe

The European Commission's policy agenda focus on Opening up education. Firstly, barriers to educational access (e.g. costs, geography, time and access requirements) can be reduced or eliminated. This can enable learners to improve or retrain their skills more affordably and more flexibly - important aspects in today's economic crisis in Europe. Secondly, it contributes to the modernization of higher education in Europe, as contemporary open education is mostly based on digital technologies. Finally, it can bridge non-formal and formal education by making it easier for institutions of higher education to recognize evidence of learning outcomes (including badges) that they issue to learners. For this to happen, a common approach is needed to highlight the funding opportunities of open education. This would open up educational practices in



cooperation between European universities and serve as a mechanism for validation and recognition of non-formal learning. It would also be a leader for learners to achieve new and improved career opportunities and personal growth. It would also help to bridge non-formal and formal learning.

Opening up education is important for universities for various reasons. Not only is it a political priority, it also acts as a catalyst for teaching and learning innovation about digital technologies. There are advantages to open education in every dimension of openness to all stakeholders. Open education has an "ethos" that encourages reflection in areas that might otherwise be neglected or left aside on certain occasions, as an exception rather than a norm. With regard to the access dimension, institutions opting for open education, for example, continue to consider supporting the adaptation of courses to special needs. In this way, they can extend their reach and increase the opportunities for participation in education.

Learners can access course materials and knowledge free of charge (except Internet connections) without prior permission and learn at the most convenient times for them. Universities learn what types of teaching materials other universities use to teach similar subjects. Open education enables universities to work together openly, to exchange teaching materials or to produce together. These aspects contribute to the "openness" of education, which enables it to attract new audiences. Openness also enables new teaching and learning methods and more flexibility in how and when teaching materials and teaching can be accessed.

If institutions take full responsibility for opening up education, they should align their strategies with efforts to modernize higher education in Europe. These strategies should be open to new target groups and practices, while at the same time offering the possibility for inter-institutional cooperation regionally and across borders. At the heart of higher education is the mission to provide knowledge, practices and opportunities to learners in local and global communities at universities to better educate them and advance science. Open education is a good fit for this mission because it focuses heavily on learners, both distance students who are not officially enrolled in a higher education institution and learners who are enrolled and attending classes on campus or online.

Designing an open education strategy for an institution, or rather, redesigning a current university strategy to adopt open education and become a more open institution, is an important step for a university to drive modernization forward. Opening up education offers opportunities for all those involved (Inamorata dos Santos, 2016). A recent study from the UNESCO Institute for Information Technology in Education (IITE) and OER Africa surveyed the mainstreaming of OER in 15 countries to assess how the educational potential of OER had been realized (Housan & Butcher, 2019). Three European countries were involved, Germany, Slovenia and United Kingdom, as detailed below. The study indicated in general that there is still lack of awareness on OER. Findings include:

- lack of strategic/policy support: Few organizations have adopted OER as part of their institutional strategy. Even though this support is a clear requirement for successful adoption, organizations are yet to change their policies. Educational institutions have not yet developed strategies to incorporate OER on a broad base (e.g. incentives for OER creation/usage). For example, in higher education, there is no rewarding system for professors and lecturers sharing their learning materials

- lack of awareness and insecurities on copyright/IPR, quality issues. These issues have been discussed intensively in different educational sectors. In higher education expertise on IPR and licensing is low amongst educators
- there is also resistance from publishers, focusing on the “lack of quality mechanisms” when using OER.

### **Germany**

Germany was involved in the Open Courseware Initiative in the early 2000s, and several organizations were involved in European Open Education projects in the following ten years. However, there were no joint efforts to harmonize and synergize the Open Education activities in the country. In 2012 national activities began with the Federal Ministry of Education and Research (BMBF) and the consultation with German experts in OER. The BMBF supported a specific 18-month program (OERInfo) to provide a national coordinating body and 24 other model projects, and projects in higher education depending on internal institutional funding. There is limited experience with commercial business models and the sustainability of existing initiatives is unclear. Much informal exchanges exists in schools, but they do not use specific open licenses. Schoolteachers' willingness to participate in education is higher than in other educational sectors, but the level of OER expertise is low. There are potential for introduction OER in schools, but a broad approach is needed to educate about OER open licensing in particular.

### **Slovenia**

In 2006, the Ministry of Education and Sport issued its first public tender to develop educational interactive e-materials under Creative Commons licenses. In 2015, the Government issued the “National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015–2020.” By 2017, the government had delivered a range of actions to push the open education agenda nationally, regionally and internationally. Sixty projects were undertaken. The Slovenian government translated its practice in implementing OER into a Roadmap. The country’s biggest initiative in open education, OpeningUpSlovenia, was conceptualized in 2013 and officially launched in 2015. It focused on a digital transformation of society. In this broad sense it encompasses various open practices (OER, open pedagogies, open technologies, collaboration, etc.). In addition, the Ministry of Education has published as OER a series of open textbooks and courses for teacher training. Policy commitments are accompanied by adequate funding. The government seldom directly funds the creation of OER but requires each recipient of national public funding (between 2015 and 2020) to publish their works with open licenses. In 2017 the Government and the Ministry of Education and Sport hosted together with UNESCO and COL the 2<sup>nd</sup> World Conference on OER in Ljubljana, where the Ljubljana Declaration (2017) and the Ministry Statement (2017) were inaugurated to be adopted in member countries.

### **United Kingdom**

In the UK, Higher Education has a long and strong support for initiatives, including funding for the Higher Education, Joint Information System Committee (JISC), and the Higher Education Association (HEA). Worth mentioning are the UK Open University, and OpenLearn, OpenLearnCreate, and FutureLab. Of course, JISC JORUM, the UK OER repository has played an important role for the OER development in the country. UK OER conferences have been held annually for at least 15 years. Today, the conferences attract a large global audience exploring research, initiatives and good practice. In addition, there are requirements with a shift in





finance from purchasing copyrighted materials to creating openly licensed material. Finally, the issues of recognition and reward for producing and using OER were argued.

### Sweden

Although Sweden was not included in the above-mentioned survey, it can be highlighted that Sweden as well as most member countries replied to the UNESCO OER recommendations (UNESCO, 2019a). It is also worth mentioning that research funding is not provided when open access for research outputs is not included. In Sweden the K-12 sector is far ahead in respect of the use, and reuse of OER. There are several initiatives on open lessons. In addition, we should consider the new Digital plan for schools by the Swedish Association of Local Authorities and Regions (SALAR), which is an employers' organization and an organization that represents and advocates for local government in Sweden. All of Sweden's municipalities and regions are members of SALAR. In higher education, several both national and institutional initiatives are ongoing. Two national OER projects were conducted with funding from the Swedish Royal Library and the Internet Foundation. In museums there are large ongoing initiatives. Finally, Wikimedia Sweden should be highlighted, which helps teachers and librarians to use Wikipedia, archives and museums to reach out with their material and support with higher quality.

### United States

Within higher education in the United States, Open Education is a broad category that has had different meanings. Open Education has referred to educational institutions or opportunities that do not have admission requirements. In some cases, Open Education also is associated with the Open found in Massive Open Online Courses, or MOOCs. Recently, however, Open Education has become more closely identified with Open as in Open Educational Resources, emphasizing the permissions that accrue from an open license. The Hewlett Foundation's definition of OER, provided above, is generally recognized in the US ([OER Defined](#), William and Flora Hewlett Foundation). Key criteria are also the 5 Rs formulated by David Wiley: Retain, Reuse, Revise, Remix, Redistribute. ([OpenContent Definition](#), David Wiley, CC BY 4.0).

One must also note that recently Open Pedagogy has emerged from the OER community to describe teaching practices and philosophies that arise from and focus on core values of OER. Open Pedagogy recognizes that "Knowledge consumption and knowledge creation are not separate but parallel processes, as knowledge is co-constructed, contextualized, cumulative, iterative, and recursive." ([Open Pedagogy](#), Robin DeRosa and Rajiv Jhangiani, in the [Open Pedagogy Notebook](#), CC BY 4.0.) A 2018 national survey of higher education teaching faculty shows OER awareness steadily increasing, with 46% of faculty aware of OER, up from 34% in 2015. Further, of all faculty teaching introductory courses, 22% report using OER. ([Freeing the Textbook: Open Education Resources in U.S. Higher Education, 2018.](#)) Another recent development finds states requiring institutions of higher education to mark in their course schedules all classes that use OER. Examples include public colleges and universities in [Washington](#), [California](#), and [Georgia](#).

Open textbook projects funded by states have demonstrated success in relieving students of a significant financial burden. Examples include projects in [Georgia](#) and [North Dakota](#). More recently, OER has been leveraged to create programs through which students can earn certificates or degrees using only OER and no commercial textbooks. Examples include [the Zero Textbook Cost Degree program](#) of the California Community Colleges and the [OER Degree Initiative](#) of Achieving the Dream. As of 2019, 10% of the 1050 US



community colleges offered their students the opportunity to complete programs of study without purchasing commercial textbooks.

Successful advocacy may take a multi-pronged approach with the participation of several stakeholders. Faculty associations may formally call for the adoption of OER. For example, the statewide faculty organization for the largest system of US higher education has called for creating local OER liaisons at each of the 114 California Community Colleges ([Academic Senate of the California Community Colleges](#)). Another example is a letter-writing campaign organized by a national student advocacy organization in which fifty-two student associations called for the federal government to create an open textbook grant program ([Student Government Leaders Unite](#)). Several national networks support advocacy. The Federation of Public Interest Research Groups, or [US PIRGs](#), combines research and grassroots organizing to advocate for consumer-oriented causes, including [affordable higher education](#). This group is a key resource for local student associations. The Scholarly Publishing and Academic Resources Coalition, or [SPARC](#), is an organization of libraries that advocates for making Open the default for education and publishing. SPARC has been instrumental in several national advocacy campaigns, including national [Open Textbook Pilot grant program](#). The Community College Consortium for OER, or [CCCOER](#), is a community of practice that offers professional development around OER. Due to its large membership, CCOER is an influential if informal advocacy network. In California, an OER Student Advocate Network is being developed. This project aims to develop and empower current higher education students to become effective advocates for OER. The goals set for the students are to develop a toolkit for student OER advocates, improve their ability to advocate for OER awareness on their own campuses, and to enlist other students and student governments to promote OER to faculty.

### **Ensure a Robust Open Organization**

The UNESCO OER Recommendation points to overall actions to ensure robust open organizations for mainstreaming and sustainability:

- Build the capacity of stakeholders to find, re-use, create and share OER
- Develop supportive policy
- Ensure inclusive and equitable access to quality OER
- Nurture the creation of sustainability models for OER
- Facilitate international co-operation

According to Housen & Butcher (2019), there are requirements for awareness raising and capacity building of teachers and content developers in OER open licensing and their potential to offer innovative online education in the digital environment. Also needed are the dissemination of research on the potential educational and business benefits of OER education. Effective business models need to be developed, including the usage, implementation of mechanisms to ensure the maintenance and ongoing quality and sustainability of OER. A shift in finances from the purchase of copyrighted material to the production of openly licensed material is required. Many initiatives have so far been triggered by bottom-up initiatives, so that mainstreaming and sustainability are now subject to requirements for state obligations, such as the adoption or enforcement of policies OER requiring open licensing of state-funded teaching materials and the



establishment and enforcement of national OER policies covering all levels of education. In addition, there are needs for political support at all levels. Guidelines for "open" approaches should not be independent, but holistic, leading to a common approach to open education, open access, open data and open source. More development of new technologies for searching and extracting data and for developing data mining models is needed. To enable disaggregated provision of services, for example, government grants are required for a pure assessment service and not for mass financing for a full-service model. Finally, it is necessary to develop a broader culture of sharing learning resources throughout education.

## Conclusion

Drawing on the country survey by Housen & Butcher (2019), we suggest topics for further consideration:

### Use and adoption

- How are OER used, modified, and changed (within and between countries)?
- Why is OER under-utilized in basic education?

### Awareness

- How can public awareness and adoption be promoted?
- What strategies can instill and promote a culture of collaboration among educators?
- What are the perceptions of the value proposition to institutions?

### Effectiveness

- What is the impact of on students across countries?
- What examples illustrate innovative pedagogical and educational outcomes?

### Funding

- How will new policies be funded?
- What are the funding mechanisms to support development?
- What quality assurance mechanisms are available?

### Business models

- Which open business models are promising and sustainable?
- What role should Open play in the commercial delivery of online education?

### Quality

- How can quality assessments and procedures be designed to assure the quality of rapidly changing resources?

### Policy development and implementation

- What pre-conditions and factors are needed in order for policy to be adopted institutionally?
- How should policy be implemented?

### Improving diversity

- Should research focus on interactive/mobile technologies rather than textual content?
- What language barriers exist?



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## **Towards Operational Excellence in Aviation Training: OEF Framework for Developing Integrated Systems for Online Learning & Development**

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### **Abstract**

Air transport is one of the fastest growing industries in today's world. Forecasts suggest that the volume of air transport will double over the next ten years. In the next 15 years, air transport will support 99 million jobs. Similarly, the industry is changing rapidly due to technological innovations, customer expectations and increasing regulation to protect operations from emerging safety and security risks. Existing competence development methods and systems cannot keep up with these multiple and changing demands. This puts air transport companies in a difficult and challenging situation. In 2018, 55% of ground handling companies confronted a skills shortage in their workplaces. Of these companies, 63% thought skills shortages caused delays to flight schedules or impacted service delivery. Of incidents that caused ground damage, some 62% occurred due to lack of skills. The situation is unsustainable and generates costly problems for employers. New approaches are urgently needed. These places put significant demands on learning and training providers to develop the skills, competences and attitudes for staff in a meaningful, rapid and sustainable manner. To meet this need, Airport College International (AC) - a private online training academy for the air transport sector established in 2012 - designed an Operational Excellence Framework (OEF), which glues together the three critical elements that companies need today to ensure they have the right people with the right skills working in the right way. These are: (1) Talent Acquisition (2) Online Training and (3) Operational Reporting & Assessment. Airport College has re-invented the way competence development in air transport sector can be enabled by digital transformation, relevant quality content and mobility. The OEF provides a foundation for the digital services Airport College offers for staff training and development, currently available to over 300 airports globally. It consists of a complete range of Online Training modules covering mandatory aviation competences required by national and international governing aviation bodies (e.g. IATA and

ICAO). The Talent Acquisition element helps companies find the most suitable employees with less effort and better accuracy by using automated mobile queries, systematic assessment and online learning to raise “informed employee candidates”. The Operational Reporting & Assessment element is a mobile-based system for employees and management to collect and assess information related to the operating environment (e.g. airfield) and to construct new understanding on how to make operations safer and more efficient. This paper discusses the theories and models of online education, talent acquisition and performance management which form the basis for Operational Excellence Framework. Some early findings from pilot implementations by Airport College’s client organizations are shared as well.

**Keywords:** Aviation, Online Training, Talent Acquisition, Assessment, Artificial Intelligence, Compliancy

## Introduction

The rapidly growing air transport industry needs scalable and dynamic digital learning and competence development systems to be able to respond to the changing and increasing demands for competence development. Airport College International Ltd. (“AC”) is a private online training academy which provides digital learning and competence development solutions for the air transport sector. Established in 2012, AC develops online training courses for companies operating in air transport, airport ground handling and logistics. AC operates globally with representation in more than 300 airports and with offices in Helsinki and Tokyo. AC’s strongest and most developing markets are in Japan, Korea, Europe and Africa.

AC’s online training portfolio includes a broad offering of self-study courses in mandatory aviation training topics. All courses comply with the regulations of international aviation authorities such as IATA and ICAO. Courses are available on-demand and AC’s all-in-one online training service comes with advanced follow-up and reporting features. In this way, employers can ensure that their staff competences are always up-to-date. AC also provides professional certificate and degree programs in cooperation with universities and other training institutions.

Over the years, the AC service portfolio has expanded. Today AC also provides a range of tools that support the development of competences and organizational capacities for companies operating in the air transport sector. These include the Talent Acquisition system which fulfils the needs of clients to locate, recruit and maintain talent. Employee turnover rates are increasing in the air transport industry. According to recent

statistics, 50-90% of new airport employees leave within the first year of employment. AC's Talent Acquisition system addresses this issue by developing informed work-candidates who learn about the employer and the open work opportunities. In turn, applicants' qualities and their suitability for open work positions are assessed. Through the implementation of this system employee candidates with most potential will be selected for final recruitment phases.

Operational Reporting & Assessment is a mandatory process required from air transport companies to ensure and improve operational safety. It applies risk management and quality management methods to identify operational risks, to understand the causes of these risks and to look for appropriate solutions. AC's Operational Reporting & Assessment system was developed for smartphones used to collect and report incidents and accident data in the field. This allows management to analyze risk scenarios and take necessary actions.

AC's three main service products were initially developed as separate stand-alone applications. In 2019, the company initiated an R&D initiative which aims to integrate these systems. The reason for integration is the possibility to combine and exploit data available through the different systems and utilize open data for improved accuracy. This will allow creation of a more comprehensive and precise service portfolio to support operational excellence. The threefold approach aims to connect learning more closely with organizational performance involving competence development from three dimensions:

- (1) to identify future demands for employee competences
- (2) to provide targeted, on-demand learning opportunities for employees
- (3) to allow companies to identify potential talent and attract most suitable new employees.

The basis for system integration and development is the Operational Excellence Framework (OEF), introduced in this paper. In the next sections, we discuss the theoretical aspects and models of online education, and the practices of talent acquisition and performance management which form the basis for OEF. Some early findings from pilot implementations by client organizations are shared as well. We also look at the possibilities of using Artificial Intelligence to exploit local and global operational data and open data sources within OEF. The conceptual development work of OEF has been undertaken by AC on a self-funding basis involving a team of concept designers and technical experts. At present, Airport College is finalizing a funding proposal (together with its research partners and strategic corporate partners) to source public funding for the second phase of OEF development work. This phase will focus more on the design and



implementation of AI-based elements and advanced VR/AR features. This work will be carried out within the “AI in Learning” initiative which involves two Finnish universities (Helsinki and Lapland) and seven EdTech companies. The project is due to start by the end of 2019.

## Objectives

The objectives of this initiative (OEF phase 1) are to:

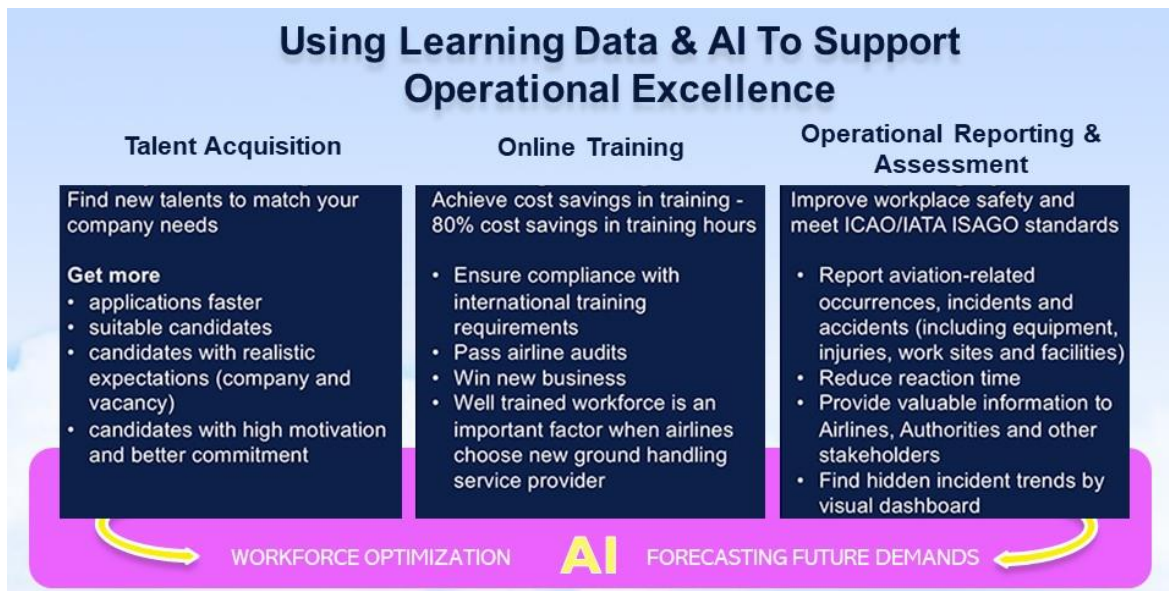
- Identify possibilities to integrate data processes between AC's three core service products (Talent Acquisition, Online Training and Operational Reporting & Assessment).
- Identify how Operational Performance Data can be utilized in learning design, development and delivery.
- Identify how AI can be used to process Performance and Learning Data-based outcomes that support more efficient, precise provision of learning activities
- Find out which open data sources are available and suitable for use with AC's “Operational Excellence” concept
- Simulate the OEF model in practice and based on test feedback establish recommendations for further development of the model.

## Theoretical Framework

Technology holds a lot of promise to change the way of managing human capital. According to De Smet et al (2016)

...that means not just allocating talented people effectively and efficiently... but also freeing employees to focus on the more meaningful parts of their roles, as machines take over those that can be automated. Managers can benefit as well, by getting out from under the burden of appraisals, which will be redefined and multi-sourced on the workforce platform, so they can focus more on the development and professional growth of their direct reports.

The main elements of the OEF framework are described in Figure 1. This illustrates the three main elements of OEF and how data integration and AI are used to generate added value. We review the three main elements in detail.

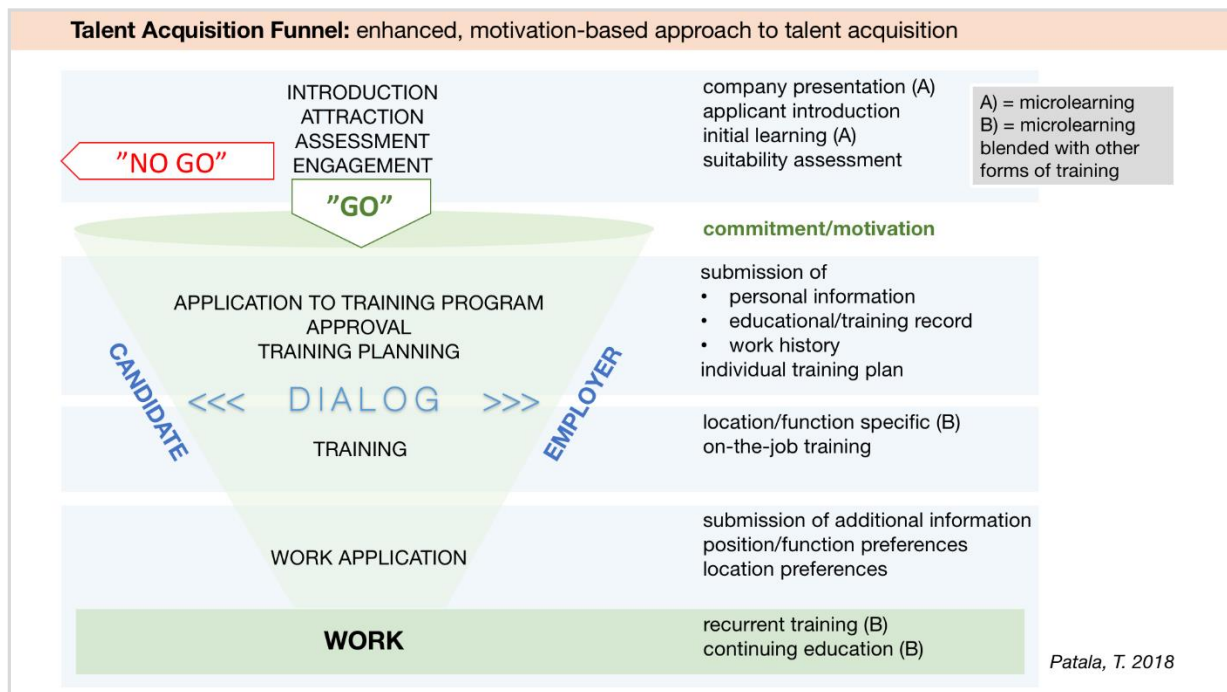


**Figure 1: The three main elements of AC's Operational Excellence Framework**

### Talent Acquisition

Traditional models of recruitment are seriously challenged by the quickly changing labor market of our time. While work applicant numbers are increasing and demands for workforce competences are diversifying in many industries, companies are struggling to match the most suitable employee candidates with open positions. The process of recruitment using traditional methods is labor-intensive. It is difficult to ensure that the most suitable candidates eventually get selected. It is a generally known fact among HR professionals that, in recruiting new employees, the first months of employment usually define how successful and committed employees will become in their work (Hogan, 2015). From this basis, the AC development team innovated a new kind of funnel approach to talent acquisition in cooperation with client companies. The development and implementation process followed the lean startup model (Ries, 2015) using one large client company as a testbed. The talent acquisition funnel aims to tackle the problem of high employee turnover and to make the process of recruitment more efficient through automation. According to research, a key factor that determines how long employees remain in their new position is their range of expectations and understanding about their assigned work task. By supporting so called "informed work candidates", lower employee turnover rates and improved commitment levels among new employees can be expected (Jackson, 2017). This is why training has a central role in the new talent acquisition processes. Work applicants learn about the employer and what to expect from the work before they proceed with the application. This initial

phase of application takes one week to complete. Everything is done online using self-study learning modules and automated queries. Applicants passing this phase qualify for the final recruitment phase which is done following company-specific procedures that may include additional assignments, assessments and face-to-face interview. In Figure 2 the talent acquisition process is illustrated using the Talent Acquisition Funnel.



**Figure 2: The Talent Acquisition Funnel**

## Online Learning

By online learning we refer to web-based self-study modules which are optimized for studying using mobile devices. In the corporate sector, digital learning is often the preferred way of training (Patala & Vancell, 2018). Air transport is not an exception. In fact, it is one of the most regulated industries. This means that the amount of training employees need to take is very high and training demands are constantly increasing and diversifying. This explains why air transport companies are looking for more efficient online training resources to fulfil training requirements. AC's online training modules are designed on micro-modularity principles. This means that modules are bite-sized, topic-centred and easy to use. There are many benefits to applying micro-modularity such as more efficient and flexible production and, from the learner point of view, improved quality of the learning experience and higher levels of engagement with the learning task (Westfall, 2016, Swanson, 2008, Johnson et al, 2011). Better access to learning enabled by mobility is expected to make employees better connected to their work roles which has a positive impact on belonging,

retention and productivity (Garrison, 2016). AC's course portfolio includes courses in the following categories (with examples of courses listed):

- A. Introduction (e.g. Introduction to the Airport, Introduction to the Airline Business, Introduction to the Air Cargo Business)
- B. General studies (e.g. Aviation Security Awareness, Human Factors)
- C. Function-specific studies (e.g. Passenger/Ramp/Cargo Handling)

### **Operational Reporting & Assessment**

The Operational Reporting & Assessment system was initially developed to allow aviation companies fulfil aviation authorities' requirements to carry out incident and accident reporting routines. This is critical to ensure safe operations and continuous improvement of operations in the quickly changing working environment where new risks emerge constantly (IATA, 2018). The system facilitates ICAO/IATA ISAGO (Safety Audit for Ground Operations) Compliance and is based on four pillars:

- (1) Safety Policy
- (2) Risk Management
- (3) Safety Assurance
- (4) Safety Promotion.

These measures aim to report safety incidents/accidents, plan corrective actions, monitor/implement actions and analyze safety trends. In a wider perspective, the system gives organizations a simple, efficient, and secure method of reporting any type of workplace events including safety, security, quality or compliance issues. The approach follows the Total Quality Management (TQM) philosophy which challenges organizations to strive to continuously improve processes by gathering and utilizing workers' knowledge and experience. AC's Operational Reporting & Assessment system was developed for smartphones that are used to collect and report data in the field. The data is gathered into a database where managers get updates and can take necessary actions and carry out corrective measures as needed. Incident data collected from the field is extremely valuable for planning operations and to be able to anticipate future demands for competences. Within OEF operational performance data can be utilized in learning design, development and delivery.

## Towards Integrated Service Model

The focus of service integration is at synergies we can generate by allowing service elements to interact with each other and by using shared data sources. For example, if the Operational Reporting & Assessment element indicates that there is an operational problem in a specific point of the transport chain, we should be able to assess whether there is a shortfall in employee capabilities and, if this is the case, target learning interventions accordingly. Much focus is put on seamless user experience to allow employees to interact with learning and development activities in “the flow of work” (Bersin, 2018). While nearly 60% of organizations say learning is not aligned with business goals (Wentworth & Kane, 2018), the integrated service model makes business goals more visible to employees and provides tools by which employees can take concrete actions to achieve these goals and get rewarded. This all links with the critical but troublesome issue of evaluation and ranking of the performance of employees, which is described in the May 2016 article of McKinsey report as follows:

...the worst-kept secret in companies has long been the fact that the yearly ritual of evaluating (and sometimes rating and ranking) the performance of employees epitomizes the absurdities of corporate life. Managers and staff alike too often view performance management as time consuming... (Ewenstein et al 2016).

The OEF concept aims to transform this process, that’s been traditionally perceived as time consuming, subjective, demotivating and unhelpful by managers, into a transparent, fluent and efficient flow of actions that are a natural, integral part of every employee’s work. The OEF model was developed from this basis and it is described in detail next. The following illustration describe the critical linkages and intersections between service elements and give examples of data that is exchanged.

everything is designed to develop competences and capabilities to ensure the organization is able to meet operational requirements. Operational Reporting & Assessment collects and processes critical information related to emerging demands for competences which is immediately at the disposal of training managers to target learning activities accordingly. Most relevant data types used are Incident Data and Incident Root Cause Analysis data. From the perspective of employee skills and capabilities, the process maximizes the benefits of focused, on-demand training provision.



**Figure 3: Integrated services and the use of shared data**

EvOpportunities to develop general awareness, skills and competences are provided centrally based on role- and function-specific competence requirements. Opportunities for individual learning and development are available as well. Through the use of open data, automatization and AI, the process will be made more efficient by providing automated inputs that target learning interventions more precisely where they are most needed. This applies to self-study modules and learning simulations, as well as assessment and testing. Open data sources such as ICAO API, weather API (Terminal Aerodrome Forecast), CheckWXAPI, flight punctuality data and open weather are used. The system harnesses global data sources which are available for use locally to understand how globally emerging risks may impact local circumstances and how these factors together impact the way employees should carry out their work. Open data provides immediate feedback to learning and development where locally relevant factors are considered when aligning learning interventions.

Understanding operational requirements and demands for competence is equally important for those in charge of recruiting new employees. Job matching is done based on this using an automated process and training interventions are targeted to potential and new employees using the same principles.

## Conclusion

During the writing of this paper, two large companies operating in the air transport industry have implemented parts of the service portfolio involving their employees and potential work candidates in the process. It has been possible to simulate the fully integrated process to understand how it would benefit these companies in practical terms. The fully integrated service model is going to be implemented as a Minimum Viable Product (MVP) during the coming months, providing the project team more feedback on how users perceive the actual service and its potential benefits in the workflow. The first perceptions from clients underline the fact that it is extremely important and valuable for competence development to understand what is going on in the field every day. Only by establishing concrete mechanisms like OEF that make the work challenges of today and tomorrow visible, it is possible to align competence development and organizational capacities so that the organization is prepared to manage with them. Currently most organizations carry out these same actions at least partly manually. With automatization and clever use of data and AI, we can significantly reduce reaction time and make the process more accurate. In safety-critical businesses this is a key enabler that allows companies to provide out top-quality service and respond to the increasing demands of their clients. During the next phases of the project the MVP implementation will take place allowing us to understand better how the concept should be developed and eventually released for clients.

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## Engagement Patterns and Learner Strategy Profiles in Online Higher Education: A Learning Ecologies Perspective

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### Abstract

In today's globally networked knowledge society, lifelong learning opportunities in higher education are available across a range of contexts. Through the hybridization of digital learning scenarios - from formal to informal - expanded learning opportunities generate a continuum of learning contexts and practices mediated through digital technology. These opportunities range from everyday informal and self-directed learning, to peer learning as well as more institutional and formalized learning. As many authors argue, emerging contexts and practices of learning signal an urgent need to critically examine the interconnections and complex relations between what is learned in formal academic scenarios and the everyday learning that happens outside of the classroom in professional and everyday settings. The potentialities of pervasive digital contexts offer opportunities for a wide variety of self-directed and interest-driven everyday learning, which can complement and support academic learning. As such, the current research problem illustrates that expanded and emerging online education scenarios require connected pedagogical designs and curriculum for empowering lifelong learners to harness the affordances of the web. The current mixed methods study is underpinned by a learning ecologies (LE) perspective as a framework to analyze learning processes across a continuum of practices and contexts. As such, the study outlines strategies and practices students use to connect learning across contexts to support academic learning in online higher education. The paper presents results from a larger mixed methods interpretive case-study. The multi-site study examines three fully online Masters of Education programs, collecting data through program documentation, student interviews and a digital survey. Purposeful and criterion sampling were used to select 13 case study participants across 3 sites in Spain, the U.K. and the U.S.A. Findings highlight student views of their experiences learning across a range of strategies and practices that rely on digital resources, and networked peer collaboration and social support. The findings integrate a qualitative thematic network analysis highlighting salient themes in how students develop online learning strategies with quantitative procedures, including PCA as a classic categorization and reduction technique, to understand the underlying variables of learning strategies students use to support academic learning in online higher education. Recommendations for a connected curriculum are presented linked with the literature on lifewide and lifelong learning in online HE, in line with a mission toward building transformative online pedagogies.

**Keywords:** Online Higher Education, Learning Ecologies, Connected Curriculum

## Introduction

In today's globally networked knowledge society, lifelong learning opportunities in higher education are available across a variety of contexts and practices. Through the hybridization of digital learning scenarios - from formal to informal - expanded learning opportunities generate a continuum of learning contexts and practices mediated through digital technology. These opportunities range from everyday informal and self-directed learning, to peer learning as well as teacher or mentor directed learning. As many authors argue (Sangra et al., 2019; Adams Becker et al., 2017), emerging learning scenarios signal an urgent need to critically examine the interconnections and complex relations between what is learned in formal university programs and the everyday learning that happens in the workplace and in informal contexts.

The potentialities of ubiquitous digital contexts particularly support opportunities for a wide variety of self-directed and interest driven everyday learning. This is particularly vital in online graduate programs in learning technologies and digital education whose population tend to be an older age profile, where roughly 70% are combining full-time work, (Schneller & Holmberg, 2014; Clinefelter et al. 2019) with part-time study and other personal commitments. As such, the current research problem illustrates that expanded and emerging online education scenarios require connected pedagogical designs and curriculum for empowering lifelong learners to harness the affordances of the web (Fung, 2017; Barnett, 2017). Such responses would require a connected curriculum empowering lifelong learners to harness the affordances of the web for learning across both formal and informal contexts and practices, bringing universities into new configurations and connections with the wider world. In so doing, HE institutions can support wider connections between academics, students and 'real-world' communities across a range of eco-systems. The study outlines strategies and practices students use to connect learning across contexts to support academic learning in online higher education.

## Learning Ecologies in Educational Research

Although certainly not widespread in practice, ecological perspectives on learning in higher education and beyond have become more visible in recent years (Jackson, 2016; Barnett, 2017; Fung; 2017). The continuous emergence of new digital technologies and the rise of a networked knowledge society are vital factors that have catalyzed ecological thinking on learning and development in and with the digital, ushering in the concept of learning ecologies (LE) (Sangra et al., 2019). As such, emerging LE research has advanced conceptualizations of lifelong and lifewide ecologies of university learning (Ellis & Goodyear, 2013, 2019; Jackson; 2016; Barnett, 2017), new learning environments and emergent learning (Williams et al., 2011; Cope & Kalantzis, 2017), processes of personalized and self-directed learning across contexts, and the appropriation of available resources (Maina & González, 2016). Although, as some authors have noted, "studies analyzing the continuum between formal and informal learning in higher education and adult education, as well as vocational educational training are still needed" (Sangra et al. 2019 p.15). A learning ecologies framework emphasizes the interacting role of social interactions, practices and resources in individual learning trajectories mediated through tools and technology (Barron, 2006; Ito et al., 2013), and as such, will be an analytical focus of the current study.

## Student Learning in Online HE

In online HE, student approaches to learning, that is, what they do to learn through activity, has become pedagogically and technologically more complex in networked learning environments, moving away from transmission models and toward constructivist and connectivist approaches (Anderson & Dron, 2011; Bates, 2015). In online graduate education, two broad categories of activity have been identified as particularly suitable for networked learning in digital environments (Ellis & Goodyear, 2013), including inquiry and discussion through a combination of independent study as well as collaborative and groups projects. Inquiry is focused on a range of research-based activities, while discussion leads to collaborative community building and co-construction of knowledge and meaning making, in line with a communities of practice approach (Wegner, 1998). In this context, there is growing recognition that student learning needs to be active, cumulative, purposeful and goal oriented, personal yet within a social context, situated and contextual as well as self-regulated (Ellis & Goodyear, 2013; Broadbent & Poon, 2015; Jackson, 2016). Such attributes of ‘good learning’ are supported by an ecological perspective that values and supports students organizing their own ecologies for learning and development throughout one’s life.

## Methods

The central research question addressed in the current study is: “How do students experience learning across a continuum of contexts and practices - from formal to informal - to support academic learning in online HE?”. The current article will present integrated results that respond to the following sub-question: What digital learning practices and strategies do students use to support academic learning in online HE across a continuum of contexts - from formal to informal? The paper presents mixed methods results from a predominantly qualitative interpretive multi case-study that took place in the 2017–18 academic year. Case sites were selected as exceptional cases of best practice in distinct cultural and geographic contexts that may be able to offer clear insight into the phenomenon under study. Purposeful and criterion sampling were used to select a total of 12 case study participants across three sites at the UOC (4), the U of E (4) and the UIUC (4).

### *Data Collection and Analysis*

The current study used a mixture of data collection methods, including programme documentation, online video interviews and a digital survey underpinned by a learning ecologies perspective. Data generation began with an examination of each programmes externally facing digital communications, including an initial thematic analysis of the course and programme guides. The development of a learning ecologies analytic model in the first phase of the research was used as a sensitizing concept (Van Den Hoonaard, 2012) in order to focus the possible lines of inquiry. The LE conceptual model was influenced by the work of Barron (2006), Jackson (2016) and the literature on lifelong learning (Colley et al., 2003) and has been used as a guiding heuristic and an organizational scheme to analyze student experiences of learning - from formal to informal - across contexts and practices. The conceptual model details an LE as the configuration of activities, material resources, social relationships and the interactions that emerge from them that support opportunities for

learning across a range of contexts. This process led to the development of an interview protocol and a quantitative survey design underpinned by a lifelong learning ecologies conceptual framework.

As a foundational qualitative procedure, thematic network analysis (Attride-Stirling, 2001; Nowell et al., 2017) has been used for the detailed processing, analysis and thematic development of the interview data exploring a range of student experiences studying online. These included learner intentions for studying online, as well as their approaches and strategies for learning across contexts (i.e. learner activities, resources used and peer support) through learning accounts of a typical “work” week. Interviews were audio recorded, transcribed and coded using an inductive approach. During the analytical process, researchers met on several occasions to search for, review and define thematic categories through researcher triangulation, peer debriefing and consensus building.

As a quantitative procedure to make sense of the variables related to learner experiences in online higher education, a dimension reduction technique was performed, namely a Principal Components Analysis (PCA). This process aimed to identify whether the different components of students experiences of online learning (sets of activities, relationships & resources) could be grouped into principal components. PCA’s are linear combinations of variables which help reduce data complexity and support the analytical process (Guitert & al. 2018). A PCA statistical procedure transforms observations of possibly correlated variables into values of linearly uncorrelated (not directly observed) variables called principal components (Jolliffe, 2011). The results of the PCA were integrated with the qualitative results in a complementary manner, in order to respond to the central research question.

## Results

Through an analysis of how students approach learning in online HE, it was possible to make inferences and identify patterns of learning strategies students use as they develop valued academic practices in response to the academic curriculum and required learning tasks. As a result, the following three themes, presented in detail below, were identified during the analysis: (1) learning strategies and experiences in the academic curriculum; (2) everyday informal practices to support academic learning; and, (3) online relationship interactions across contexts.

### Learning Strategies and Experiences in the Academic Curriculum

*Table 1* outlines a range of formal learning strategies used to support formal academic learning. To clarify how we use the term learning strategy, we refer to Ellis & Goodyear (2013) who conceptualize a learning strategy, particularly in the context of e-learning and digital education, as what students do to translate an academic learning task into learning activity. It is evident that the strategies identified in *Table 1* fall into categories of academic engagement and core academic literacies, metacognitive strategies (including planning and monitoring learning), social collaboration, as well as self-directed and networked learning.

Building Critical Thinking skills through Information and data literacy (browsing, filtering, curating and managing information/knowledge)
“I have been thinking a lot about how to organize note taking, I’ve adapted Evernote. So I’ve been trying to use Evernote, and think about how to organize my thoughts, create outlines for the works (assignments). How to actually read an academic article and pick information out of that article? How do I warehouse that, so it’s more accessible, so I can use it for knowledge artefacts that I am creating, at work, or in the future dissertation.”
Time management in organizing weekly course tasks using digital tools
“I have it (course calendar) marked in 17 places, in google calendar, in the study in front of me, I have it (course calendar) marked on the calendar in the living room. And I’ve got my husband, he has it marked in his calendar as well, in case I miss something”.
Metacognitive and self-regulation strategies (planning, monitoring, and evaluating course work)
“Another piece that I like is how the course has created these activities that activate my metacognition. So I feel like I’m spending a lot of time, thinking about my thinking, or thinking about the activities that I am doing”.
Student directed course community building: seeking help from peers and social support through forums, debates and course community
“In the more informal community that we have, for my immediate peers in our immediate programs, I feel like we’re we’re talking about the things that we want to talk about, as opposed to what the instructor wants to talk”.
Connecting micro-scale course tasks with macro-scale course tasks (weekly posts with final project)
I’d write my weekly updates based on what I was finding and then I would also use their research to write the work (assignment), as well. I was kinda doing double duty, I was being more efficient about what I was actually doing. So it wasn’t two separate projects, it was one single project. So that’s basically how I learned, or conditioned myself to sort of shape all of this to be more efficient about how I am going about learning” (Ryan)
Engaging with and learning from peer knowledge works through peer-review and peer-feedback activities
“Without question peer collaboration supported my learning. In many cases, it was the contribution of my peers with greater knowledge than myself who worked in groups together”

**Table 1. Learning Strategies and Experiences in the Academic Curriculum**

To complement the qualitative results, a PCA was carried out from a scale related to the frequency of digital practices in support of academic learning based on the Digital competence framework (Vuorikari et al., 2016). After the removal of 1 variable, 8 items remained providing an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (MSA) was 0.83 (minimum acceptability threshold is 0.6) and a significant Bartlett’s test,  $p < 0.001$ ), which means the sample is adequate for performing a PCA. The PCA resulted in 2 component solution with an Eigenvalue bigger than one, a common rule of thumb for identifying the number of components. The two factor solution accounted for 71.03% of the total variance explained, including (57.65%) for PCA 1 and (13.39%) for PCA 2.

The PCA used the varimax orthogonal rotation method which allows the identified high values of variable loadings to characterize the different components. Variable loadings in a principal component translate covariance/correlation between original variables and the components. As such, each component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in *Table 2* below, shown in the order of the highest loadings. The two compounded factors showed a Cronbach’s  $\alpha$  of 0.833 and 0.786 respectively.

Integrating and elaborating digital content that others have created. 0.827	Browsing, searching and evaluating information, knowledge and digital content. 0.847
Creating and Developing your own digital content. 0.812	Managing information, knowledge and digital content. 0.721
Creatively using digital technologies by applying different tools and resources 0.796	Communicating and sharing resources and content. 0.713
Identifying technological needs and solving technical problems. 0.792	
Collaborating in the co-creation of resources, information and knowledge. 0.708	
PC1=Creative and Collaborative Activities	PC2= Browsing, Managing and Sharing Information/Knowledge Activities

**Table 2: PCA Dimension 1. Frequency of Digital Practices in supporting Academic learning**

Given that the loaded variables appear related to creative and collaborative practices using digital technology, we named the 1st principal component “Creative and Collaborative Activities”. As the variables in the 2nd component appear related to lower order and everyday digital activities we named the 2nd principal component “browsing, managing and sharing information/content activities”.

### **Everyday Informal Practices to Support Academic Learning**

Outside of the academic assessment structure of each graduate program, a range of complementary informal activities that could support formal learning were identified. When participants reflected about their experience studying online, a range of activities were discussed that could be categorized as informal and self-

directed activities. The most salient of these strategies include engaging with course themes once a course has finished and engaging in interest driven new media production, offering an abundance of opportunity to connect informal practices with formal learning activities, including through interest-driven inquiry. *Table 3* below highlights salient themes identified in the interviews.

Staying engaged with course themes once formal course has finished: i.e. strategic engagement with social networks and new media (twitter, facebook, youtube) for academic/professional purposes
“So I’ll follow people on Twitter for example, who I know will be posting things that I am interested in.”
Engaging in interest driven new media production (audio/video, blogging)
“I started a podcast outside work because I heard someone on a podcast say it was quite easy, and I looked up what’s the best microphone and how to you get good sound, how do you edit it. So I was always quite self-directed if I’m interested in learning something.”
Searching for training/employment opportunities through online networks and communities (LinkedIn, Online communities of practice)
“Yes, I am in a group in my region to look for employment and prepare for the public teachers exam, in fact I am in many different Facebook groups to prepare for the public exam.”
Connecting interest driven media engagement into academic or professional practice
“I probably listen to around 10 hours of podcasts per week.”

**Table 3: Complementary Informal Activities to support Formal Learning**

In relation to everyday digital activity outside of work or study, the PCA for dimension 2 was related to the more informal dimension of digital practices and activities, derived from the LE conceptual model. After the removal of 3 variables, 7 items remained providing an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (MSA) was 0.815 (minimum acceptability threshold is 0.6) and a significant Bartlett’s test,  $p < 0.001$ , which means the sample is adequate for performing a PCA. The PCA solution resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The two factor solution accounted for for 65.25% of the total variance explained, including (47.67%) for PCA 1 and (17.54%) for PCA 2.

Each component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in *Table 2* below, shown in the order of the highest loadings. The two compounded factors showed a Cronbach’s  $\alpha$  of 0.808 and 0.703.

Engaging in Mentoring and/or Coaching and/or Volunteering. 0.840	Browsing, searching and filtering digital content .799
Interacting more formally across my Professional Development Networks 0.832	Sharing Content .698
Interacting with Online Interest Groups and Online Communities 0.798	Communicating with peers and peer groups 0.535
Communicating with peers and peer groups 0.545	Interacting informally across my Personal Social Networks. 0.532
PC1= Intentionally Networked Activities	PC2= Everyday Browsing communicating and sharing activities

**Table 2: PCA Dimension 2. Importance of Everyday Digital Practices across contexts in supporting academic learning**

Given that the loaded variables appear related to engaging in intentional activities across social groups, communities and networks using digital technology, we named the 1st principal component “Intentionally Networked Activities”. Given that the loaded variables that appear for component 2 are related to browsing, communication and sharing activities we named the 2nd principal component “Everyday Browsing, communicating and sharing activities”.

### Online Relationship Interactions Across Contexts

The final PCA discussed in this article was related to online relationship interactions across contexts in support of academic learning. From 9 items, an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (MSA) was 0.819 (minimum acceptability threshold is 0.6) and a significant Bartlett’s test,  $p < 0.001$ , which means the sample is adequate for performing a PCA. The PCA resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying the number of components. The two factor solution accounted for 66.07% of the total variance explained, including (52.19%) for PCA 1 and (13.88%) for PCA 2. The two compounded factors showed a Cronbach’s  $\alpha$  of 0.850 and 0.751.

Interactions across Personal Social Networks 0.866	Interactions with Teacher(s) 0.779
Interactions with peers outside of school and work 0.792	Small group interactions with university peers 0.777
Interactions across Professional Social Networks 0.782	One- to -one interactions with university peers. 0.737
Interactions within Online Interest groups and communities of practice 0.688	
Interactions with work colleagues 0.553	
PC1=Networked relationships across contexts	PC2= One-to-One and small group relationships in formal contexts

**Table 3: PCA Dimension 3. Importance of Online Relationship interactions in supporting Academic Learning**



Given that the loaded variables appear related to socially networked interactions across a variety of contexts, we have named the first component “Networked relationships across contexts”. For the second component, the load variables appear related to dyadic and small group interactions in academic contexts, and thus the second component was named “One-to-One and Small Group relationships in formal contexts”. This confirms the finding that relationships interactions in supporting formal academic learning can be reduced to two broad patterns; 1. Informal and networked interactions across contexts; and 2. dyadic and small group interactions in formal contexts.

## Discussion

Several of the key learning strategies identified in the results section align with a meta-analysis of self-regulated learning strategies (SRL) in online higher education (Broadbent & Poon, 2015). These include metacognitive strategies, time management, peer learning, help seeking, critical thinking as well as organization. It is clear that making productive use of their time, paying attention to their learning behaviour, including planning, monitoring and evaluating their learning are productive strategies to support academic achievement and learning. Further key strategies evidenced in the study include student-directed community building that can be an important dimension and key component of an individual’s LE as they develop valued academic and disciplinary practices through peer help, communities of practice (Wegner, 1998) and social support through networked learning (Dron & Anderson, 2014).

The range of informal practices and strategies presented can serve as integrated approaches to linking academic practices to the wider world and across contexts. As such, a consideration for lifewide learning designs in online HE can recognize that academic learning is taking place alongside a range of learning spaces that individuals inhabit, including professional learning (Barnett, 2011). Such an approach can lead to what Romani and Marovec (2011) call invisible learning, where the blending of formal, non-formal, informal, and serendipitous learning can happen in innovative and emerging contexts.

Finally, in relation to both networked and more intimate group and dyadic relationship interactions across contexts, the identified PCA dimensions relate clearly to current understandings of social configurations for online learning (Dron & Anderson, 2014). Such social configurations for online learning can contribute to emergent practices where boundaries between formal and informal learning become blurred (Cope & Kalantzis, 2017; Greenhow et al. 2016). This is particularly salient in light of knowledge that online HE students use both formal and informal networks to support their learning (Czerkawski, 2016). Given the professional character of graduate programs in digital education, a fundamental design decision for program teams is to develop a connected curriculum that explicitly links academic learning activities with professional trajectories and workplace learning, building an integrated university learning ecology (Jackson, 2016; Fung, 2017; Barnett 2017, Goodyear & Ellis, 2019).

## Conclusion

The current study aimed to respond to a significant challenge facing online HE by examining the complex relations and interconnections between what is learned inside and outside of formal academic contexts, with a particular emphasis on strategies students use to integrate such experiences. In this sense, the study examines what is required to harness the potential of online education? The study contributes new insights into a range of formal and informal strategies that students use as they experience online HE across range of contexts in their lives. Through curriculum design, program teams can encourage a range of activities that have been identified in the literature that support student learning, including self-regulated learning strategies and peer collaboration and social support through student-directed course community building.

Results also highlight that two central relationship configurations underlie student experiences of online learning, including both networked and more intimate dyadic and small group configurations, bringing empirical support to research on social learning theories in the digital age (Dron & Anderson, 2014). Aligned with the literature on lifelong and lifewide learning in online HE, the findings also suggest that in order to fully harness the potential of online education, an essential approach could be through a connected curriculum framework (Fung, 2017) and in particular making explicit connections across subjects and out into the world, connecting academic learning with workplace learning, and connecting learners with each other, across program phases and cohorts and with alumni networks.

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## DEAO: An Innovative Framework to Improve Online Learning Experiences using UX Design Applied in the Education Domain

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### Abstract

For a few years now, UX design has been contributing to the production of websites in order to improve users' experiences during their interaction with the online environment. From this perspective, users become the centre of the design process. In the context of online education, it is understood that an experience should be learning-oriented, since the users are also learners. In this sense, the online university (UNA-SUS), imagined how UX design and learning design could converge to improve the learning experiences of Brazilian healthcare professionals. Drawing on the work of Dewey (2007) and Mattar (2014), this paper presents the results of a dialogue between the two fields, design and education, around the concept of experience. We highlight, as an element of theoretical convergence, the quality of experience. In practical terms, the DEAO framework was built and adapted from the conceptual framework of Garrett (2011) in order to ensure the quality of online learning experiences in all contexts. Initial results highlight positive effects on interdisciplinary collaboration among our courses production team.

**Keywords:** UX Design, Learning Design, Online Education, DEAO

### Introduction

Our experiences with digital technologies have been intensified with the rise of Internet access. The way society connects with and through cyberspace had become easier and more intuitive as computers, smartphones, tablets and wearable devices became popular. In the 1970's, only experts were able to use personal computers, which were newly invented. Furthermore, we can barely remember, or imagine, that before the 1980's there were no icons on computer interfaces. A new culture, called cyber culture by Lévy (1999), emerged with the advent of the social web, smartphones, applications and others devices. It represents new ways of connecting with each other in online environments. Therefore, the experiences we

have in those environments are part of our daily life and complete other experiences that previously only happened in the offline world. With this brief contextualisation, our aim is to show that it has become crucial to optimise experiences involving the use of hardware, software and virtual environments. In this endeavour, user experience design (or UX design) has stood out, from some years now, as a central area.

From this perspective, at UNA-SUS Brasilia, online university for healthcare professionals, our production team gives special attention to the user experience. Thus, for designing our MOOCs, in 2018 we decided to use Garrett's conceptual framework (2011) as a reference. It's five planes – strategy, scope, structure, skeleton and surface – guide the design process. In the context of online education, nevertheless, experiences provided by a course are learning-oriented, since users are also learners. This article, therefore, presents the DEAO framework, an adaptation of Garrett's framework in which we linked two kinds of design process: user experience design and learning experience design. Thus, we have relied on the experiential learning concept theorized by Dewey (2007), and on Mattar's (2014) contributions in the learning design area. With this study, our aim is to offer practical guidelines that could ensure or improve the quality of online learning experiences and improve the design process of production teams.

### **User Experience and Learning Experience: Focus on Humans and Quality**

In the 1990's, according to Pine and Gilmore (1998), the experience economy began to replace the service economy, which was preceded by the industrial and the agrarian economy. These authors suggest that experience's economic value is based on enjoyment and memorability. For this reason, according to them, experience is a bigger concept than service. In other words, no more services are delivered but rather experiences. That is the reason why user experience became central in the design area. While in the industrial era design focused on form and function, in post-industrial times design focuses on users, their experiences and the subjective factors involved in it (Oliveira, Limeira, & Santa-Rosa, 2014)

User experience is not about the inner workings of a product or service. User experience is about how it works on the outside, where a person comes into contact with it. When someone asks you what it's like to use a product or service, they're asking about the user experience (Garrett, 2011, p. 6).

It is interesting to observe that a similar movement has taken shape in the educational field. In fact, McLellan (2000) emphasised the need for staging educational experiences instead of delivering instruction. In the same perspective, Mattar (2014) suggested a distinction in Brazilian Portuguese between "instructional design" – commonly used in Brazil – and "educational design". According to this author, "instructional" refers to

unidirectional, passive and behaviourist conceptions of learning. Instead, “educational design” implies interactive and learner-centred approaches. In that respect, McLellan (2000, p. 62) reminds that “the educational aspect of an experience (...) is essentially active. Learning, as it is now largely understood, requires the full participation of the learner”.

In this way, the human-centred approach is a convergent point between UX and learning design. In the design process special attention was given to users or learners who will live the experience. Besides this convergence between both fields, there is another one: the focus given on the quality of experience. For Alben (1996), ensuring quality in and with the design process is a key point for providing people with successful and satisfying experiences with their product.

By “experience” we mean all the aspects of how people use a product: the way it feels in their hands, how well they understand how it works, how they feel about it while they’re using it, how well it serves their purposes, and how well it fits into the entire context in which they are using it. If these experiences are engaging and productive, then people value them. We call this “quality of experience.” (Alben, 1996, p. 13)

To the concept of quality of experience, some criteria used in the UX design literature can be associated to describe a satisfactory experience: aesthetic (Alben, 1996), enjoyment, memorability, autotelic, engaging (McLellan, 2000), efficient, positive, pleasurable (Garrett, 2011), satisfying, unique, fun, effective (Unger & Chandler, 2012).

In education, before considering the quality of an experience, we may define what an educative experience is. According to Dewey (2007, p. 39), which defended an “education of, by and for experience”, there are two variables that ensure the educative nature of an experience: interaction and continuity. By interaction he meant that “An experience is always what it is because of a transaction taking place between an individual and what, at the time, constitutes his environment” (p. 43) In other words, an experience is always personal and unique insofar as it belongs to each human being and his/her context.

Continuity, in addition to defining an experience as educative, is also a criterion of its quality. This means that “every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences” (Dewey, 2007, p. 34). To that extent, “the educator [has] a long look ahead, and views every present experience as a moving force in influencing what future experiences will be” (p. 87).

The experiential continuum suggested by Dewey (2007) in the context of the learning experience, to a certain extent, is also involved in the user experience. As a matter of fact, in UX design user's previous experiences are considered and integrated to the current provided experience. However, future experiences are not always a key point, unlike Dewey's experiential continuum.

Another criterion of quality for an educative experience, according to Dewey, is agreeableness. This interacts with the dimension of pleasure expressed in UX Design, which is linked to our senses. In that way, Garrett mentioned that:

Every experience we have - not just with products and services, but with the world and with each other - fundamentally comes to us through our senses. In the design process, this is the last stop on the way to delivering an experience to our users: determining how everything about our design will manifest to people's senses. (2011, p. 135)

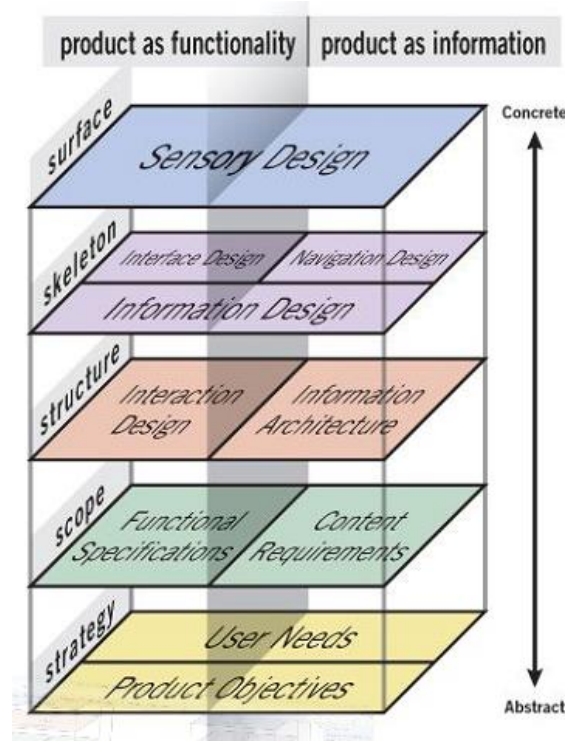


Figure 16: Garret's framework (Garrett, 2011, p. 161)

After these first general considerations, it will be presented in the next part of this article how to establish a practical dialogue in our design process between the UX project and learning design, given the quality of the experiences provided by our MOOCs.



## DEAO: Online Learning Experience Design Framework

In order to create online learning experiences, it is necessary to understand the environment in which it will occur. In our context, a self-service website provides this environment to our students, where “there is only the user, facing the site alone with only her wits and personal experience to guide her”. (Garrett, 2011, p. 10).

Our understanding of how to build a website was based on Garrett's conceptual framework (Figure 1) because it allowed us to "address the problems of the user experience and the tools we use to solve them" in the design process (2011, 21). Each plane of Garrett's framework (2011) depends on the decisions made in the lower plane, from the most abstract to the more concrete. The elements of the first and the last plane, strategy and surface respectively, are transversal. In the intermediate planes - scope, structure and skeleton - Garrett (2011) suggested a division into two visions: functionality and information. The main characteristics of his framework are summarised in Table 1.

Garrett's framework (2011) introduces a dynamic that organises decision making at appropriate times of web design: decisions made on one plane immediately affect the next one. Although it has a linear structure, it is possible that a decision on a higher plane, such as the skeleton, causes the updating of the lower planes (strategy, scope or structure). In that way, it is also agile.

Planes	Elements	Characteristics
Strategy	User needs	Consideration of the objectives and needs that lead users to access the site (it can be a complex task because user profiles can vary for the same site)
	Product objectives	It can be business-oriented (for sales sites) and/or involve company identity issues, success metrics, etc.
Scope	Functional specifications	Detailed definition of the functions that the site will integrate
	Content requirements	Identification of the type of content, required resources, characteristics (file size, image pixels, etc.) that the functions will need to take into account
Structure	Interaction Design	Description of the actions and expected behaviours of users and how to contemplate them, including prevention and resolution of errors
	Information architecture	Structuring content elements to improve future information processing

Skeleton	Interface Design	Organisation of interface elements in such a way that users understand and easily use the functionalities of the site. The focus is on user's interaction.
	Navigation Design	Allows users to move within the proposed information architecture.
	Information Design	Presentation of information so that it is easily understood and utilized by users. The focus is the communication of information to users
Surface	Sensory Design	Determine how the information and functionalities of a given product will or should mobilise the users' senses (touch, hearing, vision in a web environment)

**Table 1: Elements of the five planes of the Garret framework (elaborated by the authors)**

Another feature that shows the flexibility of Garrett's framework (2011) is the transition from one plane to another. This border is neither fixed nor clearly defined. However, the best way to ensure the process is to keep the work concomitant in at most two planes, which means that the planes can at some point occur in parallel. "A better approach is to have work on each plane finish before work on the next can finish" (p. 23). That is, it is possible to work on Structure and Skeleton at the same time, but in order to start working on Surface, Structure must be finished.

When our team explored Garret's framework (2011) for designing online learning experiences, the first issue was the difficulty in contemplating the educative dimension of the future experience. Specific questions were not just about function or information, but about education. On the other hand, both functionality and information needed to be considered in the design process.

For this reason, we decided to integrate a new column into Garrett's framework (2011), in order to meet the educational objective of online learning experiences. This third column consider, this time, product as knowledge (Figure 2). This adaptation, called DEAO (for *Design de Experiências de Aprendizagem On-line* – online learning experiences design in Brazilian Portuguese), is indeed a way of integrating conditions that will allow learners to transform information (column 2) into knowledge (column 3).

In the first plane - Strategy -, we integrate three bases: students' analysis, context and educational objectives. Both UX design and learning design, with their respective focuses, seeks to know and understand the target audience. A further step, with the educational dimension, is to consider students' previous knowledge, as well as their expectations and previous experiences, following the concept of experiential continuum suggested by Dewey. Analysing who our students are and what they do need or expect is one of the first steps of a learning design process according to Mattar (2014). In that way, user's needs indicated as the basis of UX design are different – and complementary – from learner's needs.

[Educator] must survey the capacities and needs of the particular set of individuals with whom he is dealing and must at the same time arrange the conditions which provide the subject-matter or content for experiences that satisfy these needs and develop these capacities (Dewey, 2007, p. 57).

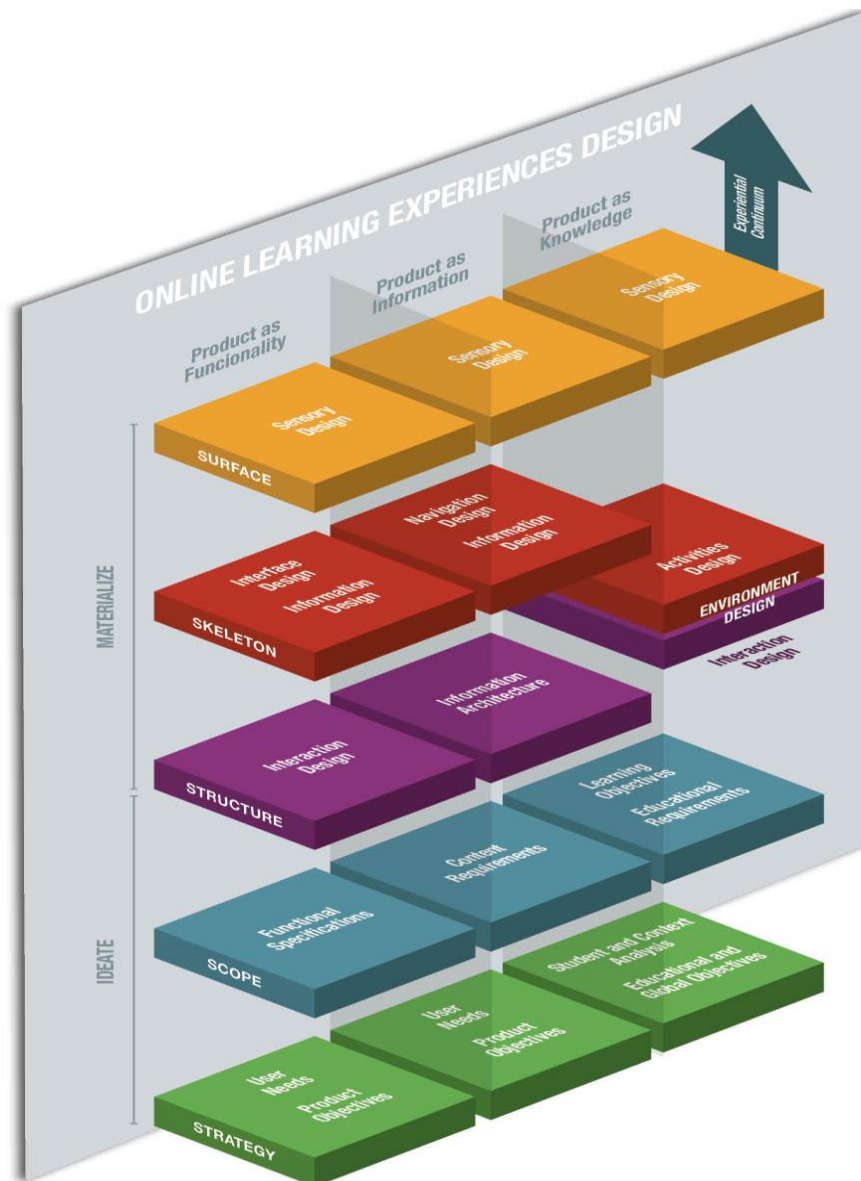
Context analysis is the second element integrated into Strategy. It considers the online learning environment itself and the environment of performance, that is the environment in which new knowledge and skills will be mobilised (Mattar, 2014). Again, this allows us to value, at the beginning of the process, the experiential continuum concept – which is indicated at the top of the framework as a perspective – as a fundamental principle of the quality of experience and its educative value.

In our context, considering our students' performing environment to a certain extent symbolised, for example, a way of contemplating possible gaps between theory and practice. In some Brazilian realities, professionals can have to deal with some limits for practicing the course theory. It represented also an opportunity to consider elderly people needs, which will benefit directly from new knowledge and skills of healthcare professional.

The third element of the new column of the Strategy plane, educational objectives, answer the question "why is this learning experience being planned?". It records the purposes of the educational resource as a whole. In our context, it is also a way to reflect and formalise in pedagogical terms the demand of our stakeholder, the Brazilian Ministry of Health.

Scope is the densest plane of the framework. In it, learning outcomes are defined. It is time to think "what students will be able to do after the course" (Mattar, 2014, p. 81). Learning outcomes are complementary to another element of this plane: the educational requirements, which involve choices relating to learning theories, pedagogical activities, media, language, and assessments tools and methods, among main elements that will be defined and used. For example, enabling and promoting peer's interaction (learner perspective) is a kind of educational requirement that would need to interact with content requirements and functional specifications (user perspective).

It is also in the Scope plane that we define content (main theoretical topics) that will lead to learning outcomes as an intersection of content and educational requirements. In our context, both learning outcomes and associated contents are defined by members of our team (usually learning designer and team coordinator) together with specialists of elderly people healthcare. Stakeholder's role is validating the Scope plane.



**Figure 2: DEAO framework - Online learning Experiences Design (elaborated by the authors)**

In the Structure plane, the learner's journey and her/his interactions with the environment are defined through information architecture and interaction design. Interactivity, in educational terms, concerns all interactions that students will have with content, teachers, or with each other.

The design of pedagogical activities meets with web interactions (Mattar, 2014). Thus, learning design plays a relevant role at this time of the whole design process. "By planning activities rich in interactions, the educational designer will be exercising one of his/her highest arts", according to Mattar (2014, p. 131).

Transdisciplinary work is fundamental and indispensable in terms of feasibility and involves at least learning designers, developers and graphic designers.

In the third column of DEAO framework, Structure and Skeleton merge in order to match the educational environment design evoked by Mattar (2014). In this "double plane", the design of activities and interactions is done without pre-established order, one being able to precede the other.

In our team, at this stage we define pedagogical approach (case studies, reflection...), forms of evaluation, and media production's needs with our learner specificities in mind. This means, for example, that the course structure will be different for caregivers and doctors. For caregivers-oriented courses, concretely, we create the script of a fictional (but realistic) narrative which will structure the course and guide theoretical content writing. Afterwards, once this content written and approved by specialists, design can move forward.

The Skeleton plane, from a UX perspective, allows the visual translation of components decided in the previous plane. Conceptual design models for the web can be used, such as content distribution grids, button sizes, scrolling direction, among others. It concretises the learning experience in a simplified visual model.

In our design process, in this plane, we use wireframes. With this prototype, navigation is made available in order to experiment interactivity from both UX and learning perspectives. Moreover, we have noticed that it was easier, in our validation process with our stakeholders, to focus on content and pedagogical elements. Without this step, stakeholders used to focus on visual elements that were not important at this stage of the design process and sometimes implied changes that affected our production workflow.

Finally, the Surface plane, with sensory design, transcends all three columns (functionality, information and knowledge). It is the first factor that guarantees the pleasant and memorable aspect of the web experience. In this plane, the visual part in the prototype previously validated in the Skeleton plane is concretely applied. From an educational point of view, we pay attention, for example, to colours, icons or other elements that have specific and shared meaning.

## Conclusion

This study notes how it is necessary and possible to establish a connection between UX design and learning design, around the concept of experience. This connection aims to ensure the quality of online learning experiences. The next step of this study will be performing usability tests and applying post-course surveys in order to verify if the quality of the provided experience is perceived by real learners. Abstract concepts, such as enjoyment, memorability, pleasurable, are indeed a challenge to be measured, especially in a context

where learning is not yet associated with the aesthetic or the pleasurable. Research support may be one way to overcome this barrier.

Since the DEAO framework was applied in the design process of six courses it added more than 73 thousand enrolments, so it's possible to share three main results that, at least, allowed us to improve the design process in our production team. First, it was noticed a growing awareness among our team members of the need to focus on the quality of our learners'/users' experience. This can be a first step towards the effective quality. The second result refers to a better collaboration in our team. The DEAO framework offers practical guidelines for transdisciplinary dialogues and indicates when it can be established during the design process. A multidisciplinary process involves several skills, which means each person is responsible for the stage that she dominates technically. In a transdisciplinary process, however, the various skills work together, and responsibilities and knowledge are shared in view of a common objective. Finally, a better communication with our stakeholder was noticed. The DEAO framework helped us to formalise and to guide our validation process. This allows us – stakeholder and team – to focus on appropriate elements in appropriate moments.

From these first results, we can say that UX design brings contemporary contributions for online learning design or, in other words, for the creation of what Dewey (2007, p. 41) called "environmental circumstances that lead to experiences that lead to growth".

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## A MOOC Quality Scale: Validation and Experimentation in a Pre-Experimental Design

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### Abstract

In the field of distance education (DE), the traditional concerns regarding quality and persistence are renewed given the fact that online courses reach a very wide population through the different MOOCs initiatives worldwide. MOOCs bring new actors to DE while many *on-campus* universities use MOOCs to develop their online presence. MOOCs face the same challenges as DE; persistence and quality. Quality literature has been developed for DE and is also now emerging for MOOCs. Chaney et al. (2009) and Shelton (2011) proposed quality frameworks for online courses which contain quality criteria and indicators. While these are often used by institutional representatives (as in the OLS Scorecard), students and other educational actors (teachers and instructional designers) are in a privileged position to evaluate some of these criteria. For example, students should be consulted on how engaging the learning activities proposed in a course are. The objective of this study is to develop and validate the use of a quality perception questionnaire and to examine how modifications to MOOCs' impact student's perception of the quality of the MOOC. This paper reports on the results of two studies. In the first study answers to 3 open-ended questions were extracted, categorized and analysed with an emergent coding approach (Anadon and Guillemette, 2007). Links were established between these results and Chaney et al.'s (2009) and Shelton's (2011) online quality frameworks. The results informed the creation of a quality evaluation questionnaire for MOOCs. The second study then evaluated this questionnaire through exploratory and confirmatory factor analyses in the form of structural equation modelling. The resulting questionnaire consisted of 4 scales (clarity, communication, contents, learning experiences) and 11 sub-scales showing good psychometric properties. The empirical efficiency of the questionnaire was also evaluated using a pre-experimental design, with two versions of a MOOC on Clinical Reasoning. Informed by participants' comments in previous iterations of the questionnaire each design team made changes to the design of the MOOC. Results showed significant differences on 5 of the 11 scales using non-parametric rank analysis. In conclusion, our questionnaire seems to capture efficiently the pedagogical impact of MOOC modifications and points out elements that are the most important for students. Results could be applied both to MOOCs and other forms of online courses.

**Keywords:** MOOC, Quality Perception Scale, Validation, Pre-experimental Design



## Introduction and Objectives

MOOCs have been around for nearly 8 years and have become a topic of some interest for many researchers. While they might not be the rupture innovation as promised by some (Christensen et al., 2013), they are now becoming a steady and quite important part of the postsecondary distance education offering. In the past decade, many universities around the world joined the MOOC phenomenon of online teaching and learning, raising new theoretical and practical concerns about the quality of these peculiar online courses offered by universities. However, as distance education, MOOCs face persistence and quality challenges, and if some efforts regarding quality insurance have been present, most of these efforts don't take into account the point of view of those who are the most concerned by MOOCs, learners themselves. Thus, this study aims to shed light on the most important quality features of MOOCs from the learners' perspective. Its objectives are: 1) to develop and validate a MOOC quality questionnaire; and 2) to examine how MOOCs' modifications impact student's perception of MOOCs' quality.

## Context and Problem

Distance education has been around for more than one century and has encountered many evolutions along with the development of technology. It has always been a vector of openness in education, in the original sense of accessibility. This principle is reiterated and maximized in MOOCs where obstacles are minimized and where registering for a course is free and takes about 2 minutes to complete.

Even if the original connectivist MOOC (cMOOC) on connectivism CCK2008 offered in 2008 was not so massive with about 2 300 participants (Cisel & Bruillard, 2012), the massive scale of MOOCs caught the attention of many, and some MOOCs attracted a much more massive amount of learners. This was the case with Sebastian Trun's MOOC «Introduction to Artificial Intelligence» which attracted about 160 000 participants (De Santis, 2012). This example gave rise to a very important MOOC development, with a MOOC offering of over 11 000 MOOCs that attracted more than 100 million learners in 2018 (Shah, 2019). A very large proportion of these MOOCs, have been described as xMOOCs (behaviourist MOOCs) by many because of an accent on transmissive features.

MOOCs have become a particular form of distance education, relying quite heavily on short video and automated quizzes (Glance et al., 2013). Even if the original dichotomy between cMOOCs and xMOOCs is now disputed (Cisel, 2015), and that MOOC designs can vary quite a bit (Veletsianos, Collier et Schneider, 2015), most MOOCs rely on a traditional transmissive approach to learning, oriented toward teacher-centered pedagogy, thus resembling xMOOCs (Cisel, 2015). That said, MOOCs come with many of the same challenges that distance education such as persistence and quality (Evans, Baker & Dee, 2016; Hood

and Littlejohn, 2016). Considering the massive number of learners involved, these challenges become somehow magnified.

MOOCs are democratizing distance education, for learners, teachers and institutions (Dillahunt, 2014). MOOCs have been a first step in online presence and distance education by many 'bricks and mortar' universities and it is hardly surprising that they rely on the first wave of pedagogies mobilized in distance education (Anderson & Dron, 2011). By their openness, MOOCs attracts a more diversified array of learners. Many of these learners have no former experience in distance education. This was the case for 70% of participants in a MOOC studied by Roy, Bachand and Boivin (2015). Therefore, with a new and more diversified clientele (Christensen *et al.*, 2013; Glass, Shiokawa-Baklan and Saltarelli, 2016), MOOCs developers must have a better understanding of participants' expectations and experience.

According to Bernard *et al.* (2004) meta-analysis, learning outcomes in distance education are comparable to those obtained in face-to-face context, but with a much higher variability, which brings concerns about quality in distance education. Means et al. (2009) report a similar result. Practically, an obvious interpretation would be that concerning distance education, it is easy to do worse than in on campus courses, but doing better requires thoughtful efforts. In MOOCs, there is an abundant literature on the very low completion rates varying between 4 % and 15 % (Jordan, 2015; Daïd & Nguyễn, 2015). Thus, MOOCs face the same challenges as distance education; persistence and quality (Evans, Baker et Dee, 2016; Hood et Littlejohn, 2016).

Since MOOCs are highly visible in the public space and that many universities developing MOOCs are newcomers in the field of distance education, the subject of MOOC quality have gained a high importance for many (Hood et Littlejohn, 2016; Emplit, Blondin, Roland et Poellhuber, 2015). While distance education has been for many years the apanage of institutions specialized in distance education (such as the many Open Universities we can find in the world), online courses and program strategies are at the core of the development of a large part now (Allan & Seaman, 2007). Most recently, for many universities, MOOCs have been the cornerstone for the development of an online courses strategy. However, in the context of a MOOC, where some institutions do not have a long experience in online learning, quality is emerging as new problematic (Hood and Littlejohn, 2016).

### **Quality in Postsecondary Distance Education and in MOOCs**

Universities have developed a variety of means and process to ensure quality assurance of courses and programs, and these vary from one country to another. For many professional programs, accreditation

processes are in place. An important literature on quality frameworks and approaches to education has been developed in the past decade. For example, the “3P model” (Gibbs, 2010) conceptualize education as three interrelated components: presage, process and product. The first dimension (presage) involves the teachers, the learner and the platform. The second dimension (process) analyses the pedagogical approaches integrated within the course. The last dimension (product) looks at the outcome of the product: completion, success, etc. This model provides insight for variables and measures to be considered in assessing courses quality, and can be applied to MOOCs.

Some of the quality initiatives have been based on peer course review system by faculty. It is the case of the Quality Matters™ standards (QM), which have been applied to a large number of campus courses. However, many authors consider that distance education is a specific context with particular characteristics which need an adapted framework. Distance education initiatives have been the object of an important literature (Shelton, 2011; Chaney et coll., 2010, Depover, Karenti et Komis, 2012, etc.). As for on campus courses, distance education quality processes also often focus on the course design process (Depover et al., 2012).

The Quality Matters approach has been applied to distance courses (Parscal & Riemer 2010), as well as to MOOCs (Lowenthal, P., & Hodges, C., 2015). A similar peer course review approach has been implemented in a French-Canadian context, by a team that systematically analysed distance education quality literature to develop rubrics aimed at distance course development teams (Potvin & Gérin-Lajoie, 2017).

Other authors reviewed a body of empirical research realized to assess quality in online learning in United States (Chaney *et al.*, 2010; Shelton, 2011). Those proposed a list of criteria derived from their analysis, mainly based on the institutional perspective, to describe the quality of online learning. Shelton (2011) suggests six dimensions (in order of importance): (1) institutional commitment, support and leadership; (2) teaching and learning; (3) faculty and student support; (4) technology and evaluation; (5) cost-effectiveness; (6) student and faculty satisfaction. Works by Chaney *et al.* (2009) have helped to build the OLC Quality Scorecard, a quality framework based on the institutional perspective, and that is now very widely adopted. The evaluation quality process analysed according to 9 dimensions subdivided in 75 items. Each item is assessed a score between 0 (deficient) to 3 (exemplary). However, this questionnaire examined the online learning offer from the institution perspective (e.g.: “Students should be provided a way to interact with other students in an online community (outside of the course)”). While these approaches have value, they somehow neglect learners’ points of view. When “end-of-courses” surveys are distributed to students, they often focus either on satisfaction or on a very general perception of quality, as in Parscal & Riemer (2010) for example.

MOOC quality initiatives took some time to develop, some considering the sheer number of participants as a sufficient indicator of quality (Cisel, 2014). As mentioned previously, the Quality Matter approach has been applied to MOOCs (Lowenthal, P., & Hodges, C., 2015). Conole (2013), the most cited approach, also developed a series of 7 criterias based on MOOC design. In the European context, efforts have been made to develop the OpenupEd Quality Label, a set of benchmarks that applies at the institutional or at the course level (Rosewell & Jansen, 2014). None of these approaches incorporate formally the learners' perspective.

As early as 2012, Daniel (2012) have argued that MOOCs should be evaluated by learners. However, to assess adequately learner's perception of MOOC quality, there is a need for a validated instrument that could measure quality based on criteria adapted to the distance context and to the specific characteristics of MOOCs.

The objectives of this research are to develop and validate a MOOC quality questionnaire and examine how MOOCs' modifications impact student's perception of MOOCs' quality

## **Methods**

To better understand the present methodology, we'll first develop on previous studies. Due to limited time and space, the present paper will only examine the last study in detail.

### *Study 1: Theoretical Construction of Quality Questionnaire (Qualitative Data)*

Of more than 10 000 participants registered to those two MOOCs, 659 answered three open-ended questions in the survey distributed at the end of the course. Those answers were extracted, categorized and analysed with an emergent coding approach first (Anadon and Guillemette, 2007) with the QDA software. In a second phase, links were established between these results and Chaney and Shelton online quality frameworks (see Roy, Poellhuber, Garand et Goyette-Beauchamp, 2016).

### *Study 2: Development and Validation of Questionnaires (Quantitative Data)*

We created a French language MOOC quality evaluation questionnaire based on the rubrics in Online quality frameworks most appropriate for participants to evaluate, largely based on the results of the qualitative analysis of study 1 both for the categories used and the items formulation. Questions for the MOOC quality scale have been developed along 4 main dimensions and 12 sub-dimensions. An initial number of 87 items in the following 4 scales have been formulated: clarity, communication, interactivity and contents. This MOOC quality questionnaire was tested in 10 MOOCs offered between fall 2015 and fall 2016. A final shorter

questionnaire comprising sociodemographic variables, satisfaction measures and the MOOC quality questionnaire was answered by 1074 MOOC participants (62 % women), from Canada (40 %), Europe (40 %), Africa (10.5 %) and other parts of the world (9.5 %). Psychometric properties were validated throughout statistical analysis: exploratory factor analysis, confirmatory factor analysis, correlation analysis and consistency. Exploratory and confirmatory factor analysis converged in a solution comprising 4 scales and 11 subscales (table 1). The structural equation model developed to realize the confirmatory factor analysis can be considered satisfactory (CFI = .922, TLI = .908, RMSEA = .042). The reliability coefficient as measured by Cronbach’s Alpha for all 11 subscales varied between .617 to .917.

### Scales

The final questionnaire is composed of 31 items, based on 4 categories and 11 subscales, having also satisfactory to very good fidelity a measured by alpha coefficients. The categories are: interactivity, clarity, communication and contents. Table 1 provided an overview of each category and subscales included.

Categories	Sub-scales	Description
Navigation	Information, navigation and accessibility	Students’ perception of MOOC instructions, navigation easiness and accessibility
Communication	Support, collaboration	Students’ perception of MOOC support availability and collaboration possibility
Contents	Videos, examples, teachers competencies	Students’ perception of the content offered in the MOOC : credibility, quality, etc.
Learning experience	Engagement, evaluation and feedback	Students’ perception of learning experience and motivation support, quiz evaluation fairness and instruction clarity

**Table 1: Description of questionnaire**

### Present Study

This study was realized along a pre-experimental protocol in a pre-post design in which participants for the two data collection are independent. Quality perception questionnaires were used to monitor the effect of

MOOC modifications on quality perception and to realize an empirical validation of questionnaires on a practical case.

A massively open online course was created in order to make accessible the clinical reasoning process (CRP) model developed at Université de Montréal to a large audience of health care professionals (Charlin *et al.*, 2012). The MOOC was delivered for the first time in 2015 and a second time in 2016, with a total of 1965 participants from 23 countries. Between both iterations, the design team was fed with qualitative results consisting of the answers of the participants to the open-ended questions of the final questionnaire and the perception of the teachers. The design team made a few changes based on participants' comments for the second iteration. Those will be discussed in the results section.

#### *Data Collection*

1215 participants registered for the first iteration of the MOOC in October 2015 and 1001 registered for the second iteration in January 2016. Out of these, 128 answered the final quality questionnaire comprising for the first iteration of the MOOC and 43 for the second iteration.

#### *Analysis*

The results of the normality tests oriented us to make non-parametric Mann-Whitney rank test for each of the quality questionnaire subscale.

#### **Results**

The main changes were the introduction of a better support and communication structure between participants and the teachers that were the MOOC authors. Those changes were introduced based on the qualitative questionnaire results (open-ended questions) which were transmitted to the teaching team members. After consulting these, teachers thus introduced communication tools like *Google Hangouts* that could be attended synchronously or watched asynchronously. An assistant was hired to moderate and animate discussions in the online forum dedicated to the activities of the MOOC. The assistants had to answer participants' questions within 48 hours. Students also asked for more examples. These were introduced in the discussion forums by the teacher, the assistant and the participants themselves. Links towards external resources were also introduced in order to answer some of the participants' recurring issues. Some quiz questions that were used in the first iteration to foster reflexion about the upcoming topic at the beginning of a certain number of sequences were removed because of the negative comments from students that were expecting a right or a wrong answer.

To assess MOOC quality, we looked at the differences between both iterations of CRP MOOC offered at University of Montreal between the second and the first iteration of the MOOC, using the MOOC quality perception questionnaire. Analysis showed significant differences on 5 of the 11 scales. Table 2 shows significant improvement on the following variable: access (+0.39), collaboration (+0.59), teachers (+0.33) and examples (+0.31). Those results showed that changes introduced between the first and the second iteration of the MOOC had an effective impact.

Categories	Navigation	Communication	Content	Content
Sub-scale	Access	Collaboration	Teachers	Examples
CRP 2015 mean	5.06	3.94	5.53	5.42
CRP 2016 mean	5.45	4.53	5.86	5.73
Mann-Whitney U	601.50	290.50	554.50	628.00
Wilcoxon W	3527.50	1418.50	3480.50	3631.00
Z	-2,034	-1,963	-2,596	-1,994
Bilateral signification	.042	.050	.009	.046

Note. Only significant differences are reported

**Table 2: Non-parametric rank analysis of the CRP MOOC**

## Discussion

This research has resulted in the development of an original, validated instrument measuring the perception of quality from the learners' perspective, and focusing on the criteria that are the most important for learners in MOOCs. It led to a 31 item questionnaire for which reliability analysis was within acceptable norms for all of the 11 subscales. Like many others, this MOOC was originally conceived in a transmissive fashion, but the need for student support and communication emerged from students' comments and questionnaire results. This collaborative feature of MOOCs is often overlooked, but is deemed essential in distance education, as underlined by the OLC Quality Scorecard, as well as in MOOCs (Conole, 2013).

Through the synchronous Google Hangout sessions that were recorded and made available to learners asynchronously. The teaching team also directly worked to provide more relevant examples to learner and to answer their questions in a variety of ways. All of these measures somewhat made the teacher become more present to learners.

The reasons for which the access aspect of the MOOC quoted higher in the second iteration is unclear. It is interesting to note that it is precisely on the aspects of the MOOC that were the object of changes that the differences were significant. Moreover, it showed the relevance and the importance of quality approach in MOOC context.

### **Conclusion**

MOOC quality is an important factor for the institution, considering the high visibility of MOOCs (Emplit et al., 2015). For many learners, MOOCs are the first contact with online learning (Christensen *et al.*, 2013) and with the institution.

Our study resulted in a validated instrument having fair to good psychometric characteristics and has shown that a quantitative quality questionnaire for learners can be used effectively to monitor and improve the quality of MOOCs. Our original instrument may help determine MOOC design change's impact on students' perception of the quality of the MOOC. These changes might also impact learners' motivation (which we didn't measure).

Although the pre-experimental design used limits the strength of the hypothesis of causality, this research shows the potential interest of such a quality questionnaire not only for the MOOCs, but also in distance courses, since the essential dimensions which constitute the quality of the MOOCs and distance courses do not seem to differ that much, distance courses relying more and more also on videos and quizzes. It would of course be necessary to repeat the validation process with a more traditional FAD clientele.

### *Limitations*

The questionnaire was validated in only one MOOC, which is specialized in the health professions and for which the number of participants was quite small. A pre-experimental design was used rather than a true quasi-experimental design, which lead to more alternative interpretations. For example, it is possible that the observed differences were due to an History effect (global changes in time that affected all learners) or to learners' differences. In fact, we did observe that in its second iteration, the MOOC had a lower proportion of University of Montreal students registered to it. The simultaneous use of exploratory factor analysis and



confirmatory factor analysis in the form of structural equation modelling is not the norm and could be criticized.

### *Future Perspectives*

These results contribute to the reflection on what could constitute a quality framework in the domain of MOOCs and distance education. In practical terms, this questionnaire could be an important part of an integrated quality approach that would alternatively or simultaneously call on learners, designers and the institution. Previous work already allows for the input of the designers (Potvin &) or the institution (OLC Scorecard). Completing this with the learner's point of view would be very valuable and may also have some effect on MOOC persistence.

Considering that MOOC can be followed by thousands or even hundreds of thousands of learners, universities must offer a product of quality. However, we urge institutions to view MOOC not only from a traditional perspective but also from the learners' perspective.

Further research should be made to integrate a more systematic approach to MOOC quality to help teachers and developers to modify their approach in MOOC development.

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## Holistic Model to Preventing Cheating in Online Learning

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### Abstract

Online learning in Canadian higher education is now ubiquitous. Although contract cheating has increased in face-to-face contexts, the perception persists that cheating is endemic to online learning, with some countries addressing the issue at the national level. While cheating has always existed, academic integrity remains a basic tenet of higher education. It is, therefore, imperative that online learning not only meets the demands of 21st-century learning but also upholds the values the academy so rightly cherishes. Based on a review of the latest relevant literature, we propose a holistic model for dealing with academic misconduct in higher education, as applied to online learning settings. Our approach targets four axes: 1) policies and infrastructure, 2) backward design, 3) collaborative learning, and 4) building a culture of academic integrity. Axis 1 addresses the need for robust anti-cheating policies and infrastructural support. Axis 2 acknowledges that course development should stem from the desired understandings from which teaching logically follows by flipping course development on its head and foregrounding essential understandings that students will ultimately require. Axis 3 relates to the often-touted missing puzzle of 21st-century education: collaborative learning. Given that conversation and collective identity are key to deeper approaches to learning, collaboration needs to underpin each step of the learning process. Axis 4, meanwhile, accentuates the importance of collective, multifaceted methods of addressing cheating and plagiarism. Rather than tackling academic misconduct solely via preventative or solution-focused measures, the fourth axis encompasses the teaching of ethics and ethical behaviour, the implementation of efficient detection mechanisms, the enforcement of fair and equitable consequences, and the designing of assessment measures that prevent cheating. While implementing such an approach requires a comprehensive, ongoing effort from multiple stakeholders, the potential benefits are significant. We therefore conclude by highlighting possible caveats and limitations to the proposed model.

**Keywords:** Academic Integrity, Higher Education, Online Learning

## Introduction

Although not quite as old as the hills, academic misconduct has long been a part of campus life. Already in the 1970s, university ghost-writing services were busy rolling out mail-order catalogues replete with pre-written term papers, made-to-order options, quickfire turnaround rates, and sliding scale fees designed to meet every North American student's needs (Hammer, 1976). In some ways, not much has changed. Notwithstanding appeals for 'authentic' assessments that purportedly mirror the tasks of the modern workplace or the push for alternative modes of assessment (e.g., computer-based, formative, self- or peer-assessment), exams and essay assignments remain the norm (McKie, 2018). Several possible explanations exist, including the inherent tension between tried-and-tested methods and newer, potentially more time-consuming approaches. The fact remains, assessment outcomes have always mattered to students. Not entirely surprisingly, then, reports indicate that no type of assessment is immune to contract cheating and academic misconduct is currently committed by one in seven students worldwide (Maxwell, 2019; McKie, 2019). What we set out is a description of eConcordia's holistic approach to promoting academic integrity and combating cheating in online learning courses. Our approach targets the following four axes: 1) policies and infrastructure, 2) backward design, 3) collaborative learning, and 4) building a culture of academic integrity.

### **Axis 1: Robust Anti-Cheating Policies and Infrastructural Support**

The first axis is built on the premise that policies and infrastructural support are essential to the development of academic integrity. According to the International Center for Academic Integrity (2017), anti-cheating policies and procedures should exist in written format, be regularly updated, and be freely available on the university's website (ICAI, 2017). For optimal dissemination, however, policies and procedures need to be widely advertised, for example on fliers, at campus events, or via email. In addition, universities ought to require students to sign a document acknowledging they have read and agreed to abide by the policies and procedures. The ICAI recommends that academic integrity groups or committees comprise representatives from each relevant sector of the university community (i.e., professors, administrators, students, etc.). These groups require clear, written purpose statements and should hold regular meetings throughout the academic year. Moreover, they ought to inform the rest of the university about their activities. Similarly, the ICAI suggests setting aside an annual budget for an academic integrity 'office' or 'designated team', with its own mission statement, job description(s), and dedicated website. Ideally, all its staff will be full time and it will provide regular information-sharing activities. As for academic integrity student volunteer groups, the ICAI

stresses the importance of transparent organizational structures and frequent awareness-raising events that actively reach out to the whole of the university community.

To help guarantee alignment with the ICAI's recommendations and provide our community with the best possible means to learn about academic integrity, eConcordia liaises closely with the university's regulatory bodies, administration, and code administrator. Regular involvement in university-wide Digital Strategy meetings and uploading of links to relevant Concordia policies on all its courses mean that eConcordia plays a vital role in shaping and upholding academic integrity. The university, meanwhile, has established the following bodies: (a) formal and/or university-appointed active academic integrity groups/committees on campus; (b) an academic integrity 'office' or 'designated team' with specific individual(s) assigned to conduct academic integrity policy administration, promotion, and education; and (c) an active academic integrity student volunteer group on campus, distinct from formal groups/committees requiring students' election or appointment.

## **Axis 2: Backward Design to Course Design and Development**

The second axis acknowledges that course development should preferably stem from the desired understandings teaching intends to attain. As such, our second axis involves the adoption of a 'Backward Design' to course development. According to Wiggins and McTighe's *Understanding by Design* (2005), instructors spend most of their time thinking about the content they want to cover in class and how they will do this, instead of focusing on how students will apply this content out in the real world. Wiggins and McTighe also point out that when assessment revolves around the replication of targeted content, it can be perceived as inauthentic, raising the risk of academic misconduct. For example, the objective of a traditional geometry lesson might be to calculate the surface area of 3-dimensional figures. While solving textbook examples may be relatively straightforward, transferring one's understanding of surface area calculations to real-life problems—arguably the ultimate demonstration of deeper forms of learning—may involve a host of complex calculations and careful judgment. A 'backward design' to course development would involve three main steps (McTighe & Wiggins, 2014):

- *Step 1: Identify learning outcomes.* Identify your desired learning outcomes, then craft questions that broaden and deepen students' understanding of key concepts and processes in order to facilitate eventual learning transfer.
- *Step 2: Choose assessment evidence.* Determine the type of assessment evidence that best

documents and validates the achievement of learning outcomes from Step 1. Adopting an assessor's mindset right from the outset invariably sharpens and focuses your teaching.

- *Step 3: Plan learning content.* Plan lesson content (i.e., instruction, activities, and resources) that supports the attainment of your learning goals (Step 1) and aligns with your chosen form(s) of assessment (Step 2).

Thus, within the context of an online history course at eConcordia, 'backward design' looks as follows:

- *Step 1: Identify learning outcomes.* The aim of this history course is to provide its students with a basic knowledge of Quebec's history, social policies, and identity issues. This learning goal is, therefore, clearly communicated to students on the course's landing page and on the course agenda to guarantee process transparency as well as to foster student engagement. By knowing the overall goal of the course, students are able to see how each course activity helps them achieve said goal.
- *Step 2: Choose assessment evidence.* With the learning outcome in mind, a set of assessments are then chosen. Students complete 12 weekly assignments, from which the best-graded 10 are chosen to account for 70% of the students' final grade. The other 30% of this grade are allotted to a final exam. Additionally, students earn bonus points for participating on the course's discussion board. The authentic assignments include readings, analysis of documentaries, exercises on interactive maps, discussions about the meaning of the Canadian anthem in English and French, song sharing exercises, and the like. These assignments cover a wide range of subjects and pedagogical mediums.
- *Step 3: Plan learning content.* For the students to be successful in their assignments, the course needs to equip them with the necessary tools and knowledge that will allow them to engage in meaningful learning. Therefore, as a part of its learning experience and instruction, this course provides students with diverse materials covering topics such as a detailed account of Quebec's history, debates on nationalism, markers of migration patterns, indigenous peoples, race, ethnicity, economy, social mobilization, sports, lifestyle, landmarks, art, and so on.

### **Axis 3: Enhanced Collaborative Learning to Achieve Desired Outcomes**

The third axis underscores the importance of enhanced collaborative learning as a means of minimizing academic dishonesty. Research shows that regardless of the type of assessment, today's students can easily succumb to contract cheating (Bretag et al., 2018; Harper et al. 2018). Collaboration may, however, help ease the pressures found in higher education settings. For example, when students feel part of a community and



are able to ask questions about course content and receive honest feedback, they are likely to take ownership of their learning and feel less inclined to cheat. This is, moreover, grist to the proverbial mill since collaborative learning is often touted as the missing puzzle of 21st-century learning. Given that conversation and collective identity are key to deeper approaches to learning—and that students can achieve more working as a team than by acting independently—collaborative learning can furthermore be implemented at any step of the learning process. For instance, during instruction, we can adopt peer-led instructional practices. During interactions, we can encourage peer-led interactive communication strategies (e.g., interpreting, exemplifying, summarizing, inferring, comparing, explaining). And during assessment, we can incorporate peer and collaborative forms of assessment (e.g., classifying, checking, critiquing).

Although some may feel students will act with impunity in online settings because they are hidden behind a screen, online learners may actually be more given to collaborating with each other for a number of reasons (Mowbray, 2007). Altruism is one. The expectation that cooperation is reciprocal is another. Online collaboration also enhances learners' reputations, boosts self-efficacy, and confers benefits associated with group membership. For this to happen, however, Mowbray states that online communities should establish cooperative norms. Thus, communities ought to set up dedicated hubs in which members can collaborate regularly. At the same time, members must have a say in how collaboration takes place within their community. Mowbray notes that cooperation increases when individuals receive an automatic notification that another member has responded to their messages. It is also enhanced through backlinking and when the effort required to cooperate is minimized, for example, by reducing the number of clicks involved. Other enhancers of cooperative behaviour include group identity and non-anonymity. Online communities foster the former by ensuring their interface has a standardized visual format and that new members receive induction courses. They achieve the latter by blending online and off-line learning activities. Ultimately, however, Mowbray argues that we cannot expect that collaboration in online learning communities will happen of its own accord. In other words, it must be carefully planned.

The collaborations of an online learning community also depend on the quality of interactions between a learner and their instructor, peers, and course content (Prammanee, 2007). According to Prammanee, instructors can nurture learner-instructor interactions in multiple ways. They can post questions to the group, use social cues to prime interaction, and offer help and timely feedback—all of which demand a high degree of planning and organization. Prammanee argues that learner-learner interaction should ideally occur in small groups and be on a weekly basis. That said, for students to interact freely and ask each other course-related questions, students need to feel comfortable with the technological tools we provide them. Also,

learner-content interaction works best when students feel cognitively and metacognitively engaged and the subject matter has direct work applications. Although all online learning communities aim to foster learning and are to some extent shaped by the technology they use, they share other key characteristics. Schwier and Daniel (2007) point out that members of successful communities demonstrate an awareness of other members, the activities they engage in, and the virtual environment they share. They act in accordance with the community's social protocols, and they establish individual historicity (i.e., history and culture) and clear boundaries of identity and purpose. They are also characterized by mutual reciprocation and interdependence, embracing plurality by including groups external to the immediate community while acknowledging the members' autonomy to decide whether or not—and to what extent—they actually engage in community discourse. Moreover, not only do they value social participation, they operate on principles of trust, are future-oriented (but reflect on prior experiences, postings or events), and set themselves apart through the intensity of their online engagement.

As part of its ongoing efforts to enhance collaborative learning across its courses, eConcordia has created a Twitter-style class discussion board with a participation grade that is calculated according to the number of tweets posted (i.e., responses and initiations of discussions). In courses using this discussion board, students have to justify and elaborate upon their tweets, a design strategy that promotes communication as well as collective understanding. eConcordia similarly encourages the use of peer evaluations. By adopting a key role in their own assessment, students become proactive and gain a richer appreciation of how they may be evaluated by the instructor later on in the course.

#### **Axis 4: Multifaceted Mean(s) to Addressing Cheating**

Dealing with academic cheating post facto is neither time-efficient nor straightforward. Accordingly, the fourth axis encompasses a multifaceted approach that targets multiple stakeholders, as well as different time points in a student's online learning experience. According to Dick, Sheard, and Hasen (2008), this approach involves four critical stages: education, detection, consequences, and prevention.

##### *Education: The Teaching Of Ethics and Ethical Behaviour*

It is not enough for students to know how to avoid cheating. They need to know why it is wrong. Anti-cheating initiatives also have to address faculty members, as well as course development and production staff as this results in teaching practices that lessen the likelihood of cheating. For the students, therefore, eConcordia

has recently launched a compulsory e-learner success module entirely devoted to ethics and ethical behaviour in higher education settings. The module includes exercises, case study analyses, and strategies on how to avoid academic misconduct. For the professors, eConcordia holds regular education sessions after each academic term for professors to share and discuss the different types of cheating they are currently dealing with and to provide useful feedback that can influence future iterations of the e-learner success module. Lastly, eConcordia provides professional development to its e-learning course developers via weekly research bites and offers support to its analysis and production teams via interactive workshops on the topic.

#### *Detection: The Implementation of more Efficient Detection Mechanisms*

Faculty members require efficient mechanisms that alert them to instances of cheating. Students may also benefit from access to technology that can pre-empt potential problems before they hand in plagiarised work. To this end, eConcordia has implemented a new in-house plagiarism checker that allows professors, TAs, and students to see not if they have plagiarized from one another. Using the eConcordia plagiarism checker involves the following steps.

- i. *Word ranking.* First, a TF-IDF (i.e., term frequency-inverse document frequency) algorithm is used to rank all the words in a set of assignments, or documents. These words are ranked by the number of times a word has been used in a document and how that compares to the rest of the documents. For instance, if the word 'large' is used quite frequently in a set of documents, then the ranking for that word will be quite low because of its frequency. On the other hand, if the word 'small' is used sparsely in a set of documents—but used somewhat often in a subset of documents—the word's ranking will be high for that set of documents.
- ii. *Document matching.* Next, a K-NN (i.e., K Nearest Neighbor) algorithm containing the TF-IDF scores of the documents is used to find the match between two documents. In technical terms, the K-NN refers to the distance between any two documents: the lesser the distance, the more similar they are. These distances are scored on a range of 0 to 100. Hence, if a distance between Document A and Document B is 80 and Document A and Document C is 30, then Document A and C is more similar to each other than A and B.
- iii. *Locating outliers.* Distances between documents are plotted on a normal distribution model to make an objective judgement about the outliers. Any distances that fall outside the standard deviation t-range are marked as potentially suspect cases.
- iv. *Cross-referencing suspect cases.* The fourth step serves as an additional validation but only applies

to the online quiz system, not the upload system. In this step, in order to check if students have used the same IP, browser session, or device, suspect cases are referenced with the information collected when students took the quiz itself.

### *Consequences: The Imposition and Enforcement of Fair and Equitable Consequences*

Students should know that there are consequences being enforced for cheating. The penalties for cheating may vary depending on the gravity and frequency of the offence. For instance, a first-time cheater might receive a severe warning, whereas a repeat offender could face automatic expulsion if there is clear evidence of premeditated cheating. In the event of suspected academic misconduct, professors and TAs on an eConcordia course are expected to follow the university's academic honesty procedures. (See Axis 2 for further details).

### *Prevention: The Modification of Assessment Measures' Designs And Formats*

We need to design assessments that make cheating hard. We also have to ensure that the costs of cheating outweigh the benefits. To this end, eConcordia courses currently use the following:

- *Videos on 'How to succeed'*. To minimize potential misunderstandings, we recommend professors create videos explaining exactly what their students require to do well on course assignments and exams.
- *Randomized quizzes*. To prevent students from memorizing quiz questions, we create differentiated quizzes using a bank of randomizable multiple-choice questions.
- *Formative quizzes*. To increase the amount of formative assessment and test-taking practice, we include quizzes that can be taken multiple times and for which students can select those they score highest on.
- *Quiz timers*. To identify outliers with regards time taken to complete a quiz and thus prevent the quick copying and pasting of answers, we have introduced quiz timers.
- *Subjective / open-ended tasks*. To add variety to quiz and test formats, we include some subjective or open-ended tasks, even if these impact TAs in terms of grading rubrics and workload, not to mention student workload.

- *Personalized assessments.* We include these as it is harder to contract cheat on highly personalized assignments (e.g., asking students to video their self-reflections).

## Conclusion

For some, it may be tempting to make swift pronouncements about how cheating is endemic to or exacerbated by online learning. As we have argued, however, academic misconduct is neither new nor an inevitable consequence of e-learning. The suggested holistic approach to addressing the issue of cheating in higher education is a complex undertaking that requires an understanding of the affordances of teaching and learning. It also calls for concerted efforts from students, faculty, and the university at large. As such, eConcordia understands that the approach is part of an ongoing, iterative process. It recognizes that maximizing the impact and effectiveness of the approach will involve a rigorous and potentially costly systematic evaluation process comprising data evaluations and predictive models of anti-cheating initiatives. Furthermore, analysing cases of academic misconduct and plagiarism, designing and administering measuring metrics and key performance indicators (KPIs), exploring behaviours, perceptions and or experiences of individuals who have been exposed to the holistic model, and updating existing anti-cheating policy evaluations cannot be achieved overnight. Notwithstanding the inevitable challenges, eConcordia remains committed to meeting the demands of 21st-century learning and upholding academic integrity as a basic tenet of higher education.

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## Future Ready Distance Educators: A Metacognitive Study

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### Abstract

Changes in higher education through changes in government funding, competition amongst institutions, the increased use of technology and a shift to learner-centred education are leading to changes in the roles of distance education teaching staff. This paper forms part of a larger study which was carried out at the University of South Africa, to determine staff perceptions of the importance of each of their current roles as distance educators and how they think these roles will change in the next few years. In addition, research was undertaken to assess the staff's perceptions of their own competency in each of the identified roles, and their own needs for training to prepare themselves for the futures roles of distance educators. A mixed methodology was employed. Firstly, a web-based survey was sent to a stratified random sample of Unisa academic staff to reflect generational cohorts, colleges, educational levels, length of service at Unisa, gender and various other demographic variables. Key results from the quantitative questionnaire have been published in the Distance Education journal, Vol 39 (1) 2018. The second phase of the project involved conducting semi-structured interviews with staff members, ranging from relatively inexperienced teaching staff to older more experienced academics, as well as regional support staff. This paper presents the findings from this second phase. Purposive sampling was used to identify a sample that was representative of the population of academic staff at the University of South Africa. The interviews were recorded using the LiveScribe Smartpen. All interviews were transcribed, and an analytical thematic analysis was undertaken using the Atlas ti software program. The main theme that emerged was the participants' anxiety about the rapid pace of their changing roles, and their ability to cope with the new demands being made on them. An additional finding, not related to the research questions, emerged. The participants acknowledged that self-directedness is an attribute that is necessary for preparing themselves for the future roles. In addition, all the participants indicated that they found the interview process to be deeply helpful from a metacognitive point of view – in their busy academic schedules, they seldom have time to think about the future direction of their roles as distance educators and through participation in these interviews, they were able to so.

**Keywords:** Distance Educators, Metacognition, Future Roles, Self-directedness, Technology

## Introduction and Background

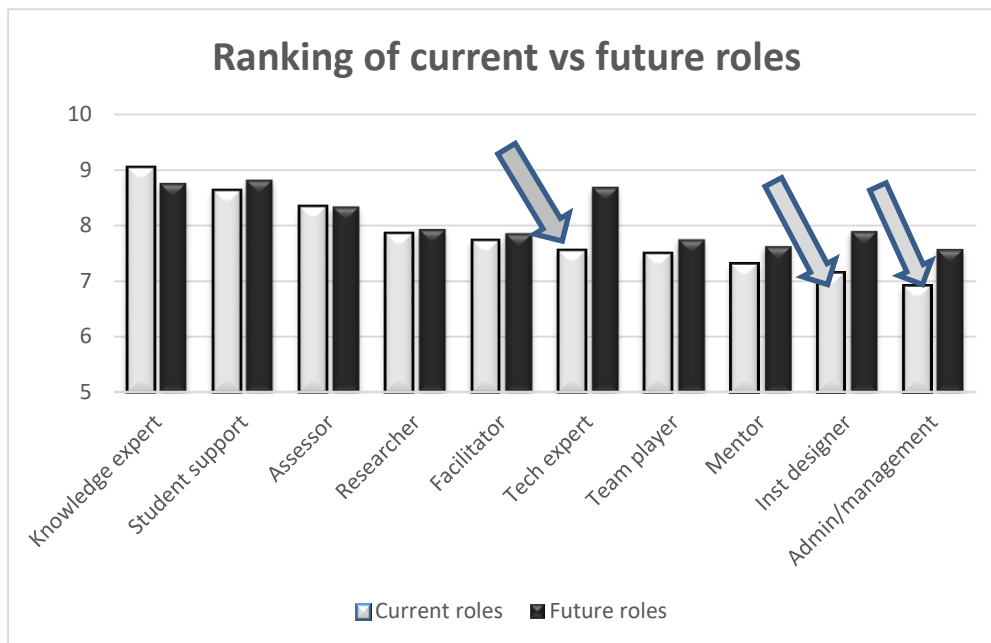
As part of a larger study on the future roles of Distance Educators (DEs), this paper follows on from previously published results of a content analysis of Distance Education (DE) roles and a quantitative survey that was sent to all teaching and research staff at the University of South Africa (Unisa). Roberts and Bezuidenhout (2017) identified, through a content analysis of seminal research on the roles and competencies of DE teaching staff, 10 significant roles (see Table 1).

Technology expert
Instructional designer
Administrator/manager
Assessor
Mentor
Team player
Facilitator
Student support
Researcher
Knowledge expert

**Table 1: Roles for distance educators (Roberts & Bezuidenhout, 2017)**

In a follow up research article, Roberts (2018) carried out a quantitative survey using a self-designed questionnaire among the teaching and research staff at Unisa, one of the top 10 mega universities in the world. (Daniel, 2012). In this research, she investigated the importance of each of the above roles according to the academic (teaching and research) staff, both in their current jobs as well as in the next 5 years. In addition, the respondents were asked to rate their perceived competencies in each of the roles as well as to identify areas of professional development that they require in order to fulfil the future roles. Figure 1 shows the results of the questionnaire with respect to the statistical analysis between the ranking of importance of the current roles versus the future roles.



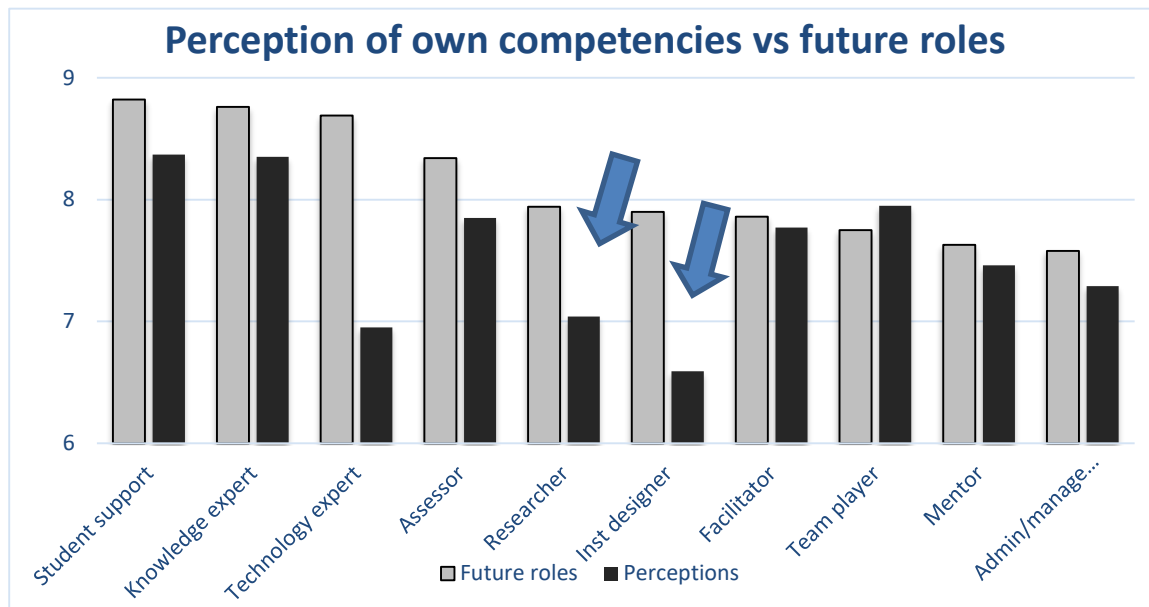


**Figure 1: Ranking of importance of current versus future roles**

Statistically significant results were found between the roles of technology expert, instructional designers and administrator/manager. These 3 roles all indicated a higher ranking of importance in the future compared to currently. Although a significant result was found in the role of administrator/manager, the respondents ranked this role to be the least important. An important note here is the finding of Hulsman, Makoe and Zawada (2016) that administration tasks take up 22% of work time of teaching and research staff in the College of Human Science at Unisa. A gap analysis was performed to assess the differences in the staff's perception of their own competencies and the importance of their future roles.

Once again, the roles of technology expert and instructional designer showed a statistically significant difference between perception of competency and importance of the roles in the future. Here the research found that in the roles of technology expert and instructional designer, the respondents felt that they needed further training for them to fulfil these future roles.

Against the background of the results presented in Figures 1 and 2, it became important to explore these findings in greater depth through a qualitative unpacking of the importance of the roles for DErs. The aim of this article is therefore to report on the findings of one-on-one interviews that were conducted among DE teaching and research staff at Unisa.



**Figure 2: Ranking of perceptions of own competencies versus future roles**

## Literature Review

A full literature review on the roles and competencies of DEs was carried out in the previously published articles from this project (Roberts & Bezuidenhout, 2017; Roberts, 2018). Additional findings from the qualitative interviews suggest that fear of behaviour changes due to new technologies, self-directedness and metacognition have emerged as important concepts.

- Future roles for distance education staff and the fear of technology

Anderson (2016) is of the view that educators are continually grappling with how to integrate pedagogy with emerging learning technologies in their own teaching. This necessarily involves a change of behaviour from the educator. Ross and Collier (2016) refer to this as “threshold concepts”. Two of these thresholds are identified by McGowen (2012:35)

First, they may have a preconception that technology is merely an add-on, not an integral part, of teaching: and, second, they believe that they should know exactly what they are doing before using new technology in the classroom, resisting a period of experimentation, or even play, that other find helpful when teaching with technology.

Ross and Collier (2016) assert that some educators will embrace these new technologies and incorporate them into their own practices. However, the roles of the educator in online learning remains contested and is dependent on the educator's own beliefs and philosophies, as well the intuition where they teach. This has led to a confusion of the roles that are required, particularly with the emergence of online learning and the increased use of technology in teaching.

An added confusion for DE teaching staff is that they are already distanced physically from the learners (Moore, 2003) and according to (Smith, 2012; McWilliam, 1996) the physical body plays a major role in the classroom in terms of creating the instructor identity and relationships with the learners and they are seen as far more than merely transmitters of knowledge. This role for the educators could well become extinct in the digital teaching space and create feelings of confusion, resistance to change and insecurity for the educators. Mason (2008) argues that educators should focus on emergent situations, such as the integration of technology as a new role for teaching staff, and this emergent situation should encourage new behaviours.

- Self-directedness

This term was first coined by Knowles (1975) and refers to one's own personality trait of self-determination and the ability to regulate and adapt your own behaviour to the demands of a situation in order to achieve personally chosen goals and values. Knowles (1975) describes "self-directed learning" to be, "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating their learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes"

- Metacognitive and reflective process in distance education.

Metacognition can be defined as "thinking about your own thinking" (Flavell, 1979). The term metacognition was first mooted by Johan H. Flavell in 1979 and his theory developed to include one's thinking about your individual process of planning and assessing your own understanding of different concepts.). According to Flavell, "metacognition refers to one's knowledge concerning one's own cognitive processes, or anything related to them, e.g., the learning-relevant properties of information or data" (Flavell 1976: 232). Flavell (1979) states that metacognition consists of both metacognitive knowledge and metacognitive experiences. Metacognitive knowledge talks to acquired knowledge of one's cognitive processes, which can be used to govern your own thinking processes. Flavell (1979) further divides metacognitive knowledge into four categories: knowledge of person variables, goal variables, task variables and strategy variables. Metacognition refers to a range of acts that call for thinking about thinking. One of these, labelled as self-

reflectivity, refers to thinking about one's own thoughts and feelings, in line with Flavell's knowledge of person variables. Intrinsic to auto-ethnography is the cognitive self-reflection of experience.

In the process of this research, an unexpected extra dimension emerged from the interviews. The participants were able to reflect on their own teaching and pedagogical styles and in many of the cases, the interviews provided an opportunity for thinking about their practice. A metacognitive process was (unintended) provided to the participants.

### **Methodology**

Following on from the quantitative study of Roberts (2018), Phase 2 of the research aims to unpack and further investigate the above results. In order to obtain more rich and personal information, this phase of the project was undertaken through semi-structured one-on-one interviews with selected participants. The reason for this was to further probe and contextualise the finding from Phase 1 of the research.

This qualitative phase of the research is grounded in an interpretivist paradigm. This paradigm offers an alternative model for conducting research in a social setting. The use of the alternative paradigm enables the researcher to gain insights into different phenomena through an insider view, as the researcher is fully involved with the person being researched. Phenomenology is an inductive qualitative research tradition rooted in the 20th century philosophical traditions of Edmund Husserl (descriptive) and Martin Heidegger (interpretive) (Reiners, 2012). This phase of the research followed a descriptive phenomenological methodology. For the interview part of the research, purposive sampling was used to identify representatives from each of the Unisa colleges, age cohorts according to generation and gender and experience as a distance educator. Initially it was decided that interviews would be conducted with 12 academic staff members with the proviso that once data saturation had been reached, the interviews would cease. Data saturation was found after interview number 9.

The interviews were scheduled for 45 minutes. A gate keeper was asked to contact via email the possible participants and invite them to participate in the study. The researchers conducted the interviews themselves as they preferred to immerse themselves in the data from the beginning. This also allowed them to read non-verbal signs and make notes of significant observations during the interviews. The interviewers requested permission from the participants to record the session while taking notes at the same time. In all cases, the participants granted permission for the interview to be recorded. Each interview was transcribed by an independent transcriber and presented to the researchers in a word document format.

Data analysis was conducted through the software package Atlas ti. Table 2 represents the varying profiles of the participants in this study. This research followed Giorgi's (2009) explanation of the data analysis process. Firstly, the transcripts were read through. Then individual units of meaning were marked and coded. The units of meaning were then transformed into "psychologically sensitive" meaning units.

Respondent number	College	Academic Role	Years of experience in Distance Education	Gender/Race	Age bracket
1	Human Science	Full professor	30+	White/male	61+
2	Human Science	Associate professor		Black/male	
3	Technology support	Director	5	White/ female	31-40
4	Law	Full professor	5	Black/female	41-50
5	School of business management	Associate professor	8	White/female	51-60
6	Senior lecturer	Education	3	Black/male	31-40
7	College of graduate studies	Researcher	5	White/female	31-40
8	Lecturer	Agricultural science	15	White/female	51-60
9	Lecturer	College of Human Science	3	Coloured/female	31-40

**Table 2: Participant profiles**

## Results

The aim of the qualitative analysis was to further unpack the roles that were identified in the 2 previous articles (Roberts & Bezuidenhout, 2017 and Roberts, 2018) where 10 roles were identified and reported on. In this previous research, the importance of the roles of technology expert, instructional designer and administrator/manager were identified as becoming the most important for distance educators in the next 5 years (Figure 1). In addition, DErs' perceptions of their own competencies in the roles of technology expert and instructional design had the lowest rankings and were identified as potential areas for further training. (Figure 2). In both figures, the role of a knowledge expert/subject specialist is ranked highly.

In the qualitative analysis, 5 codes emerged strongly, and these can be directly linked to some of the roles identified in the previous 2 articles. These roles are: bureaucratic administrator, subject specialist, Ode

technologist, researcher and finally, not necessarily a role but an attribute that is an enabler of enhancing the roles, that of a self-directed learner.

### *Bureaucratic Administrator*

This code refers to the DER fulfilling the role of an administrator in a bureaucratic environment. This role has been found to be quite prominent within a DE context (Hulsmann, Makoe & Zawada, 2016). Although these processes are crucial for the purposes of quality control and assurance, they tend to take up a lot of the DERs time, which could have been spent on more prominent roles, such as conducting research or writing of papers that will be more beneficial for both the academic and the institution (Paewai, Meyer, & Houston, 2007). It was noted that many DERs tend to complain about the tedious administrative component associated with being a DE scholar and that this tends to take away time that would have been better implemented elsewhere. Furthermore, it was indicative from the discussions that the administrative duties associated with various roles will not seem dissipate, rather it was predicted that an increase of administrative duties will occur when the institution changes to a fully online model of teaching and learning. Below are the reflections from DE staff members:

*“I think the biggest challenge currently in academia is the over regulation. The simplest tasks are absolutely marred by red tape and forms and things like that, which is understandable in terms of quality control and trying and things like that. But, I feel that I do too much of that and I do not have time for research and teaching because admin takes up all my time.”* (Participant 1)

*“It should not be, I came to [Distance University] straight from [Full-contact University] within the first 6 months I kind of felt home sick and I remember I said “I am not sure if I am still a lecturer or an administrator” ...because there is a lot of admin in ODeL.”* (Participant 4)

*“The other role, you know I am not the administrator. But I find myself doing a lot of admin work and when students are complaining that they did not get their mark. Which is not actually my duty that is something that is done by the exam section, or the student is registered but on the system is only say that they are only provisionally registered so the student do not know if they are registered or not.”* (Participant 4)

The above-mentioned quotations voice DERs’ concerns regarding the administrative workload in an Open Distance Learning (ODL) environment. It is evident that the administrative component associated with the various work roles tends to become overwhelming to the DERs, in that they are expected to adhere to the bureaucratic university structure in assuring quality control. Administrative work seems to be associated with

various role functions related to the key performance areas concerning an academic's roles within the university, so much so that the most *"simplest tasks are absolutely marred by red tape and forms"*. whereby the academic would not have sufficient time to focus on more productive tasks Furthermore, DErs started questioning their core functions within the institution due to the mass amount of administrative workload associated with their daily tasks and suggested that they would require administrative assistance in order to ease the administrative workload:

*"I think as we have specialists in technology helping us how to teach, so we have specialists in administration, so I think we need more help in term of that from secretarial staff and also from students helping as research assistants. Then you can focus on your expertise and subject knowledge."* (Participant 1)

*"I feel more admin is coming back to the lecturers and we worry more about what needs to be done and we are being shifted away from the core about what we should be doing. I think more support need to be given to helping and supporting the academics with admin."* (Participant 2)

Participants suggested that support needs to be provided through the appointment of staff whose core function would be to assist with administrative duties.

#### *Knowledge Expert/ Subject Specialist*

As with conventional teaching approaches in the Higher Education (HE) sectors, the DEr is expected to be knowledgeable within their particular field of work/study. This code refers to the role, among many others, as the DEr owning the role of knowledge expert or subject specialist. This incorporates the process of being able to teach within the field of knowledge. These DErs have indicated that they should also be involved with research processes within the particular field of knowledge and to ensure that they remain up-to-date with the latest trends and niche areas within their field of speciality. DE teaching and research staff are expected to develop their own personal learning environments through which they collect and integrate new knowledge in order to ensure a proactive lifelong learning mindset that will ultimately keep them abreast with new developments in the subject, pedagogy and learning related technology that is related to the distance education environment (Shaikh & Khoja, 2014):

*"You have to know your subject and that is not all, you have to know how to teach your subject... I am not only a researcher, I am also an educator and I have to know my subject and how to teach my subject in order for students to learn... although there is always new developments so I feel I am a subject specialist."* (Participant1)

*“For me number one would one is a subject specialist, because I regard that the core of what I should to teaching and equipping students and if we lose that as the centre of what we do and simply become a research centre...I think we will lose what we are supposed to do, the transfer of skills and yes research is important because we need to equip ourselves and get cutting edge information to develop materials and that research is needed and it is important.” (Participant 2)*

*“Well, first thing that come to mind is that I think they must be relevant in their discipline and that could mean they must keep abreast with the latest information and obviously translate that back in their teaching so the students to hit the ground running.” (Participant 3)*

*“And another thing that complicate matters further, is with me...I am a subject specialist in this, but when it comes to my own research, my research goes beyond my own subject. I teach corporate law, but the research that I do is on corporate criminal liability. So it is aspects of corporate law and aspects on criminal law. So when I have time to work on my own research I am getting more knowledge on that other field and not as much on my own field of research.” (Participant 4)*

*“...but more importantly is subject specialist, I have to know my subject, before I can teach and teach it in a technological way. So I will have it subject specialist, technology, facilitation skills and mentoring skills. So that would be the order of importance to me and yes where the pastoral care comes in, in between, all over the place.” (Participant 5)*

The above-mentioned reflection from DEs depicts the importance of their role as a subject specialist. This knowledge base is necessary to fulfill the additional roles of being a researcher, teacher/lecturer, and content developer amongst many others (Cornelius & Higgison, 2000; Muñoz Carril, Sanmamed, & Hernández Sellés, 2013; Varvel, 2007). From a metacognitive perspective, DEs described that they do not envisage that their role of a subject specialist will alter or become of lesser significance due to the rapid changing pace of DE, but rather that the role of knowledge expert/subject specialist would prevail due to the significance regarding the knowledge base needed in order to fulfill the other aforementioned roles.

#### *ODL Technologist*

A more specific role that the DEs tend to specifically adhere to within the DE realm would be that of an ODL technologist. This particular code refers to the work presented by Shelton (2014) whereby two core components known as “core technologies” and “marginal technologies” are discussed. Core technologies



would refer to the use of core software programs that are usually implemented by any educator (e.g. PowerPoint, Word, and Excel). Marginal technologies consist of more specialised programs implemented by a much smaller group of academics that relate to specific roles. With this in mind, DEs need to be familiar with certain technologies or platforms that would be utilised specifically to the context of ODL in ensuring that they would be able to fulfil their roles as DEs and be able to keep up with the “internet of things” related to DE:

*“In terms of ODL...I think it is more a move towards utilising technology more, engaging with students through online and there are a number of ways it can be done. Either through social media, Facebook, via My UNISA, the post or other platforms. Where students can be learning, even the podcasts. There is a module now, where I have been using podcasts to break that gap...The students are able to hear a voice behind that which they are leaning. I think this is a way of bridging the gap and making the transition towards ODL.” (Participant 2)*

*“It is difficult for me to answer right now, because many of the things I am doing...If I think of the things that I am doing with MOOCs and with open source and broadcasting knowledge, I think definitely the ICT knowledge is what I would like to gain.” (Participant 3)*

*“In a ODL context, as long as we are working with these technological tools, I think in each in every department, we should be sure that all colleagues are able to engage together as a group and knowing how to use them and why we are using them and what we are trying to achieve. How are we going to use them in order to inform teaching and learning...How to use blogs, you know and those other software’s....” (Participant 6)*

*“No, but you must have knowledge of technology and know how to use the technological resources. When you say you are a technology expert, it means you may be fixing or you may be a technical expert. It may be including things that is irrelevant to your job description. Your roles is just to know how to operate them.” (Participant 6)*

As mentioned in the above excerpt, the participants indicated that there is a clear difference from being a technology expert and an ODL technologist. Some examples described by the participants are inclusive but not limited to use of podcasts, social media, online university platforms and MOOCs. DEs do in fact show some capability of applying these forms of communication, however, it important that they would be able to apply these technologies in order to accommodate their roles. Moreover, it was evident that DEs have a metacognitive reasoning approach to how they envisioned roles in the future:

*“But not just for dissemination, but for embedding it into teaching and learning material. I think that is where we are heading and I think the focus for a lot of staff and academics in higher education, needs to be now on upskilling around ICT infrastructure, putting together MOOCs, putting together OER’s. But not simply to create them but to embed them into their teaching and learning practices. So I think that particular skill is going to become quite prolific in the next few years in distance education.” (Participant 7)*

*“The technology enhanced aspect of being a researcher is going to become quite prolific in the future. A sound understanding of systems, of ICT infrastructure, just understanding the online space better, I think that is where our role is going to be more prolific in a few years’ time. I think our move from facilitation to online facilitation is going to be important and the skill to know how to use webcam, podcasts, webinars and create OER’s.” (Participant 7)*

In conclusion, the DE therefore tends to understand the holistic aspect related to the use of technology in the ODL process, in order to convey their subject matter.

### *Researcher*

One of the most prevalent DE roles, as found by Lentell (2003), is that of a researcher within their respected field of interest or discipline. This might be associated with the fact that universities expect all teaching and research staff to be involved with some form of research in order to develop and maintain their academic integrity and to keep abreast with the latest research specific to their discipline and field of study. All teaching and research staff are expected to conduct research, however, it was evident that due to the workload experienced by the participants, they are now forced to cut back on their research interests and focus on their main role as a DE that carries a heavy teaching and learning load associated with the title:

*“It has shifted over the years...I think previously my main focus was on research and it was due more to the fact that I was fixed on content, I was in but you was not fully in. So my focus in that point was more on research but not teaching.” (Participant 2)*

*“I regard research as very important, but at the same time, when I see an email, where a student is trying to contact me where they have a question. It is not possible for me to say, I will answer tomorrow.” (Participant 4)*

*“Now in ODL I am a senior researcher in IODL, but initially my research was in mathematics. But now, I am changing the focus, that is why I saying that I am looking at the profiling of mathematics”*

*teachers in digital era. So meaning here at [University] how do we profile mathematic teachers for them to go and teach out there. Because there is this outcry which is that school have challenges with teachers that are trained our institution.” (Participant 6)*

*“And now the focus has shifted away from student support, with a stronger emphasis on research and not just on student support, but also on best practices in distance education, open educational practices and open educational resources. So for the focus was moved from the backend to the frontend, now as far as the student support services go.” (Participant 7)*

*“Yes, I am involved in a research project that has to do with child and adolescent psychology.” (Participant 8)*

*“Yes, I think you need to be competent in knowing the research process. If you are an expert in the topic the student is doing their research, that is a plus.” (Participant 8)*

*“Yes, I am definitely a researcher. I have two funded projects from the NRF.” (Participant 9)*

*“Yes, that is very important, I also think every academic in a distance...or any academic in a teaching position as well, that is not purely research, needs to do some research and some reflective research probably regarding their teaching methodology’s or rather pedagogies.” (Participant 9)*

With the above section it was clearly portrayed that DErs have a major research component associated with their roles within the DE process. These research processes they find themselves in tend to be related to their own field of specialty or discipline. Some of the research processes that DErs are involved with are related to the ODL context as they have indicated that their studies relate to student success within the DE environment. The analysis shows that the participants feel that DErs should have a sound understanding of the research process in order to conduct credible and relevant research within their respected fields. As indicated by Roberts, (2018) and Roberts & Bezuidenhout, (2017), research based on DE students and staff forms part of the institution’s mandate. Furthermore, they established that the role of research remains one of the key components for both the current and future roles of distance educators.

### *Self-Directed Learner*

This code refers to the participants indicating that the onus would rest on them to familiarise themselves with the technologies used within the context of DE. The participants were all familiar with the roles and the

knowledge that they are expected to fulfil within the context. Although the university does allow training opportunities in the form of workshop opportunities and Massive Online Open Courses (MOOCs), the teaching and research staff find themselves in a space where they need to set time aside to familiarise themselves with the tools used within the academic context:

*“That is a question of learning from others and secondly becoming use to reading enough to learn what is available and take focused and structured steps to self-directed learning. To know what I have to do to stay on top of things.” (Participant 1)*

*“Yes, there should be a need to continuously develop yourself and explore the tools available.” (Participant 2)*

*“...well they should be learning themselves...I don’t know if they know this...and that does not necessary mean doing research but I think especially in the ODL environment there are so many tools and things available that could really make their own lives easier and they could pick the quality of their teaching in the ODL environment if they just read a little bit or start a google search to discover something, they should be lifelong learners” (Participant 3)*

*“Just to go back with everything to go back with everything going online and in my ideal world. In my ideal world I would not see everything in that way, but I do think that is the way the world in going. For me it made many opportunities available, for me studying through an overseas university would not been available previously, the content would not be as available or relevant. But the problem in a developing country context how do we reach all our students via technology?” (Participant 3)*

*“It speaks to your locus of control, yourself as locus of control, not your employer, yourself, not your employer, you have to make it work, you yourself.” (Participant 5)*

*“Another component involved with distance education is a lot of self-studying. It is not always me, because I am involved in so many modules, I think it is impossible for me to present on all the material in each and every module. If I was maybe involve with 3 modules, I could do that and have course content instead of the student only doing self-study and coming to me for queries or not understanding this or that.” (Participant 8)*

## Discussion and Conclusion

Four important roles emerged from the interviews with the participants and these roles are aligned with the most important of roles found by the previous study of Roberts (2018). A negative role that takes a large portion of the DE's time is that of bureaucratic administration. Administration will always for a substantial component of any work role but the fact that it features so prominently in this analysis, is a cause for concern. Academic teaching and research staff are appointed because of their primary discipline expertise, stemming from years of study and research. It would therefore seem wasteful that their time is spent on the high levels of administration that they encounter, rather than on their unique academic contribution.

This ties in with the finding that being a knowledge expert in their specific field, is one of the primary roles for which a DER is appointed. This is not unique to Ders but to all teaching and research staff in HE. Your first and foremost role is to impart subject knowledge to your students – no matter which tools of communication you are using. As ODL moves from a predominantly correspondence model to one that uses digital technologies, teaching staff find that becoming an ODL technologist is taking on a much more important role, one that encompasses a change in behaviour and not all staff are ready for this change (Ross & Collier, 2016). A distinction was found in the analysis between “core technologies” and “marginal technologies” as put forward by Shelton (2014). In the case of DERs, “core technologies” are required in order to communicate with students. The fear of many of the participants was that they need to become technology experts and be adept with “marginal technologies” and this causes fear of the unknown. Here, one could bring through the Swedish concept of “Lagom” meaning just enough. How much technological knowledge do you need to fulfil your role? How much is enough? We would argue that the “core technologies” of the use of software programs for communication is enough and that you do not need to be a technology expert, but a proficient user of appropriate technologies.

Research forms a key performance indicator of the DERs' job and is thus an important role that needs to be fulfilled. This study shows that the participants acknowledge the importance of the role of a researcher, but express frustration that teaching and administration seem to take precedence, leaving little time for meaningful research to be carried out. An unexpected finding emerged which highlights the importance of the qualitative process of research. The participants all reflected on the need for a self-directed approach to preparing themselves for their future roles. They realised that they need to take responsibility for their own training and learning and that each of them have unique requirements and areas of development. Most importantly, through the process of metacognition that was provided to them through these interviews, they can carry out reflexive thinking and identify their own future development needs.

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## The Impact of the Socio-Affective Variables in the Online Student Trajectory of the Instituto Profesional

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#### Abstract

Higher education institutions need to design innovative strategies to support students online. The IACC Professional Institute, a unique Chilean institute that offers 100% online programs, has more than 15,000 students and over 4000 graduates. In early 2018, IACC launched the Socio-affective Support Unit (Unidad de Apoyo Socioafectivo in Spanish), which is a co-curricular innovation focused on positively influencing the wellbeing of students during their educational trajectory in order to improve rates of progression and graduation. The function of the Socio-affective Support Unit is to assist students who may have issues adapting to emotional or affective situations, which may jeopardize the continuity of the student's academic programs. It also provides professional psychological, socioeconomic or other support to those students as needed. The Support Unit comprises a multidisciplinary team of professionals including psychologists, social workers, complementary or alternative therapists, psycho-pedagogues and administrative supporting staff. The team studied the causes of student dropout, during a period of eight months. Results from the study explain gaps in prior knowledge. However, the most relevant finding was that the leading cause of dropout was related to sudden changes in a student's personal life, such as well-being and socio-emotional imbalance, which makes them feel unable to make the right choices. In most cases, such results are associated with a circumstantial imbalance that could be reversed with the support of a professional team committed to the student's well-being. This paper will report on the socio-affective variables that affect students as well as the corresponding intervention strategies used by the specialists to address the issues. As a result of such interventions, 332 (48.6%) of the 683 students who had dropped out, were re-admitted or decided to continue studying, achieving a decrease in student dropout rates. This paper highlights how appropriate interventions can promote a better quality of life in students, enabling them to achieve their academic goals.

**Keywords:** Online Education, Socio-affective Variables, Student Abandonment, Retention, Academic Trajectory, Socio-affective Intervention Strategies.



## Introduction

In recent years, the relationship of the socio-emotional dimension in academic indicators has been demonstrated. According to (Berger, Alcalay, Torretti & Milicic, 2011; Caso-Niebla & Hernández-Guzmán, 2007), some socio-affective aspects in students have an impact not only on indicators of well-being and mental health but also promotes students' academic performance. In the same way (Elias and Hynes, 2008; Jiménez and López-Zafra, 2009), shows a relation between academic and social achievements and emotional characteristics.

On the other hand, Himmel (2002), states that the student's retention phenomenon and the abandonment of studies, this last defined as the tenacity of students in a higher education program to achieve their degree, can be analyzed from a conceptual perspective model involving psychological, sociological and interactional elements. Such is the case of the Spady(1970) Model, which suggests that low support of social relations, the family environment, among others, affects the level of social integration of the student in higher education institutions, which affects the abandonment or student persistence.

This means that the observation of socio-affective aspects, attitudes, decision making and adopted behaviors used to reinforce social and personal conducts during the learning process appears to be linked to the student's trajectory. In general, the evidence in different educational contexts drives to study these variables and, in online higher education, where socio-affective elements related to anxiety, loneliness, insecurity due to the interaction with technological platforms, among others, could be factors of impact on online student's academic trajectory.

According to this reality, the IACC Professional Institute in Chile, with an online education system and more than 15,000 students of various characteristics and particular needs such as personal, social, work and economic situations, notices the different emotional and socio-affective problems that these students could present during the formative process. Therefore, IACC creates the Socio-affective Support Unit, formed by professionals in areas of Social Work, Psychology and areas of Complementary Therapies. This unit aims to guide and accompany those students presenting social, psychological, affective problems or any other nature that can put at risk the abandonment of their career, by means of socio-affective intervention methodologies, that contribute to the improvement on their quality of life and benefit the achievement of academic goals.

There is also the concern about the results obtained on previous studies conducted by IACC, ("Exploratory Desertion Study Report (2016)", "Abandoners of IACC-2018 Measurement", "Reports on Graduates, 2018 Measurement (Questio)"), analyzing the causes of student dropout from studies, which were more focused

on the study of cognitive and financial variables, which lead to deepen the knowledge about the subject from a broader perspective including subjective variables, such as emotions, feelings and social aspects that may have a further impact on the academic progress of the IACC student.

This article describes the experience of creating and operating the services of IACC's Socio-affective Support Unit, as well as socio-emotional intervention strategies that have improved the well-being of its students as well as the analysis of the impact of such methods throughout their academic career. This first experience in the Chilean context in a completely online institution opens the possibility to continue detecting the causes of student dropout in an online learning scheme, from a perspective different from objective factors, such as financial and cognitive issues, in order to visualize the phenomenon from a deeper approach which includes the assessments of the student's emotional, social and ethical abilities. Thus, it is expected to contribute to future researches in the field of psychological and socio-affective professional intervention of the student within the educational system and its relationship with the progress and academic success.

### **Literature review**

With regard to the subject under study, a literary review in-depth was conducted, of researches that provided the evidence of the relationship between the socio-emotional aspect and interventions on socio-affective variables achieving an impact on academic indicators. Other studies in the European contexts and in the United States (Pianta & Allen, 2008; Roeser, Eccles & Sameroff, 2000); that has developed the meta-analysis of the effect of socio-affective skills development (Durlak, Weissberg & CASEL, 2007; Berkowitz & Bier, 2005; Zins, Bloodworth, Weissberg & Walberg, 2004, among others. However, studies on this topic in Latin America, and specifically in Chile, are scarce (Lara, Pineapple, De Los Hoyos, Navarro & Llona, 2012; Silva, Alamos, Milicic, & Alcalay, 2014). With regard to the above, this study will also provide new evidence to allow the understanding of the relationship between socio-emotional variables and the academic dimension in the Chilean context.

### **Methodology**

To achieve the purpose of this article, a qualitative research approach was followed, according to Fernandez, Baptista, and Hernandez (2006), based on an inductive process (based on exploring and describing); to obtain the perspectives of participants (emotions, experiences, meanings, and other subjective aspects). In this case, it was intended to describe and interpret by means of the narrative design suggested by (Creswell, 2005), the phases for the creation and operation of the services of the IACC Socio-Affective Unit, as well as the reality of the impact of the socio-affective elements in regard to the academic persistence of their students.

Techniques such as documentary analysis and in-depth interview were used. It stands out that even though a qualitative approach was chosen, quantitative data were used to enrich the impact analysis of socio-affective variables in the academic trajectory. The study was attended by members of the Support Unit, who have oriented 683 students, achieving 2,332 interventions up to date.

### *Context*

This study was performed at the Professional Institute - IACC in Chile. IACC is a private institution, unique in Chile that offers all its academic programs completely under the online format. Among its academic offer, there are 38 professional and technical careers organized in five Schools (Education and Transversal Capabilities, Applied Technologies, Industrial Processes, Administration and Social Development). Currently has more than 15,000 students. The Socio-Affective Support Unit is within its organizational structure, which depends on the Academic Vice-Chancellor's Office and aims to support and accompany the student, particular in the development of socio-affective aspects that benefit their academic trajectory.

### **Creation and operation service of the IACC Socio-affective Support Unit**

This section describes the experience of creating the project for the Socio-affective Support Unit. This includes strategies or action plan for its operation and the definition of the process or steps needed to meet the student's service requirement.

### *Action Plan for the Socio-affective Support Unit*

The action plan established by the Support Unit, its elements and processes to provide student care, are defined in seven phases:

- *Awareness*: The Support Unit is made known to the IACC educational community, to establish bonds of trust and to promote the participation of students in the intervention program. This awareness is made to counselors, teachers, coordinators, and school directors.
- *Student Registration*: classification of student's information with difficulties during the academic process.
- *Multidisciplinary evaluation*: allows to identify the problems and students' needs, and to carry out the diagnostic evaluation that can lead to the adequate action plan.
- *Intervention proposals*: defines the different techniques and interventions of the professionals of the multidisciplinary team.

- *Execution of therapies*: a sequence of therapeutic care to which the student will submit prior to his/her consent.
- *Follow-up*: to observe and analyze the behavior of the student during therapeutic intervention.
- *Final evaluation and closure*: related to the evaluation of the student's experiential process which originates a closure report to determine the evolution and recovery.

### *Formative trajectory and problems categorization*

The formative trajectory of an IACC online student will be defined in three milestones, these are the admission, progress, and graduation. It should be noted that graduation is the pre-qualification stage where a final examination is required.



**Figure 1. The formative trajectory of an IACC student.**

The categorization of socio-affective problems of IACC students was based on:

- a) Analysis of previous researches conducted by IACC about causes of school desertion, retention analysis and satisfaction analysis of graduate students.
- b) Focus group with counselors, performed through direct contact with the student and based on his/her perception and experience, the problem can be categorized from the students' sample.
- c) *Socio-affective intervention strategies of the IACC student*
- d) Intervention strategies refer to the way which student's cases are addressed which reveals some emotional-affective problem related to personal, financial and/or social experiences. These strategies are *effective communication, social intervention performed by the social worker and the application of complementary therapies*. Therapies include floral therapies, Reiki, Ho'oponopono; other therapeutic activities such as guided meditations, conscious breathing techniques, positive words and reality building among many others.

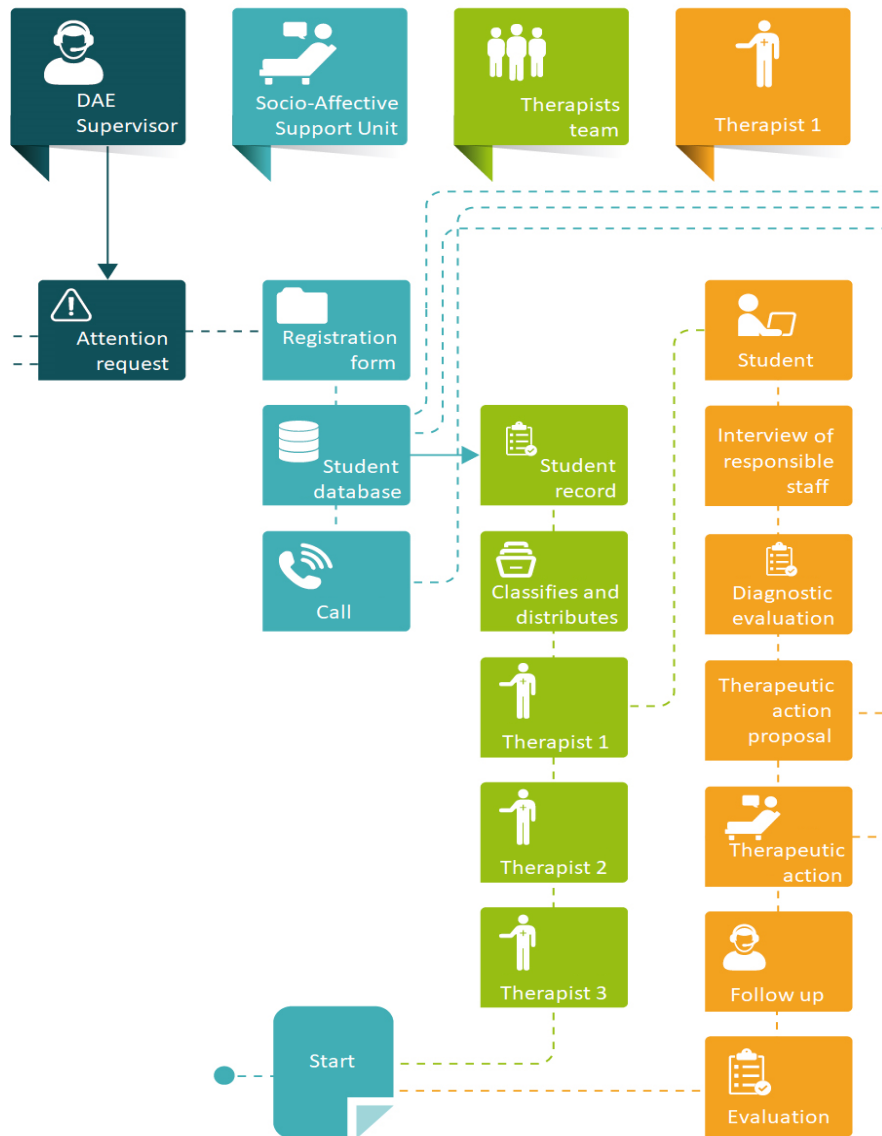
<b>Problem</b>	<b>Reason for Consultation</b>	<b>Description</b>
<b>Burnout</b>	Overburden of commitments	The student expresses a constant overload of commitments
	Demanding academic process	The student expresses that the academic requirement is too high
<b>Self-esteem</b>	Capacity insecurity	Student repeatedly feels that he/she fails to demonstrate his/her learnings
	Feeling inferior in the academic process	The student constantly doubts about his/her academic competencies compared to fellow students
<b>Distrust</b>	Distrust on format	The student is often distrustful of the study method
	Distrust of the institution (teacher, counselor, etc.)	The student is often distrustful of various institutional aspects
<b>Organization</b>	Time managing issues	The student constantly refers that he/she fails to organize his/her time to study and fulfill other obligations in life
	Lack of student's flexibility	The student shows excessive rigidity to adapt to the conditions of the study online format

**Table 1. Example of the categorization of the socio-affective problems of an IACC student**

### *Student service process flow*

The following process flow refers to the steps to be followed by a student in order to obtain a socio-affective care service provided by the Support Unit. The following are the ways that the student can access the support service:

- a) By contacting the corresponding counselor of the Directorate of Student Affairs (DAE).
- b) Through the teacher, who may report the situation to the School Director, who in turn will be responsible to report the case to the Support Unit.
- c) Spontaneous demand, the student will fill out an online service application form sent directly to the Support Unit.



**Figure 2. Stages for student care or service at the IACC Socio-Affective Support Unit**

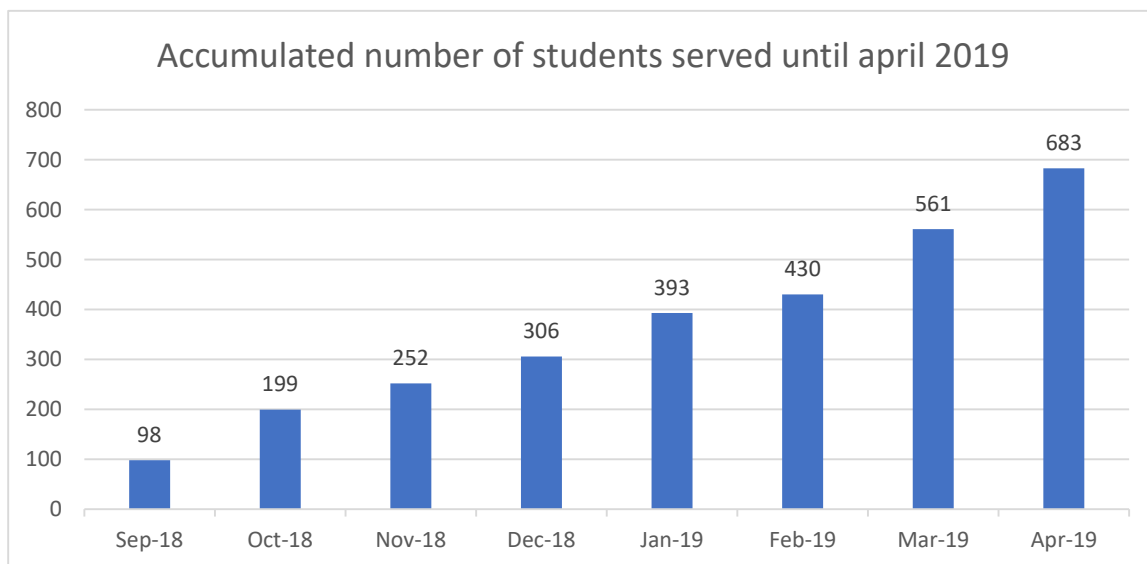
Once the service has been requested using any of the above mentioned accessing methods, the steps to be followed by the Support Unit are summarized as follows: a) the student is registered in a file which, depending on the type of issue, is classified and distributed to the corresponding professional (therapist); b) the student moves on to the interview phase with the responsible therapist, who will perform the diagnostic evaluation; c) the professional proposes a therapeutic action; d) If the student accepts he or she will continue with the therapeutic action; (e) follow up of the case and f) evaluation and case closure is carried out. The process is graphically presented below (Figure 2).

## Results

Once the stages of the research have been completed, the first accomplishment is the description of the creation and operation of the services of the IACC Socio-affective Support Unit, which is detailed in Section 3. Also, after obtaining the various data from the Support Unit conducting, accessing to documents, as well as analyzing the results of the satisfaction surveys applied to students when closing the case, it is possible to demonstrate the impact of the socio-affective intervention strategies regarding the student's academic trajectory, evidenced by: *the retention of students oriented by the Socio-affective Support Unit; the level of student satisfaction under the care of the Socio-affective Support Unit and the analysis of the academic progression of the student under the guidance of the Socio-affective Support Unit.*

### *Students retention under the care of the Socio-affective Support Unit*

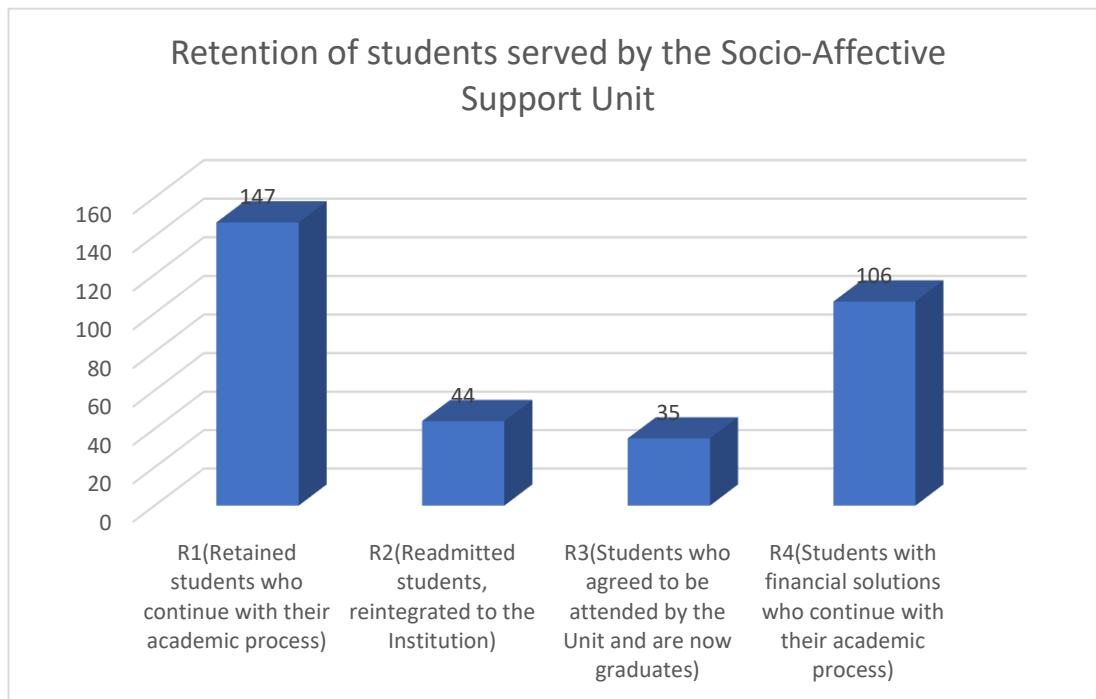
As shown in Figure 3, from the starting point of the Support Unit Services (September 2018) until April 2019, a total of 683 students were attended, accessing through the different method previously mentioned



**Figure 3. Students served by the Support Unit, up to April 2019. (monthly accumulation)**

From a total of 683 students attended, 332 students remained to study in the institution, which equals to 48.6% retention of the total students served.

As shown in Figure 4, from a total of 332 persistent students at the institution, 147 students (44.3%) continue their academic process; 44 students (13.2%) were readmitted or reintegrated into the institution; 35 students (10.5%) finished their studies or graduated from the institution and 106 students (31.9%) found a financial solution to continue the academic process.



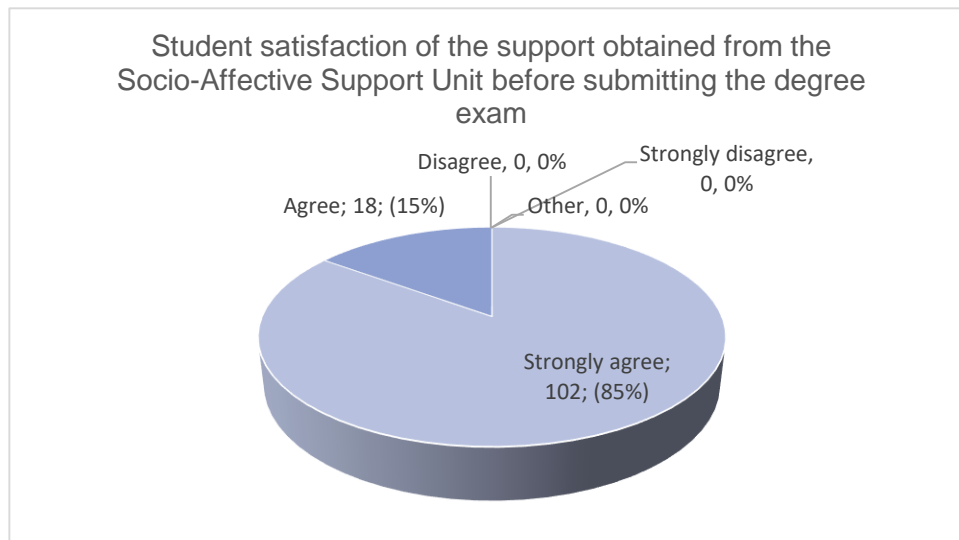
**Figure 4. Retention of students served by the Socio-Affective Support Unit-IACC**

*Student satisfaction surveys on the received service by the Socio-Affective Support Unit*

As from the moment that a student case is closed, satisfaction surveys are applied by the Support Unit. Some of the results obtained on the service satisfaction survey are represented in the figure below.

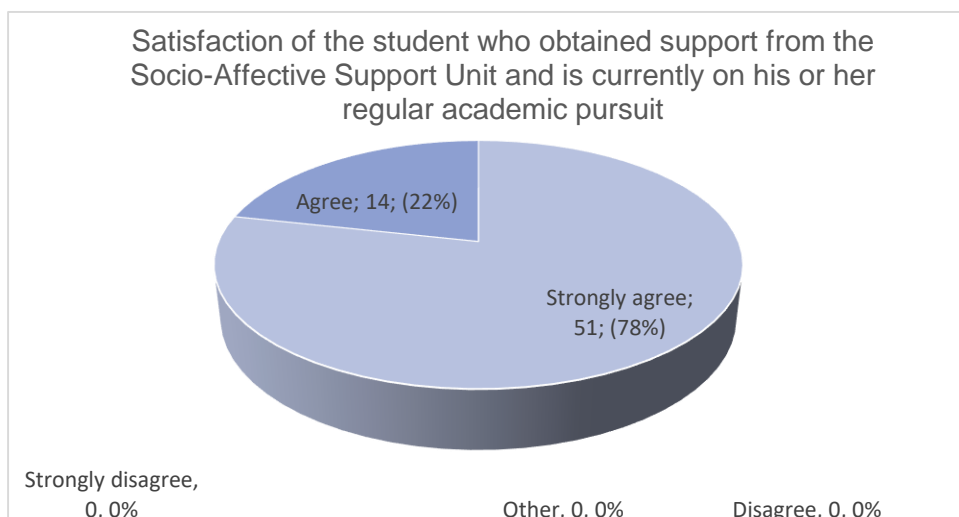
- a. For students who received support before submitting the degree exam. Regarding the statement: "The service provided by the Socio-Affective Support Unit was a contribution before the examination was taken".





**Figure 5. Student satisfaction assisted by the Socio-Affective Support Unit before submitting the degree exam.**

- b. In the case of students who where are at any point of their academic career, and received support from the unit, regardless of the supporting reason. About the statement: "The attention provided by the Socio-Affective Support Unit was a contribution to my personal development and academic advancement"
- c. In the case of students who are at some point in their academic career, and who received support from the unit for some reason. Regarding the statement: "The attention provided by the Socio-Affective Support Unit was a contribution to my personal development and academic progress"



**Figure 6. Student satisfaction assisted by the Socio-Affective Support Unit and currently on his/her regular academic pursuit**



As shown in Figures 5 and 6, the high percentage on service satisfaction of the Socio-Affective Support Unit, it stands out the degree of satisfaction (more than 85%) of students who received accompaniment and support before submitting their degree exam.

Category	Comment
The attitude of distrust of the modality of study	E1. "Your commitment is very much appreciated, for it was of great help during the very difficult times in my life, providing me with support and attention, for the e-learning format is little the support there is for obvious reasons."
(Interaction) The need for better communication with the Institution, classmates, teachers,	E2. "... It has been quite useful for me to have the support of a professional, it helped me to overcome some sorrows and share some emotions. For this, I thank in general for the support received, both by the institution and also the project teacher..." E3." The social worker responsible for my case was very empathetic to my situation, which has been complex for about a year ago..."
Financial and/or external factors	E4. "... I would like to thank the people who supported me by helping to continue my studies through socio-economic support and reducing my study payment." E5. "... In my personal situation, the support of the socio-affective unit and Matías in particular, was essential for me to solve my financial problem and therefore to be able to continue studying my third year ..." E6. "... I was very pleasantly surprised when I was contacted by the Socio-Affective Support Unit after the diagnosis of my illness. They were very friendly, close and willing to support me..."
Insecurity	E7." ... Excellent support, by the professionals dedicated to providing security, which was much needed to deal with the process of defending the examination of qualification, grateful that they provide that support..."

**Table 2. Categorization of students' open response regarding the service of IACC Socio-affective Support Unit**

In order to deepen in this study, a content analysis of open responses from student satisfaction surveys was conducted. The table below categorizes some of the student's comments about the work of the Support Unit.

As shown in Table 2, most of the students' comments advise about issues related to the need for interaction with members of the institution, the attitude of distrust towards the online study modality due to the limited support or interaction, financial and external factors (illness problems), where insecurity remains as a recursive factor.

ACCESS DATE TO THE SOCIO-AFFECTIVE SUPPORT UNIT	SEPTEMBER 12, 2018
MILESTONE	ADMISSION
REASON OF REFERRAL	Since induction was reported that the student has learning difficulties. The student requires the help of a professional in the area to begin their participation in the classroom
CATEGORY	EMOTIONAL / AFFECTIVE ISSUES
INVOLVED THERAPISTS	PSYCHOLOGIST, COMPLEMENTARY THERAPIST, SOCIAL WORKER
CYCLE AT START OF ATTENTION	1st CYCLE OF CAREER
ACTUAL CYCLE	ATTENDING THE 5th CYCLE OF CAREER
STUDENT ACTUAL CONDITION	CONTINUES TO RECIEVE ATTENTION OF THE SOCIO-AFFECTIVE SUPPORT UNIT

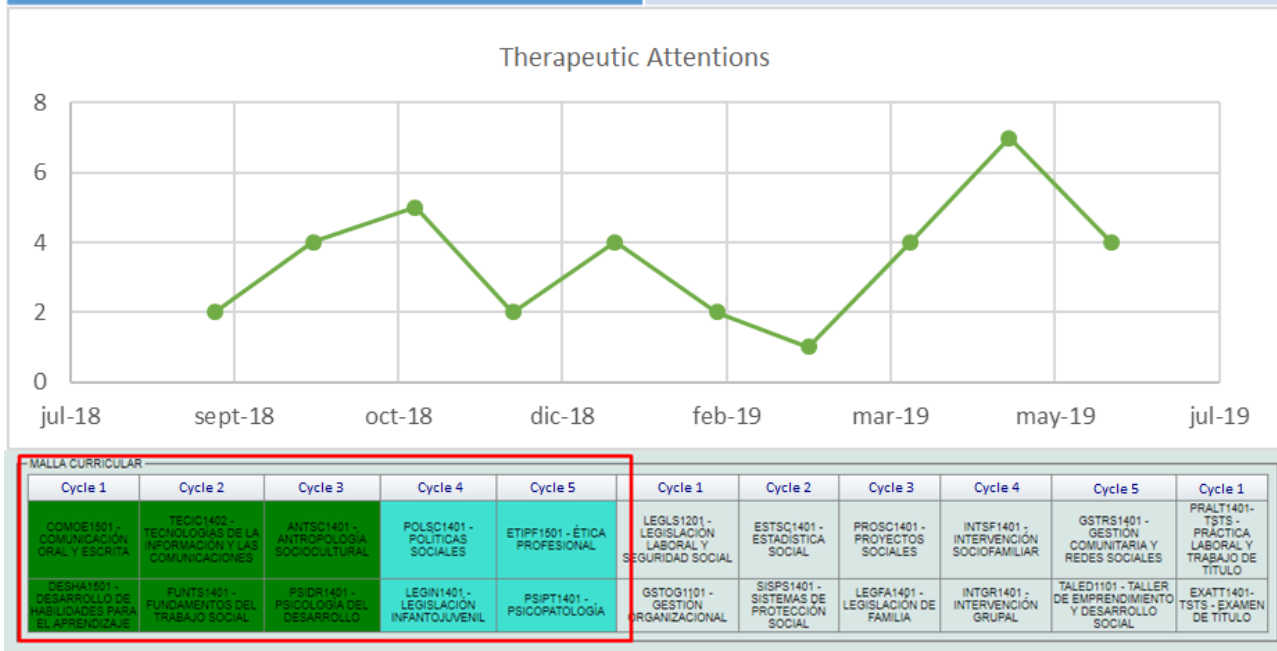


Figure 7. Student academic trajectory based on the milestone of admission

*Academic progression of the student attended by the Socio-Affective Support Unit*

The chart below shows the progression of some students assisted by the support unit. Three (3) cases were selected at different milestones during their academic trajectory considering a qualitative sampling by type-case for the purpose of the analysis is the richness, depth, and quality of the information, not the quantity or standardization (Fernandez, Baptista, and Hernandez, 2006, p.566). In this particular case, it was meant to

explore the progress of the student from the moment he or she is attended by the Socio-Affective Support Unit. The student's progression is registered considering the academic cycle currently studying at the time he/she is being attended by the support unit. Below there are the academic trajectory records of students at different milestones. Case 1. Student at the admission milestone. As per seen Figure 7, the student begins with the attention of the support unit at the beginning of his/her career, then progresses during the time the therapeutic care takes place during the four full cycles of the career. The student is currently on the fifth cycle. This is an area of attention where dropout during the first-cycle has been avoided.

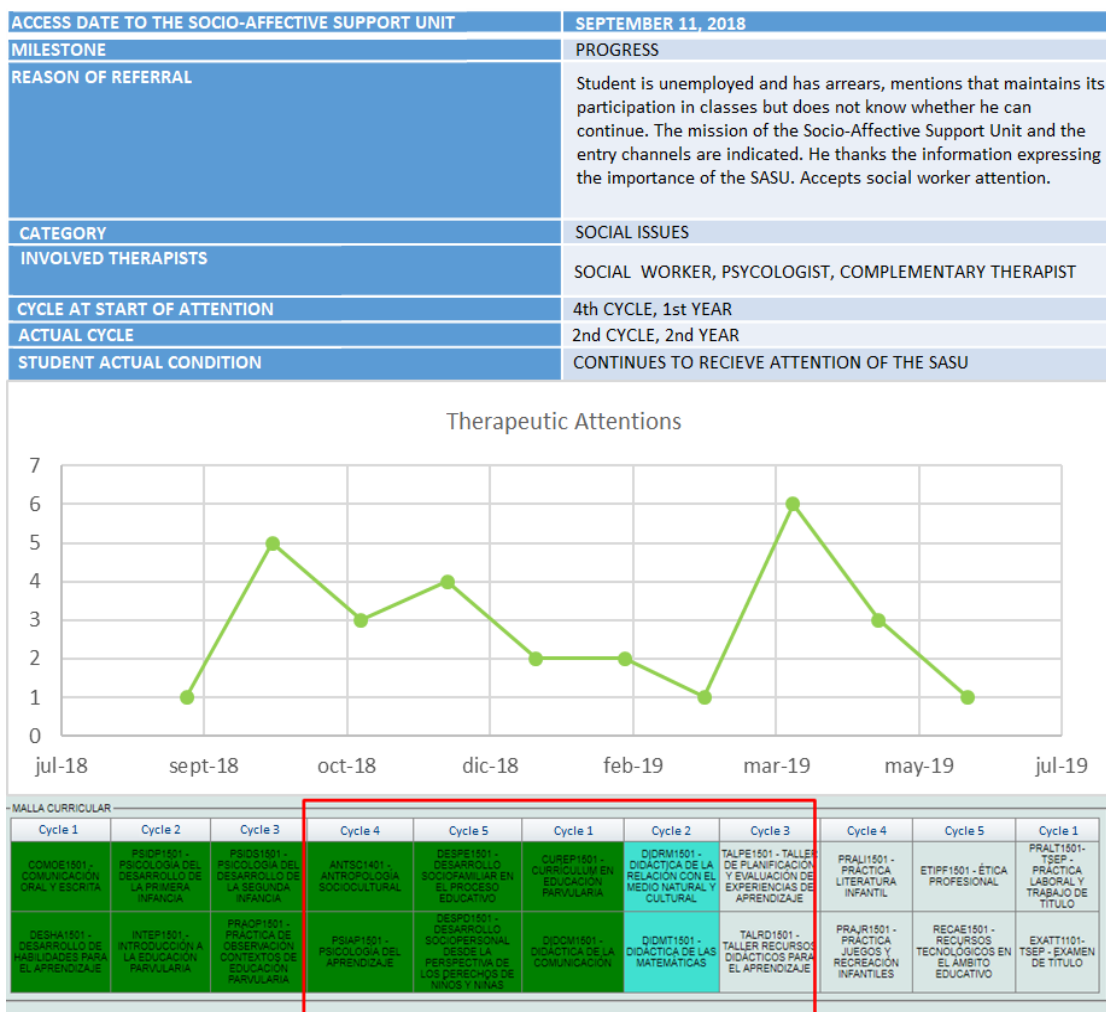
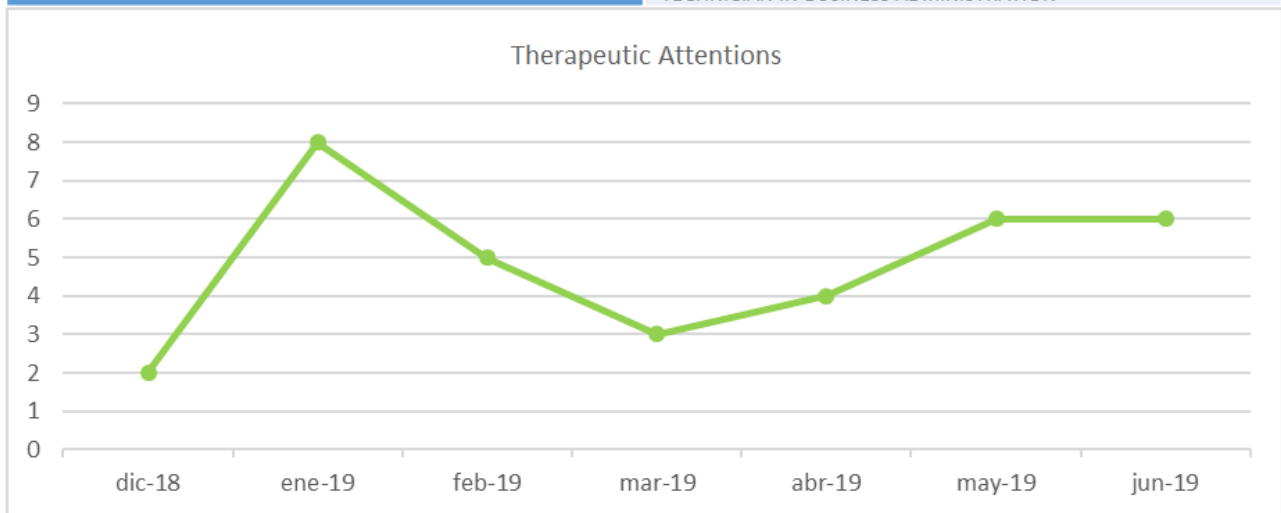


Figure 8. Academic trajectory of a progress milestone student

Case 2. A student in the milestone of progress. Figure 8 shows a student joining the support unit while in the fourth cycle of his career, then progresses three full cycles during the time he or she is in care of therapist; This student is currently advancing to the second cycle of the second school year.

Case 3. A student in the graduation milestone. Figure 9 is a student who is under graduate milestone, who after 6 months under the therapist care, manages to successfully present the degree exam.

ACCESS DATE TO THE SOCIO-AFFECTIVE SUPPORT UNIT	DECEMBER 11, 2018
MILESTONE	GRADUATION
REASON OF REFERRAL	I am writing to you since I just talked with the student Delia, she tells me that she only needs to present her exam of the title, at the moment of reviewing the situation the student tells me between sobs that she could not present due to the death of her daughter of 20 years. She tells me that she is on medication and she wants to take the exam, I personally think she needs help to face this difficult situation and thus be able to successfully complete his studies.
CATEGORY	EMOTIONAL / AFFECTIVE ISSUES
INVOLVED THERAPISTS	PSYCHOLOGIST, COMPLEMENTARY THERAPIST,
CYCLE AT START OF ATTENTION	GRADUATED
ATTENTION RESULTS	STUDENT FINISHED STUDIES IN JUNE 2019, CAREER: SUPERIOR TECHNICIAN IN BUSINESS ADMINISTRATION



Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 1
ADMIN1102 - FUNDAMENTOS DE LA ADMINISTRACIÓN	TECAD1101 - TECNOLOGIA APLICADA A LA ADMINISTRACIÓN	FUNMK1101 - FUNDAMENTOS DE MARKETING	GESTP1102 - GESTIÓN DE PERSONAS	FUNE1102 - FUNDAMENTOS DE ECONOMÍA	PSILO1101 - PSICOLOGÍA LABORAL Y ORGANIZACIONAL	FIN2S1102 - FINANZAS	EVALP1102 - EVALUACIÓN DE PERSONAS	DIAD1103 - DIAGNÓSTICO Y DESARROLLO ORGANIZACIONAL	PROT1101-TSABR - PROYECTO DE TÍTULO	EXATT1101-TSAERH - EXAMEN DE TÍTULO
DESHA1001 - DESARROLLO DE HABILIDADES PARA EL APRENDIZAJE	NIVMA1101 - NIVELACIÓN MATEMÁTICA	MATMA1101 - MATEMÁTICA	ESTDT1101 - ESTADÍSTICA	CONTB1103 - INTRODUCCIÓN A LA CONTABILIDAD	COSPR1101 - COSTOS Y PRESUPUESTOS	SELEP1102 - SELECCIÓN DE PERSONAS	LEGE1103 - DERECHO Y EMPRESA	REMRC1104 - GESTIÓN DE REMUNERACIONES Y COMPENSACIONES	CAPOG1102 - CAPACITACIÓN ORGANIZACIONAL	
								PRALB1101 - PRÁCTICA LABORAL		

Figure 9. Academic trajectory of a graduation milestone student.

## Conclusions

For the team of IACC professionals, the experience of creating the Socio-Affective Support Unit has a significant meaning due to the novelty of the process and constant learning, where is noted that the systematization, this is the planning of each of the stages, arising from the institutions' context. Within these, the categorization of problems and consequently, the derivation of intervention strategies to treat these, arises from the characteristics of the student from the institution and could be expanded as new cases emerge.

The data analysis of the cases of student's satisfaction surveys reflects that for online teaching system and in this particular context, some of the leading problems of the students are focused on: Interaction (need for better communication with the Institution, classmates, teachers), financial issues remain in the scope, external factors such as diseases, distrust to the modality of study, among others. Likewise, students' value in a very positive way these socio-affective support interventions, especially the accompaniment at the time of presenting their degree final exam.

An increase of approx. 50% is appreciated on student retention served by the Socio-affective Support Unit. Most of which were successfully retained and are currently continuing with their academic process; and secondly, there are students who found a solution to financial issues through the support of the unit and are continuing their academic process. This indicates that the financial issues appear among the causes of student abandonment for the IACC online system.

Another impact of the Socio-affective Support Unit intervention is clearly reflected on the progression during all three milestones of a student's academic career (admission, progress, graduation). Particular cases occur, in which the persistence of the student is achieved for several cycles; the degree is achieved and the desertion during the first cycle is avoided.

These results will serve as the theoretical basis for further investigations for online education context, which will provide solutions and timely responses to phenomena such as desertion, student performance, among others.

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## Employing Social Learning Analytic Methods (SLAMs) to Reimagine the Social Dynamic of Online Learning Collaborations

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### Abstract

As online networks expand, learning collaborations will occur across disciplines, countries, and people. A particular challenge is determining the process and progress of these collaborations, and how the social dynamics of interacting groups support knowledge construction. Traditional methods that rely predominantly on content analysis of transcripts to determine social construction of knowledge are time consuming to conduct and often do not provide actionable data to improve the process before it is completed. One answer to this challenge is emerging Social Learning Analytic Methods (SLAMs) that offer robust and expedient means to analyze the performance of interacting groups online. The purpose of this study is to explore the social dynamic that supports knowledge construction in interacting groups by employing SLAMs. We will use a twofold approach. First, we will demonstrate how SLAMs can be utilized in a formal learning environment during the rollout of an online university course so that findings can be used to improve the course as it is being offered. Second, SLAMs will be applied to Twitter which supports informal online learning to determine social construction of knowledge with a limited character set. SLAMs examined include, but are not limited to, sentiment analysis and social network analysis. These analyses can provide a valuable snapshot during roll out of collaborations whether in online courses or on social media so that they can be improved before they are concluded. By integrating SLAMs into online learning experiences, digital scholarship can reimagine online design, teaching, and evaluation to help meet the future needs of online collaborations in a variety of contexts. Using SLAMs, this study found that in a formal learning environment, higher phases of knowledge construction may be associated with postings containing high levels of positive sentiment and social presence. Finally, this study found that in social media informal learning environments, the social construction of knowledge occurred primarily within various stages of PI of the Interaction Analysis Model.

**Keywords:** Social Network Analysis, Social Learning Analytics Methods, Sentiment Analysis, Clustering Analysis, OILS Twitter Scraper

## Introduction

This study uses data from both a formal and informal learning environment in order to illustrate the fidelity of Social Learning Analytics Methods (SLAMs) in both domains. Formal learning environments encompass a broad range of contexts including face-to-face classroom instruction and online learning. The common chord being an association with a traditional learning experience. This study uses a discussion board from an online course as its formal learning environment of interest. On the other hand, informal learning environments include just about everything outside of the traditional classroom as well as learning that comes from everyday experiences (Merriam & Caffarella, 1999). One of the most promising frontiers of informal learning is social media because it “is clearly the largest, richest and most dynamic evidence base of human behavior, bringing new opportunities to understand individuals, groups and society” (Batrinsa & Treleaven, 2015, p. 90). This study uses Twitter as its informal learning environment of interest.

Twitter is a social media tool that allows users to compose single messages, called Tweets, to discussions organized according to thematic hashtags. Once a user has created a Tweet, users can take a variety of actions to share the information including creating a reply by writing someone’s username at the beginning of the Tweet or retweeting content by forwarding it to people within their networks (Twitter, 2016). Part of what makes Twitter a strong informal learning resource is its ability to help users organize knowledge. “Twitter hashtags help us to find discussions, snippets of knowledge, and hyperlinks to further resources from which we may learn” (Dron & Anderson, 2014, p. 181).

This study uses Social Construction of Knowledge (SCK) as its framework to identify learning because both formal discussion forums and informal Twitter dialogue share a need for strong social interaction. SCK is a subset of social constructivist theory, along with the zone of proximal development, which establishes the vital role socialization plays in the learning process (Vygotsky, 1978). Pea (1993) observes that “Knowledge is commonly socially constructed, through collaborative efforts toward shared objectives or by dialogues and challenges brought about by differences in persons’ perspectives” (p. 48). The shared objectives aspect is especially pertinent to the formal learning environment as all students seek to participate in the activity. The dialogues based on various perspectives is central to the innumerable voices that contribute to Twitter hashtags.

A variety of different methods have been used to measure SCK. Notable among these are the approaches proposed by Henri (1992) and Gunawardena, Lowe, and Anderson (1997). Both of these works focus on types

of Computer Mediated Communication (CMC), specifically online discussion forums. Henri (1992) recommends content analysis as one of the most important methods that should be used to understand SCK because of the complexities in assessing social and cognitive processes that underlie online discussions. Content analysis should be conducted according to 1) social dimension, 2) interactive dimension, 3) cognitive skills, and 4) metacognitive skills. One drawback to this approach is that it is difficult to distinguish between cognitive and metacognitive application of skills. In addition, interaction is descriptive and only one category is provided to assess this critical aspect of online learning.

Gunawardena et al. (1997) developed the Interaction Analysis Model (IAM) to qualitatively examine interactions among a collaborative group during the process of knowledge construction. The IAM was employed to examine the interaction that occurred in an online global debate to determine whether knowledge was constructed within the group through dialogue and discourse, and whether participants changed their understanding or developed new knowledge as a result of group interaction. Based on social constructivist and sociocultural views of learning, the model describes five phases of knowledge co-construction that are identified via content analysis: sharing and comparing constitute Phase I; dissonance is the focus of Phase II; negotiation and co-construction comprise Phase III, testing tentative constructions is incorporated in Phase IV, and statements and application of newly co-constructed knowledge are at the heart of Phase V.

Regardless of the method used to analyze SCK, both of these approaches agree that some content analysis is required to determine the context and meaning of the messages composed in online spaces. Unfortunately, reading through mountains of messages is painstaking and time-consuming work. Therefore, there is a need for additional tools that can facilitate the work of analysts who seek to understand SCK.

### **The Utility of SLAMs to SCK Research**

Incorporating SLAMs into studies focused on identifying SCK can address the shortcomings identified by researchers using existing methods such as Lucas and Moreira (2015) who recognize “content analysis per se disregards the temporal dimension of interactions and should, therefore be complemented by other methods that can help researchers better understand such processes and facilitate additional in-depth analysis” (p. 1505). For example, time is a primary focus of the analysis conducted when using sentiment analysis and social network analysis (SNA). Datapoints are collected over time in both methods to clearly illustrate the growth of knowledge (sentiment analysis) and how frequent interactions between people gradually develop (SNA). In Gunawardena, Flor, Gómez, and Sánchez (2016) we argue that SLAMs should be used to assist

researchers who are working with large volumes of qualitative data. SLAMs are powerful methods that can help researchers quickly understand trends in large and unstructured datasets, but they are no replacement for the rigor afforded by content analysis. This study builds on this assertion by providing further details regarding how SLAMs and IAM-oriented content analysis compliment one another.

By reimagining how mixed method research can be conducted using SLAMs along with traditional content analysis we suggest a way to transform the current practice of teaching online. For example, it is very challenging for online instructors to determine the quality of the interactions that take place within course discussion boards formatively because of the time and effort it takes to assess them. In many cases such assessments are often never completed even after courses have concluded. SNA offers a solution to this common challenge as the diagrams produced by this method can be used to incrementally ascertain the frequency and quality of interactions. Even more importantly, SNA can be conducted using existing data from discussion boards and there are a host of free tools like R, NodeXL, and Gephi to support the implementation of this method. Instructors who make SNA a part of their courses can display graphs that show which student(s) are most important to the discussion and which student(s) are lurking on the periphery. This can then serve as a motivating factor for students to focus on their online interactions and make sure they are more engaged in course activities. Using SNA to track student interactions has the potential to result in increased student engagement that will ultimately lead students to better futures and instructors to more robust teaching practices.

## **Purpose**

The purpose of this study is to explore how SLAMs can serve as a means to analyze the social dynamic that supports knowledge construction in both formal and informal online discussions between collaborative groups.

## **Research questions**

The research questions posed in this study are as follows:

1. How can SLAMs be used to assess the social dynamic that supports knowledge construction in formal online discussions?
2. How can SLAMs be used to assess the social dynamic that supports knowledge construction in an informal learning environment to determine how voluntary participation can lead to learning?

## **Social Learning Analytic Methods (SLAMs)**

SLAMs refer to a host of analytics methods including but not limited to cluster analysis, sentiment analysis, and social network analysis.

### *Cluster Analysis*

Cluster analysis is a method for determining the similarity between a collection of individuals based on a set of features (Romesburg, 2004). In the context of a discussion thread, cluster analysis groups postings in terms of similar word usage. It is useful for determining similarities between postings between different users.

### *Sentiment Analysis*

Sentiment analysis is defined by Batrinca and Treleaven (2015) as “the application of natural language processing, computational linguistics and text analytics to identify and extract subjective information in source materials” (p. 90). Sentiment analysis is performed by creating a list of positive (good, wonderful, fantastic, etc.) and negative words (bad, awful, terrible, etc.), known as a lexicon, and using automated approaches to calculate sentiment orientation as either positive, negative, or neutral (Liu, 2012). Note that a lexicon is the most crucial resource for sentiment analysis because it establishes the words and statements that are used to determine sentiment orientation (Feldman, 2013).

### *Lexica Development*

To conduct a sentiment analysis, data needs to be coded for positive and negative words. Coding is done automatically according to lists, called lexica, of positive and negative words. These words are then included in an automatic parser which produces scores for a given transcript that indicate whether the overall sentiment was positive or negative. The words included in lexica can expand this technique beyond positive and negative sentiment. For example, the lexicon used in Gunawardena et al. (2016) was created to assess social presence in an online course.

To assess social presence, instead of positive and negative words, words that contributed to or detracted from the creation of social presence were used. Words appropriate for each of these categories were identified by conducting a content analysis of the transcript. The resulting scores indicated how much social presence was being created in the course.

### Social Network Analysis (SNA)

SNA can be defined as a method of identifying the relationships among social entities (e.g. dyads, triads, and larger groups) and analyzing the implications of interaction patterns (Wasserman & Faust, 1994). The key output of SNA is the sociogram which was first introduced in the early 1930s by Moreno (1953). The intent behind the sociogram is to visually illustrate the relationships between people mapping out the interactions between people or groups in a network.

In this study SNA will only be used to answer the first research question because the dataset provides the clearest example of how SNA can be used to track and enhance online interactions.

### Method of analysis

#### SLAMs in a Formal Online Environment

In a formal online learning environment, the input for SLAMs is a table (see Figure 17) representing a discussion, which contains at least the names of the learners (e.g., *Name* column) and their postings (e.g., *Thread* column).

Count	Name	Date	Time	Thread	Initial	PHI/A	PHI/B	PHI/C	PHI/D	PHI/E	PHI/A	PHI/B	PHI/C	PHI/D	PHI/E	PHI/A	PHI/B	PHI/C	PHI/D	PHI/E	PHI/A	PHI/B	PHI/C	PHI/D	PHI/E	PHI/A	PHI/B	PHI/C
1	Jack	08/27/08	20:49:00	My own definition	JG	2				1																		
2	Jan	08/28/08	8:32:00	I agree that there	JL	2	2																					
3	Marta	08/28/08	21:16:00	When I think of	MM	1			1																			
4	Leslie	08/29/08	9:02:00	I, too, am	LW	1	1						1															
5	Alex	08/29/08	12:34:00	Jack, These are	AJ			1				1																1
6	Alex	08/29/08	12:50:00	Hi Leslie, You	AJ																				1			
7	Emily	08/29/08	16:53:00	Defining culture	EP	1	2																				1	
8	Emily	08/29/08	17:16:00	Hello Marta, I	EP			1	1																			
9	Emily	08/29/08	17:43:00	Hi Leslie, Its great	EP	1																						
10	Alex	08/29/08	13:04:00	My personal	AJ	2				1	1													1	1			
11	Betty	08/29/08	22:22:00	What a devilshly	BS																							
12	Leslie	08/30/08	8:00:00	Hi Alex, I just	LW																							
13	Leslie	08/30/08	8:03:00	I agree Emily and	LW	1	1																					
14	Cassidy	08/30/08	19:00:00	Hello class- great	CJ	1	1	1																				
15	Jack	08/31/08	12:38:00	Hi Jan, I liked in	JG	1	1																					
16	Jack	08/31/08	12:45:00	Hi Cassidy, I	JG			2																				1
17	Jack	08/31/08	13:00:00	Hi Alex! Thank	JG																							
18	Jack	08/31/08	13:13:00	Hi Marta, I liked	JG	1	2																					
19	Tammy	08/31/08	14:43:00	I define Culture as	TK																							
20	Tammy	08/31/08	14:53:00	Jan, I love your	TK			1																				1
21	Kerry	09/01/08	7:23:00	I really enjoyed	KB																						1	1
22	Jan	09/01/08	9:29:00	Hi Kerry, Your	JL								1															
23	Jan	09/01/08	9:43:00	Hi Jack, yes, I	JL			1	1	1																		
24	Jan	09/01/08	9:51:00	Hi Jack, ok, I see	JL								1															
25	Lex	09/01/08	10:44:00	I have read	LM	1																						
26	Kerry	09/01/08	12:48:00	Jan, I really didn't	KB				1																			1
26	Kerry	09/01/08	12:55:00	Lex, I really	KB			1																				
28	Cassidy	09/02/08	12:33:00	Hi Jack, Thanks	CJ								1															
29	Cassidy	09/02/08	12:48:00	Hi Kerry/Jan	CJ			1																				
30	Cassidy	09/02/08	12:58:00	Hi Lex, Enjoyed	CJ																							1
31	Angela	09/02/08	15:58:00	After reading the	AN	1	3																		1			

Figure 17. A sample datafile.

This file is exported in a .csv format, e.g., *IAM-RAW-Data.csv*, and read into R with code similar to Table 2. The code also collapses IAM subphases into the five major phases.

```
df=read.csv("IAM-RAW-DATA.csv", stringsAsFactors = F)
#
# Grab all the phase headings column numbers
#
phI.Headings=which(grepl("^phI\\.+", colnames(df), ignore.case=T))
phII.Headings=which(grepl("^phII\\.+", colnames(df), ignore.case=T))
phIII.Headings=which(grepl("^phIII\\.+", colnames(df), ignore.case=T))
phIV.Headings=which(grepl("^phIV\\.+", colnames(df), ignore.case=T))
phV.Headings=which(grepl("^phV\\.+", colnames(df), ignore.case=T))
#
# Collapse headings
#
phI=rowSums(df[, phI.Headings], na.rm=T)
phII=rowSums(df[, phII.Headings], na.rm=T)
phIII=rowSums(df[, phIII.Headings], na.rm=T)
phIV=rowSums(df[, phIV.Headings], na.rm=T)
phV=rowSums(df[, phV.Headings], na.rm=T)
#
# Create a valid time object
#
Date.Time=as.POSIXct(paste(df$Date, df$Time), format="%m/%d/%y %H:%M:%S")
#
# Create a Data Frame
#
df2=data.frame(df$Thread, Date.Time, df$Name, df$Thread, phI, phII, phIII, phIV, phV)
```

**Table 2. R-code to import a table and perform data pre-processing.**

Four analyses are typically run on the data: word-frequency, cluster, sentiment, and social network. We focus on last three types in this paper.

### *Cluster Analysis*

Hierarchical clustering is performed using the default “Euclidean” distance algorithm, and plotted as a dendrogram. Table 3 shows the R-code for clustering and generating this dendrogram.

```
#
# Hierarchical Clustering: Dendrogram
#
library(tm)
thread=df$Thread
dtm=DocumentTermMatrix(Corpus(VectorSource(thread)))
mat=as.matrix(dtm)
d=dist(mat) # default is Euclidean distance
h=hclust(d) # perform hierarchical clustering
plot(h) # plot dendrogram
```

**Table 3. R-code to visualize hierarchical clustering as a dendrogram.**

### *Sentiment Analysis*

R contains built-in libraries for doing lexical-based sentiment analysis. However, this study used three custom lexica representing positive words, negative words, and social presence words. The R-code for importing

these three different lexica, counting their occurrences in each posting, and generating a frequency bar graph, is shown in *Table 4*.

```

Positive.Lexicon=readLines("P-Words.csv")
Negative.Lexicon=readLines("N-Words.csv")
Presence.Lexicon=readLines("S-Words.csv")
thread=df$Thread
lexicon.scores=matrix(ncol=3,nrow=0)
for (post in thread) {
  positive.score=0
  for (phrase in Positive.Lexicon) {
    phrase=gsub("[*]", "\\* ", phrase)
    phrase=gsub("[+]", "\\+ ", phrase)
    phrase=gsub("[-]", "\\- ", phrase)
    phrase=paste("\\b",phrase,"\\b",sep="")
    if (grepl(phrase,post,ignore.case=T)) positive.score=positive.score+1
  }
  negative.score=0
  for (phrase in Negative.Lexicon) {
    phrase=gsub("[*]", "\\* ", phrase)
    phrase=gsub("[+]", "\\+ ", phrase)
    phrase=gsub("[-]", "\\- ", phrase)
    phrase=paste("\\b",phrase,"\\b",sep="")
    if (grepl(phrase,post,ignore.case=T)) negative.score=negative.score+1
  }
  presence.score=0
  for (phrase in Presence.Lexicon) {
    phrase=gsub("[*]", "\\* ", phrase)
    phrase=gsub("[+]", "\\+ ", phrase)
    phrase=gsub("[-]", "\\- ", phrase)
    phrase=paste("\\b",phrase,"\\b",sep="")
    if (grepl(phrase,post,ignore.case=T)) presence.score=presence.score+1
  }
  lexicon.scores=rbind(lexicon.scores,c(positive.score,negative.score,presence.score))
}

dat=rbind(lexicon.scores[, "positive"],lexicon.scores[, "negative"],lexicon.scores[, "presence"])
rownames(dat)=c("Positive", "Negative", "Presence")
barplot(dat,beside=T, names=1:length(df$Thread), legend=TRUE)
title("Positive, Negative, and Social Presence Scores")

```

**Table 4. R-code to do a lexicon-based sentiment analysis. Three lexica are imported: Positive words, negative words, and social-presence words.**

### *Social Network Analysis (SNA)*

SNA was performed in two steps. Table 5 contains the R code for generating a table of social edges, where an edge represents who a speaker received information from.



```

names=tolower(df$Name)
thread=tolower(df$Thread)
# Extract first names
first.last=strsplit(names, " ")
first.name=sapply(first.last,function(item){tolower(unlist(item)[1])})
# Go through each name and find mentions of other names
# Edge becomes othername->name
#patt=""
#for (n in first.name) patt=paste(patt,"|","\\b",n,"\\b",sep="")
#patt=substr(patt,2,nchar(patt))

patt=paste("\\b",first.name,"\\b",sep=" ",collapse="|")
tbl=matrix(ncol=3,nrow=0)
for (row in 1:length(thread)) { # Go through each post
  t=thread[row]
  # find mentions
  mentions=unlist(regmatches(t,gregexpr(patt, t))) # Might want to make unique
  # create edges
  for (n in mentions) {
    label=paste(df2[row,which(grepl("ph",colnames(df2)))],collapse=" ")
    tbl=rbind(tbl,c(n,first.name[row],label))
  }
}
colnames(tbl)=c("from","to", "label")
write.csv(tbl,"edges.csv",row.names=F)

```

**Table 5. R-code to generate the social edges for a discussion.**

Given a table of edges, *Table 6* is the R-code for depicting these edges as a sociogram, and annotating the edges with the IAM phases.

```

library(igraph)
edf=read.csv("edges.csv")
g=graph_from_data_frame(edf) # Read graph

in.degree=degree(g, mode="in") # Calculate degree
out.degree=degree(g, mode="out")
between=betweenness(g)

ug=as.undirected(simplify(g))
gr=cluster_fast_greedy(ug)
#gr=cluster_edge_betweenness(ug)

V(g)$size=strength(g) # plot
V(g)$color=groups$membership

set.seed(777)
plot(g,layout=layout_with_fr(g),vertex.label.cex=.75,edge.label.cex=.5,edge.arrow.size=.5)
set.seed(777)
plot(gr,g,layout=layout_with_fr(g),vertex.label.cex=.75,edge.label.cex=.5,edge.arrow.size=.5)

```

**Table 6. R-code for generating sociograms.**

## **SLAMs in an informal online environment**

This portion of the study will illustrate how SLAMs apply to an informal learning environment using a #BlackLivesMatter Twitter dataset collected during the Freddie Gray demonstrations from April 21 – April 28, 2015. 45,646 tweets were collected during this timeframe.

### *OILS Twitter Scraper*

Analyzing the informal learning environment begins by using the OILS Twitter Scraper to scrape unstructured tweets from Twitter from April 21-28, 2015 using the Twitter API. The OILS Twitter Scraper is an Excel-based tool written in Visual Basic by Flor (2014).

### *SCK Lexica Development*

After scraping the data, the process moved to the development of lexica. Two common methods for creating lexica are a manual approach in which words are coded and added to the appropriate list by the researcher and a dictionary approach in which words are added according to their relationship to established words with positive or negative sentiment in the dataset as determined by an online dictionary (Liu, 2012). The manual approach involves a content analysis (Krippendorff, 1980) which is performed by manually reading text and classifying the text by hand according to a research framework. Content analysis was performed on all of the tweets from April 21<sup>st</sup> and 25<sup>th</sup> to establish a foundational lexicon. Coding was performed using an Excel spreadsheet with columns for all of the IAM phases and sub-phases like the one presented in *Figure 1*. The words identified in the manual approach enable the dictionary approach in which all words in the initial lexicon were found in the online dictionary WordNet (Miller, Beckwith, Fellbaum, Gross, & Miller, 1990). During the search, synonyms that did not fit the original context of a given word were removed while those that fit the context were added to the lexica. The final product of this process is a list of words and phrases according to each IAM phase that originate in the Twitter data used for this study.

### *Sentiment Analysis*

The complete lists of words and phrases was added to routines in the OILS Twitter Scraper to automatically produce counts of the most frequently occurring words and phrases for each day in the dataset and to determine the presence of IAM phases in the data.

## Results

### Research Question 1

#### Cluster Analysis

Figure 18 depicts the dendrogram from the hierarchical clustering of the discussion thread. It is apparent that posting 25 is the most dissimilar. Similar postings include (10, 4, 31; leftmost cluster), (7, 8; rightmost cluster), and (13, 35; lowest cluster).

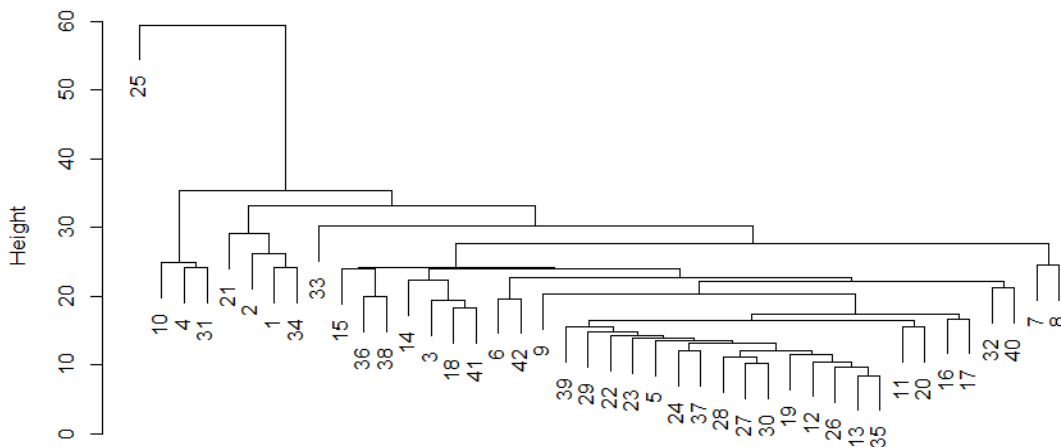
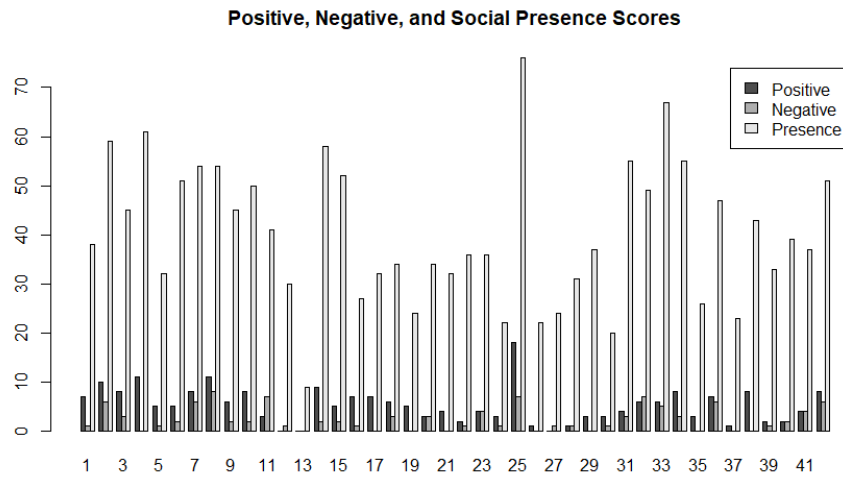


Figure 18

Figure 18. Dendrogram for the dataset.

#### Sentiment Analysis

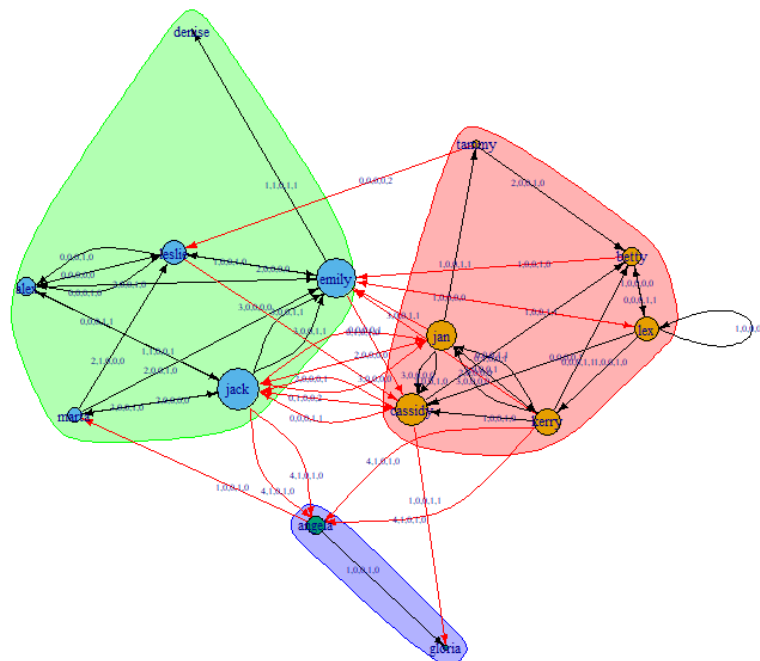
Figure 19 depicts a bar chart for the sentiment and social presence analysis. High positive, negative, or presence scores indicate areas of focus for the analyst. The bar chart shows that posting 25, which was the most dissimilar in the clustering analysis, was also the posting with the highest positive, negative, and presence scores.



**Figure 19. Sentiment analysis and social presence scores.**

### Social Network Analysis (SNA)

The SNA (see Figure 20) found three main cliques of users depicted by three differently-shaded clouds. Within the cliques, the most influential users (shown as bigger circles) appear to be associated with higher levels of IAM as denoted in the edge labels. By annotating the edge labels with IAM phases, the analyst can explore relationships between influence, interactions, and learning.

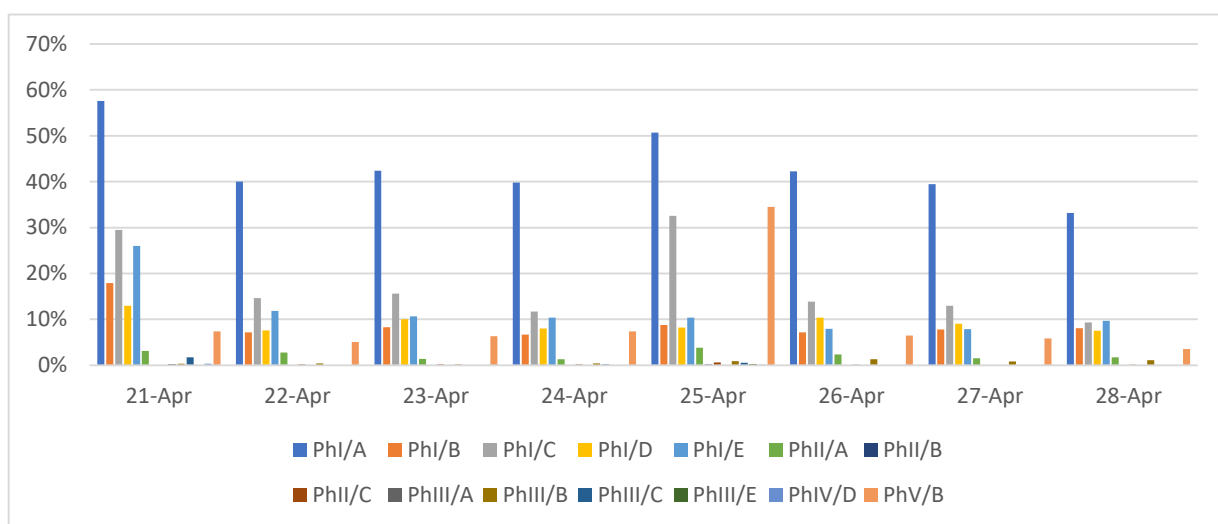


**Figure 20. A sociogram depicting who received information from whom in the discussion. The edge labels represent the IAM phases associated with the information.**

## Research Question 2

### Sentiment Analysis

The sentiment analysis results for the #Blacklivesmatter dataset are presented in *Figure 21* organized by each day in the dataset.



**Figure 21. SCK Analysis Results.**

The sentiment analysis counted the number of unigrams and bigrams that were exemplars of the given IAM phase in each sample. Note that each sample tweet can include more than one instance of a given phase or phases. The sentiment analysis shows that phase I/A was the most frequent of all the IAM phases. According to percentages, the proportion of phase I/A codes remains fairly consistent over the course of the 8-day dataset. Phase I/C and phase I/E were the most frequent following phase I/A. Excluding the content analysis days (21<sup>st</sup> and 25<sup>th</sup>), levels of phase I/C and phase I/E also illustrated a large degree of consistency ranging between 16% and 9% for phase I/C and 12% and 8% for phase I/E. Such consistency suggests that although the lexicon analysis does not account for all of the data, it consistently identifies SCK in this dataset.

## Discussion

An important goal for researchers studying SCK — in either formal or informal online learning environments — is to understand the dynamics that support SCK. These dynamics include the changes in the phases of knowledge construction over time, and the social groups that form serendipitously during extended

discourse. These changes are difficult or tedious to characterize manually, and SLAMs can help automate both the detection and visualization of these social dynamics. In the first study, cluster analysis, sentiment analysis, and social network analysis were performed on a discussion board thread. The cluster analysis showed postings which were similar based on word choice. The sentiment analysis portrayed changes in attitude towards the discussion topic, and changes in social presence. Finally, the social network analysis depicted the exchange of information, the implicit groups that formed based on this exchange, and the phases of knowledge construction associated with the exchanges.

One can combine the findings from these three analyses to form hypotheses for further analysis, or to design instructional interventions prior to the end of a course. An example of a hypothesis based on these analyses would be: *postings that are different (e.g., posting 25 in Figure 18), with high positive sentiment and high social presences scores (e.g., posting 25 by subject Lex in Figure 19) can help others reach higher phases of knowledge construction (e.g., subjects Betty & Kerry, rightmost group in Figure 20)*. An example of an instructional intervention based on these analyses would be to place students in three groups, as indicated by the sociogram in Figure 20, but to put the top influencers in different groups.

The utility of SLAMs is particularly evident when studying SCK and social dynamics in massive online groups — where traditional content analyses would be prohibitively expensive in both time and money. The second study demonstrated that SCK can be found in the #BlackLivesMatter network of practice. Sentiment analysis was able to identify SCK in the dataset at varying levels. Overall, the IAM framework identified that SCK occurred mostly in phase I as many examples of sharing opinions and providing examples were found. Interestingly, the rates at which data were coded by the SCK lexicon were fairly consistent suggesting that as people voluntarily contributed to the discussion, they continued common threads and described them using similar language. The SCK lexicon performed well for specific topics that were present on both of the content analysis days.

Many of the previous studies conducted using the IAM have failed to identify higher phases of knowledge construction (Paulus, 2007). For the most part, this study is no exception because the majority of the samples were either in phase 1/A or phase 1/C indicating that higher phases of knowledge construction did not take place. One potential explanation for this is provided by (Gunawardena, Lowe, & Anderson, 1998, August) who write that dissonance is not always needed to build knowledge because the people coming into a given discussion realize they are on the same page conceptually speaking and therefore accept statements made by others instead of disagreeing and sparking productive conflict.

## Conclusion

Traditional content analysis can be prohibitively time consuming when applied to massive amounts of online data, or to data rich in higher phases of knowledge construction. SLAMs provide researchers a host of semi-automated techniques for making explicit many of the tacit structures and processes that underlie the social construction of knowledge.

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## Key Role of Modularization for New Global Pathways Expanding Access to Multiple Study Programs

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### Abstract

Digitization, automation and artificial intelligence are the drivers of change also for education in a global context. They are based on systems theory, characterized by systems and their characteristics. A system is a set of objects between which relations exist, i.e. a well-structured whole. Based on the general system theory, an interdisciplinary pool of theories was created, which is constantly being expanded. It includes facets of complex states. Since education is a very complex task that not only includes content but also methods, organization, transdisciplinarity, interculturality, ethics, etc., the system theory is applied. In particular, the development of sociological systems theory has provided new impulses for education. Their focus on communication thus leads directly to the learning theory of connectivism. The objects as building blocks of the systems open up a modular view. If they have similar characteristics and methods, they are combined into classes. This basic principle can be applied to all educational systems. So there are classes of prospective students and present students, teachers and managers, methods and content, etc. The two latter classes find their equivalent in the teaching and learning modules. They are important basic objects for all educational processes, which is why they play a key role in the planning and design of new study programs. Qualified module descriptions do not only contain data on content, duration, scope of teaching, etc. in the sense of system theories, but also information on methods of teaching the content and generating competences. The combination and development of regional and global educational paths depends to a large extent on the mutual recognition and crediting of generated knowledge and competences. Credit points are the quantitative and qualitative expression of acquired competences in completed learning units. If educational paths are to be opened, then the module and credit point systems should be standardized in the international

context. It is the compelling prerequisite for transnational educational paths in LLL and thus for an expansion of access to diverse study programs. The practical implementation of module-based, networked education systems with expanded access and new educational pathways is based on theoretical preliminary work. The theory of complex systems is applied to further development of education systems emphasizing the central role of modularization in the context of digitization and globalization.

**Keywords:** Expanding Access, Open Pathways, Impact of Modularization, Multiple Study Programs, Holistic Approach

## Introduction

The explosion of knowledge, based on the dynamics of science and technology, as well as the intensification of globalization, networking and digitization, is creating new challenges for education systems. Higher education in particular is undergoing a massive process of change as a result of the diversification of scientific fields and an unprecedented flood of knowledge, while at the same time calling for greater interdisciplinarity and transdisciplinarity and a resulting wave of knowledge. That is why it is more necessary than ever to use epistemological and thought models which have undergone constant further development since antiquity, in order to be able to master the rapidly growing diversity of disciplines and knowledge through holistic approaches in addition to the improved performance of communication and information technologies and new teaching and learning methods. Information and knowledge management has always been based on object-oriented approaches such as semantic modelling. In practice, conceptual approaches of this kind are realized through modularization within the framework of modular systems. These building blocks offer the advantage of splitting complex knowledge areas into networked, modular architectures. In addition to a clearly defined service, smaller units offer more transparent content design, simpler possibilities for revision, target group-specific compilations and improved possibilities for storage, distribution and unification. The worldwide knowledge level serves as a benchmark to generate such modular knowledge objects and to distribute them globally relatively easily by digital means.

As a result, more and more educational hubs can be operated qualitatively and cost-effectively via new educational paths. If the modularized education systems are available worldwide, this model will considerably simplify access for students to a wide range of educational offers and providers. When accessing the modules as educational objects, those seeking education can choose between several forms of access and organization and a wide range of possible combinations. Overall, access to multiple study programs,

which can be designed to meet specific needs and target groups, and thus the worldwide exchange of knowledge is considerably expanded and improved. Within the framework of intensified cooperation in education, large education providers and corporations are forming networks which, as competence centers, possess the necessary knowledge and resources to successfully design and operate the described concept not only regionally and nationally but also in an international context.

### **Systemic and Smart Approach for Higher Education**

One of the first system analysts among philosophers, also called the founder of the occidental scientific view, Aristotle explained that the whole is more than the sum of its parts. The application of this knowledge to educational systems therefore leads to a holistic approach. A Holon is never part in itself, but always part of a whole. If education itself and education-supporting systems are to be successfully developed, decompositions and the associated simplifications and limitations of the view of individual objects or processes are only useful to better master the high complexity of large systems and to be able to investigate them in detail by reducing the area of investigation. Nevertheless, the object or the process, which was isolated as part of the whole, remains part of the whole. Both theoretical and practical developments in the field of education should be based on this holistic principle, because this is the only way to enable a realistic analysis, modelling, planning and implementation of modern education systems. In recent years, holistic thinking has become increasingly common in the development of education systems and will shape future concepts and solutions in this field. The increasing emphasis on interdisciplinarity and transdisciplinarity is an expression of the fact that the successful design of complex education systems will only be possible by overcoming disciplinary perspectives and better cooperation not only among specialists but also with users (Schumann, 2017).

This change in educational systems towards more holistic and systemic thinking is a reflection on the changes towards more integration, networking and interdisciplinarity in real systems, for example in business and industry. Analyses show that automation, networking and systemic approaches have the highest priority in competence development for digitized and automated systems. Since education always reflects real systems in essential elements, the transfer of these findings leads to analogous challenges in the content, organizational and structural design of new globalized and diversified offerings in higher education. In higher education, process and system thinking are directly linked to topics such as systems engineering, integrated engineering and digital engineering. In addition, systemic knowledge and systemic approaches permeate all other disciplines, whereby they have, inevitably, an influence on the further development of education (Heidling, 2019).

In addition, digital transformation as a strategic goal will lead to comprehensive changes in higher education. The complexity of the challenges is made clear, among other things, by the need to strengthen inter- and transdisciplinarity and to improve the joint action of universities, companies and government agencies in line with the Triple Helix model. The fields of action digital transformation, strategic objectives, identification of drivers and obstacles, operationalization of strategic objectives and design of new content are based on a systemic approach. The demand for agile curricular development also shows a tendency to use new methods for dynamic educational offers in a global context (Gottburgsen, 2019).

The transition from large systems to smart ones, such as Big Data to Smart Data, is also emerging for education systems. Smartness is a characteristic posited positively in many ways. It expresses that intelligence exists as well as a canny, prudent or amusing appearance acts intelligently. In the face of the overwhelming flood of information, the barely controllable explosion of data, the omnipresent streams of communication and the constant influence of the media, the question arises, how smart can respond to these influences and challenges by appropriate education. Digital transformations intensify these scenarios, but they also offer the opportunity to design education systems and processes in such a way that the new conditions are not only a burden but also an opportunity for better education. However, smart education also means that data, information, communication and media in all social, professional and personal areas are used intelligently, in order to generate more quality of life, better career opportunities and more personal happiness (Schumann & Kauper, 2018).

The development of smart education systems and environments is based on systemic approaches (Gros, 2016):

- Context-aware: the system must be able to provide learning support based on learners' online and real-world status;
- Adaptive support: the system must offer instant and adaptive support to learners based on their individual needs from different perspectives;
- Adaptive interface: the system must be able to adapt the interface to the user.

This type of procedure implies the use of modular systems and thus the application of object orientation.

## Object Orientation for Modularization

A system is a set of entities between which relations exist. Object orientation and the associated modularization are thus approaches in the context of general, interdisciplinary system theory. In object orientation, a system consists exclusively of objects that communicate with each other using messages. Each object has properties and methods. The properties use their values to describe the state of an object, the methods the possible actions of an object. Objects are defined via classes that represent a kind of template for objects. They define the structure of the objects and their functionality. An object is then the instance of a class. Each object of a class is uniquely distinguishable, even if the property values are the same (Siepermann, 2018).

Object-oriented is closely related to systems and software engineering. It refers to a system or software methodology that is built on the concepts of logical objects. It works through the creation, utilization and manipulation of reusable objects to perform a specific task, process or objective. An object-oriented based system is modeled and created through the use of objects, where each object's class instance has specific attributes and behaviors, and the relative methods or behaviors are called to manipulate or utilize such a system. The essence of object-oriented is that each of the created objects can be reused in the same and other programs and applications.

Object-oriented design principles (Bourque, 2014):

- Abstractions as a focused object view for a specific purpose
- Coupling and cohesion as a measure for the interdependencies and for the quality of the strength of the associations within the modules
- Decomposition and modularization as the decomposition of larger units into smaller components with different functionalities and contents as well as with clearly defined interfaces for the interaction of the components with other components
- Encapsulation and information hiding for embedding internal details with access options for a selected circle
- Separation of interface and implementation as provision of a public interface for access to open content independent of the structure of the component
- Sufficiency and completeness as the capture of all important properties and contents of a component through abstraction
- Primitiveness as an easy to implement design
- Separation of concerns as an area of design that is relevant to one or more of its stakeholders.

In object-oriented design, systems are modularized, i.e. broken down into individual parts, whereby the modules are individual parts as objects in an overall structure. Modularity is promoted by modular decomposability, modular combinability, modular comprehensibility, modular consistency and modular protection (Rogat, 2019).

### **Diversity of Individualized Educational Pathways in a Globalized World**

Diversity characterized the variety, manifoldness and multiplicity of objects and relations, processes and functions as well as actors and roles in an organization. Therefore, diversity is an organizational principle. It is part of any organizational development, especially of its strategic orientation. Four strategies are essential for the organization's overarching vision, mission, and strategy, which determine the diversity management aspirations: managing workforce representations, managing workforce demographic relationship, managing diverse talent, and managing all strategic diversity mixtures (Roosevelt, 2010). Diversification and globalization are inextricably linked. The trend is being reinforced by digitalization. Learners become more mobile through digital techniques and digital products. They are better and better able to choose from the wide range of offers; those which are best appropriate to their interest. The development creates new demands on education products and services on the education markets. Educational organizations must adapt their strategies to the changes in time. The interaction of users in social networks accelerates this process enormously.

The stronger individualization is based on a comprehensive diversification in connection with the digitization. Because more and more people are increasingly using diverse ways of accessing new products, services and offers through digitalization, traditions are increasingly being questioned and more and more choices are made available to the individuals. However, this also results in a higher individual decision-making pressure, which in turn causes a change in value systems. Learners are more individualized and have less stable relations with the educational organizations, but they are constantly in exchange with other stakeholders in order to find the best offer for themselves. The digital natives, generation Y, prioritize their criteria in the educational choice. The individual self-realization and thus the less affinity to the educational organization are based on a much higher self-attention. Learners are increasingly demanding the adherence of a work-life balance by their education providers. The entry of Generation Z into the systems of higher education will further intensify the demand for individualization of learning, because this group of people has fully integrated the digitalization into their daily lives and have learned to deal with complex situations and the related diversity.

The prerequisite for the individualization of learning is the design of modular learning systems. Once developed learning components have to be used as often as possible because otherwise the efficiency of the learning offers is usually not guaranteed. The development of individual learning modules from a basic and well-structured knowledge is technically, organisationally, contently, socially and economically feasible. These smallest knowledge modules can be mapped in semantic networks in order to make them available for individual learning paths. Individualization becomes part of the mass consumption in learning and training. It is the complementary development to the mass component production for user-individualized products in industry. After structuring the contents, the semantic network has been developed for creating an individual, on-demand generation of courses. The provision of the study documents and learning contents will be realized course-wise, supported by a multidimensional system of knowledge distribution, in which may be varied as dimensions: the knowledge of the learner, the optimal methodology used and the type of delivery channel and devices. Thus, the methodological and technical conditions are created to provide diversified educational modules for the use in the design of multivalent need-based path-ways of learning through channels varying due to the situation (Schumann, 2018).

The belief that this organizational, procedural and structural-functional approach in connection with Open Education is sufficient to regulate the individualization of access and use paths for education worldwide through increasing diversification is more of an obstacle than a means of accelerating development. Rather, a systemic view requires a consistent consideration and integration of intercultural and cultural learning due to internationalization. Diversification must also be lived more extensively and intensively under this aspect, in order to truly enable realistic individual access to global educational offers in combination with different providers and sources. There is a broad consensus that, in addition to mastering foreign languages and knowledge of the country, a number of other characteristics must be fulfilled. In particular, these include the ability to communicate non-verbally, to empathize with other people's thoughts and feelings, to accept something different and to discover and develop similarities. Intercultural competences are considered important for the coexistence of people in multicultural contexts in general and for the design of cooperative projects and institutions in particular, the number of which is constantly increasing in an increasingly globalizing world. Finally, there is a consensus that intercultural competences do not only come about naturally through encounters with strangers, but that they can and must be prepared through didactic measures. Educational institutions, like other organizations, should strive to develop and communicate "their own" culture. They should see themselves as a "cultural community". Such a joint development of organizational culture includes moral, epistemological, didactic and aesthetic options as well as a specific

design of spatial and temporal organization, communication and cooperation. They are challenged to discover new, transcultural commonalities and at the same time to further develop their own cultural identity. According to the principle of lifelong learning, educational institutions must regard all their members as persons capable of cultural development (Flechsigs, 1997).

Increasingly transcultural learning refers primarily to the change and development of the cultural orientation of individuals, whereby learners take an active role in shaping and promoting interculturality. With their individual changes they have a reflexive effect on the organisations and generate a pressure to change on the educational institutions. If educational organisations have sufficient willingness and ability to change, they will enable transcultural learning in new forms of organisation. Together with international partners, they generate diversified and multilateral offers for individualized educational paths in an intercultural and transcultural mode, whereby they become educational hubs in international educational networks. Cultural individuality continues to develop in a world of diverse, changing cultural reference systems. Only under these conditions will it be possible for learners to profit sustainably from the diversity of globally open, diverse educational offers. Under this aspect, competence orientation can also be thought of and realised in higher education in a more complex, diverse and systematic way.

### **Credit Transfer and Accumulation Systems**

The Triple Helix Model (ETZKOWITZ und LEYDESDORFF (1995)) is used for describing the innovation processes as a co-operational approach of university, industry and government. It is applied for the development of knowledge based relational networks of the three subsystems and influences the subdomain of education sustainably. The prerequisite for the successful application is a common understanding of quality. The ISO 9001 forms the basis for derived and synthesizing standardization in particular application fields. The ISO 29990 is an example for the non-formal education. It is the standard for learning services determining the essential requirements on service providers in education and training. In the society of highly developed countries as a whole, the comprehensive quality consensus and culture is the one of the main success factors. If experiences are to be transferred and cooperations developed, the quality systems have to be matched. This also applies to education. But, matching is more meaningful than taking over because of the cultural peculiarities, influencing the quality understanding.

Education institutions are subject to enormous transformation because of the massive influence of digitalization, diversification and individualization of learning and training. Usually, the education providers



are too small to meet all the challenges of global changes alone. The strategic orientation has to be focused on regional, national as well as international targets. This results in the need for greater integration, continuity and permeability of the education domains while maintaining and harmonizing high education standards. Therefore, organizational developments are placed in the context of intra-organizational aspects. The organizations are legally and economically largely self-sufficient, but join forces in networks to achieve greater size without losing their flexibility. Such alliances are increasingly addressed by larger providers, too. The coalition of education institutions supported by business and government demands the promise of quality by the single institutions as well as by the network management. The royal road would be the harmonization of the quality management systems on a high level. That is why more and more education providers are implementing quality assurance according to ISO 9001 and transferring this approach into their network relations. The foundations for the implementation of education controlling including the definition of target systems are generated.

Initiated by the Bologna process, extensive regulations on qualification frameworks and evaluations both at national and international level were created in Europe. As well as the corresponding accreditation systems, they serve the better control of increasingly complex processes in high quality. The German accreditation system has proved its worth but it will be adapted to the new challenges by harmonizing the collaboration of the governmental authorities with the education and business providers. The output orientation means more autonomy of decision for the actors in their processes, but better control of the results of learning and training activities by experts from the triple helix. Because these European and international adaptation processes are sometimes slower than the changes in reality and because of their autonomy, some universities, rapidly expanding their international activities, join international quality networks and networks as well as accreditation and evaluation associations and systems additionally. The responsible persons for transnational education cooperation have to match national quality assurance and accreditations in such a way that, despite existing differences, the comparability and recognition of the study programs and degrees are ensured.

The reduction of the quality assurance in educational cooperation on control and controlling of planning, design, implementation and implementation is insufficient for a successful project development. Rather, it is important to understand soft facts, such as intercultural and psychological aspects, in order to establish a trust base. If there is trust and mutual understanding of the processes, the education system or programs can be established by involving all stakeholders. The set of management systems and components for quality and control, as well as for recognition and crediting, can be developed as a coordinated ensemble of methods

and procedures. The mutual recognition of the proof of academic achievements reached on this basis has the key role for bilateral and multilateral cooperation. It ensures the independence of all partners involved, taking into account their specific characteristics, but synchronizes the learning results in the sense of the output orientation at the same time. The processual implementation of the recognition is reflected in the specific crediting systems for study programs or modules. There are interesting and presentable solutions in the global education network collaboration of the German University Consortium for International Cooperations constantly growing in number of members and international relations. New developments will intensify the further development of complex global education systems. Recently, opportunities, challenges and risks to digitization, digital eco-systems, and disruptive models for even more innovations in education are always and also considered from the aspect of quality assurance and improvement in heterogeneous education networks and systems (Schumann & Feng, 2019).

### **Design of Smart Course Systems for Higher Education**

The design of attractive and smart study programs for complex educational systems and portfolios is influenced by a variety of factors, with different groups of stakeholders at several levels contextualizing general complexes, interacting with each other and organizing cooperation at the personnel level (Schumann & Tittmann, 2019).

The holistic approach requires complex consideration from the macro level as a contextual level at the overall system level intervening in large, high-level societal systems, through the meso level as transactional level dealing with small-to-medium-sized groups to the micro level as organizational level solving intrapersonal and interpersonal issues (ivto, 2019; Eco, 2019). Higher education institutions must therefore enter into smart connections with all stakeholders at the contextual level in order to be able to generate smart solutions for multiple study programs at the transactional level in the interaction of the educational organizations, which offer smart applications at the organizational level for the members of the higher education institution, from lecturers to students. Common to all levels is that consistency from global thinking to operational implementation for the development of new multivalent educational pathways for international and intercultural open-minded learners should be achieved with high effectiveness and efficiency on the part of education providers. Smartness in this context means to improve target group oriented education globally, taking into account the essential interests of all stakeholders. The flexibilisation in the use of existing offers of different education providers even with large groups of students has always been seen as an advantage (Douglas, 2005).

The ideal path is via systemic approaches and the associated object orientation, which in practical terms means modularization. The following developments must be taken into account when modularizing:

- Modularization is all-encompassing in educational systems. It is the prerequisite for individualization with simultaneous sustainable development and development of diverse educational paths in flexibly combinable educational offers.
- The smallest educational modules in curricular development are called modules. The trend towards units with a volume of five credit points supports the possibilities of substitution, elimination and addition in the course of coordinating study programs and the associated recognition procedures.
- Modules are not uniformly linked to a defined workload. This can result in significantly different workloads for students.
- Modularization is also increasingly becoming content. As a rule, this type of building block formation is separate from modularization in program development. Rather, it is influenced by methodological aspects.
- If content modules are very strongly disassembled in order, for example, to be able to automatically compile application-related components in intelligent systems, this is also referred to as granulation.
- All modularized systems (portfolios of course offerings, study programs, contents, courses, etc.) can be represented in semantic networks with regard to their mutual relationships and interactions.
- The semantic networks usually comprise more than one delimited subsystem and can therefore be used to generate new solutions, e.g. for hybrid study offers.

## Conclusion and Perspectives

Systemic approaches involving knowledge-organizational, organizational-procedural, contentual-functional, methodological, communicational, interdisciplinary, intercultural, ethical and economic perspectives have proven successful in concrete developments of modularized courses in the field of key technologies on an international scale (Wernz, 2018). At present there is an intensive discussion according to which rules modules should and may be combined in order to achieve not only a high level of education but also the best possible professional qualification. Modules must be combinable in such a way that both educational profiling and vocational orientation are successfully developed. In addition to the classical further development of study programs and their modules, there are influences from globalization, digitalization and artificial intelligence that are omnipresent. This results in three basic, combinable possibilities: Integration of new elements into existing modules, replacement of old ones by new modules as well as conversion of profiles from a traditionally one-dimensional main profiling to hybrid courses of studies or partial courses of studies that combine several training profiles with each other (Gottsburgen, 2019; Heidling, 2019).

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## Prerequisites of Developing MOOCs in Advancing Innovation Competencies Designed for Indonesia 4.0

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### Abstract

Observable arrangements in providing quality satisfied massive open online courses (QS-MOOCs) related to Indonesia 4.0 were detailed in this report. It was expected to visualize determinants of QS-MOOCs viewed by faculty in conjunction with nurturing innovation competencies. It was also worth disclosing how, and in what, behavior those determinants (dimensions/attributes) interrelated. An exploratory design (mixed methods) was applied; qualitative method first and then followed by quantitative series. A conceptual framework was established by first conducting activities consisted of literature reviews, interviews, and focus group discussions. QS-MOOCs included presage, pattern, process, product, practicability, prospective, and power (7P). QS-MOOCs was perceived from scientific, technical, economic, and socio-cultural outlooks. QS-MOOCs had direct effects on innovation competencies (critical thinking, creativity, and networking). The operational framework was then established with 7P, QS-MOOCs, and innovation competencies as independent, moderating, and dependent variables respectively. The population was the academic staff of Universitas Terbuka Indonesia. Respondents were randomly chosen to accumulate data by a survey of 631 faculty members. Methodically, importance-performance analysis (IPA) and customer-satisfaction index (CSI) were emulated and then utilized to synchronously estimate the satisfaction level of QS-MOOCs and their importance degree. Methodologically, 10 hypotheses were developed and examined by applying structural-equation modeling (SEM). This is to scrutinize loading factor and interrelation power amongst determinants involved. Replies from 142 respondents were finally completed. Statistically, seven out of 10 hypotheses examined were validated by the analysis. It was decisively recognized that product (dimension: user-focussed) was the most significant determinant to QS-MOOCs (dimension: socio-culturally adaptable) and then followed by power (inspiring), practicability (advantageous), pattern (well-paced), and prospective (universal). QS-MOOCs had direct control over critical thinking (critical analysis) and creativity (new idea).

Whereas presage, process, and networking were excluded. The quantitative frame was statistically satisfactory as the nine cut-off values were seven in good-fit and two in marginal-fit categories. Still, the study recognized variance refers to the three invalidated hypotheses. The qualitative framework seems inadequately strengthened by the quantitative procedure. Further in-depth reviews are required to find the motives and diminish plausible divergence with wider coverage. This is conducted by searching for more relevant approaches, augmenting conjectural coverage, and/or enlarging the population/sample size. Lastly, the study was able to encounter 24 (of 32) attributes) as the pillars of QS-MOOCs.

**Keywords:** Indonesia 4.0, MOOCs, innovation competencies, IPA-CSI, SEM.

## Introduction

The world is confronted by the Industrial Revolution 4.0. Indonesia requires to be ready to enter the instability. This turbulence is leading to rapid and wide transformations. Indonesia with complexity observed from the population, geographical, and demographical perspectives must be ready on these challenges. The blueprint of Making Indonesia 4.0 roadmap engaged stakeholders: government, industrial sectors, and research/educational institutions (Ministry of Industry, 2017). Commitments involved are compelled to turn the roadmap into success. Five sectors are named as a priority: food and drinks, automotive, textile, electronics, and chemicals. These are five vital sectors in the world economy and Indonesia should become among the leading players. These sectors are envisaged to boost the country's exports to a thriving role in manufacturing sector towards Indonesia's gross domestic product (GDP).

During 2018-2030, Indonesia's GDP growth rates are 6-7% per year. The manufacturing industry is pursued to contribute 21-26% to the nation's GDP by 2030. Job creation through the roadmap is estimated at 7-19 million. The roadmap involves 10 cross-sectoral national initiatives: improving flow of goods, developing roadmap for cross-sectoral industrial zones, improving sustainability standards, empowering the small and medium-sized entrepreneurs, building national digital infrastructure, attracting foreign investment, boosting the quality of local human resources, boosting ecosystem for innovation, designing incentives for investment in technology, and harmonizing regulations and policies. The idea of Making Indonesia 4.0 is in line with Industry 4.0 (Nagy et al., 2018) related to the needs for 21<sup>st</sup>-century skills, called innovation competencies (Watts et al., 2013; Penttila and Kairisto-Mertanen, 2013). These trends are also highlighted by Bialik and Fadel (2015) and Liao et al. (2017). This implies that innovation has a vital role and Indonesia is required to support ways of advancing National innovation competencies.

Having reflected in those settings, Universitas Terbuka should be approvingly involved as higher education institutions in Indonesia. The University, with open distance learning (ODL) mode, is compelled to contribute to coping with Making Indonesia 4.0 in advancing innovation competencies. Considering the population, geographical, and demographical restraints, ODL is suitable for advancing innovation competencies. One way of contributing is to integrate massive open online courses (MOOCs) into the system as it was stated in the business strategic plan (Universitas Terbuka, 2017). Moreover, since 2017 the University has an additional role given by the Ministry of Research, Technology, and Higher Education to promote the Cyber University to higher education community and society in Making Indonesia 4.0. To attain this strategic plan is by providing quality satisfied MOOCs (QS-MOOCs) to support this emerging necessity.

In his previous work, Sembiring (2018a) observed the notions and dimensions of quality MOOCs behold by faculty. It was conceptually found that quality MOOCs involved six notions (6P: presage, process, product, practicability, prospective, and power). This is the elaboration of 3P: presage, process, and product (Biggs, 1993). Besides, 6P leads to knowledge, skills, and professionalism. These findings were related to the main role of universities in creating, spreading knowledge, and other academic entities with new approaches. The rise of the Internet and large-scale digitization of information (an advancement in Information Communication Technology) created openings. They are openings to transform how: (1) teaching-learning are developed and utilized, (2) knowledge-information are generated and distributed, and (3) interaction amongst students-staff-institutions are accommodated and facilitated, as highlighted by de Hart (2014), and adopted by Sembiring and Rahayu (2019). For this study, one dimension is added: the pattern.

Having reflected on issues of Making Indonesia 4.0 (and in accordance with Industrial Revolution 4.0, and the need for the 21<sup>st</sup>-century skills), Universitas Terbuka should support the government. Universitas Terbuka, with 35 years of experiences, should take part in this movement. One way of contributing to nurturing National innovation competencies is by developing quality satisfied programs to support the industrial sectors. By having a quality satisfied program, exclusively through MOOCs, the University is in the right path of making higher education open to all. The integration of quality satisfied MOOCs (QS-MOOCs) will give benefits to educational stakeholders.

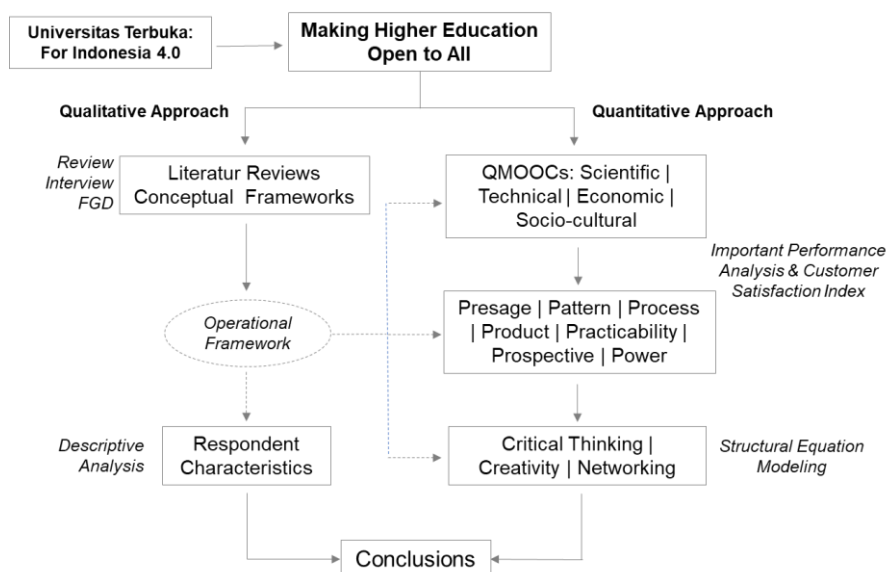
Therefore, the study is instigated to elucidate conceivable determinants on developing QS-MOOCs perceived by faculty in accordance with Making Indonesia 4.0. Four main issues are then explored further: (1) what are variables/factors and dimensions/attributes underpinning QS-MOOCs; (2) how are they interrelated one



another and in what behavior; (3) how QS-MOOCs will support the idea of Making Indonesia 4.0; and (4) how QS-MOOCs are relevant for Indonesia 4.0 through Universitas Terbuka tradition?

### Literature Reviews and the Frameworks

Conceptually, the exploratory framework starts with general perspectives on MOOCs movement in Universitas Terbuka ambience. This is the basis for the University to provide broader opportunities to “making higher education open to all”; tagline of the University. This endeavor is related to the advancement of innovation competencies (critical thinking, creativity, and networking) perceived by faculty towards Making Indonesia 4.0 (Figure 1).



**Figure 1. The Conceptual Framework**

This conceptual framework (Figure 1) is then utilized as a tool of weighing up QS-MOOCs and their inferences. This will let the University modifying important aspects related to operational elements. It might focus on institutional directions to accomplish users’ need and expectation. The University will then be able to maintain and make progress on the growth of QS-MOOCs as projected and stated in the formal document of the University. This is the way how the University is searching for proper orientation to maintain its function in eradicating access to quality education (Universitas Terbuka, 2018).

It is worth perceiving that QS-MOOCs were initially determined by 6P (Sembiring, 2018). The 6P is an extension of 3P (Biggs, 1993) and elaborated by Hood and Littlejohn (2016). As emphasized by Gemage et al. (2015), this conceptual framework is essential issues to understand what drives motivation, interest, and changing the culture from “must learn” into “want to learn”. The pedagogic aspect should remain the same as it was delivered in the traditional teaching/learning settings. In this report, quality satisfied measures for MOOCs were determined by seven main factors, the 7P (enrichment of 3P and 6P). Each variable is then elaborated into dimensions/attributes related to QS-MOOCs context. Besides, QS-MOOCs leads to critical thinking, creativity, and networking.

No	Variables	Dimension	Notes
1	Presage X <sub>1</sub>	X <sub>11</sub> : Platform X <sub>12</sub> : Well-design X <sub>13</sub> : Methodical X <sub>14</sub> : As expected by users	X <sub>1</sub> –X <sub>7</sub> , Y <sub>1</sub> , and Y <sub>2</sub> –Y <sub>4</sub> are correspondingly independent, intervening and dependent variables  Each variable has 4 dimensions; each dimension is accordingly measured by a single statement  Statements included in X <sub>1</sub> –X <sub>7</sub> and Y <sub>1</sub> will be answered two times simultaneously by respondents  The first answer of the statements is measuring their opinion (satisfaction) level; the second answer of the same statements is measuring the importance degree of their opinion  Y <sub>1</sub> was influenced by X <sub>1</sub> –X <sub>7</sub> Y <sub>2</sub> –Y <sub>4</sub> are influenced by Y <sub>1</sub>  Statements included in Y <sub>2</sub> –Y <sub>4</sub> are answered just one time with one statement for one dimension accordingly  Total attributes: [(X <sub>1</sub> -X <sub>7</sub> +Y <sub>1</sub> )x4]=32  Total statements: [(32x2)+(1x12)+1*]=77  The last one statement [*] is on the overall perception of respondents about the whole existing quality MOOCs provided and publicly offered by the University for everybody
2	Pattern X <sub>2</sub>	X <sub>21</sub> : Flexible X <sub>22</sub> : Well-paced X <sub>23</sub> : Organized X <sub>24</sub> : Complete	
3	Process X <sub>3</sub>	X <sub>31</sub> : Pedagogy X <sub>32</sub> : Inclusive X <sub>33</sub> : Systematic X <sub>34</sub> : Functional	
4	Product X <sub>4</sub>	X <sub>41</sub> : User-focused X <sub>42</sub> : Well-presented X <sub>43</sub> : Appealing X <sub>44</sub> : Premium quality	
5	Practicability X <sub>5</sub>	X <sub>51</sub> : Innovative X <sub>52</sub> : Advantageous X <sub>53</sub> : Affable X <sub>54</sub> : Manageable	
6	Prospective X <sub>6</sub>	X <sub>61</sub> : Novelty X <sub>62</sub> : Corresponding X <sub>63</sub> : Insightfull X <sub>64</sub> : Universal	
7	Power X <sub>7</sub>	X <sub>71</sub> : Encouraging X <sub>72</sub> : Inspiring X <sub>73</sub> : Satisfying X <sub>74</sub> : Maintanable	
8	Quality MOOCs Y <sub>1</sub>	Y <sub>11</sub> : Scientifically proveable Y <sub>12</sub> : Technically feasible Y <sub>13</sub> : Economically beneficial Y <sub>14</sub> : Socio-culturally adaptable	
9	Critical thinking Y <sub>2</sub>	Y <sub>21</sub> : Critical analysis Y <sub>22</sub> : Estimating risk Y <sub>23</sub> : Evaluating solution Y <sub>24</sub> : Influencing decision making	
10	Creativity Y <sub>3</sub>	Y <sub>31</sub> : New idea Y <sub>32</sub> : New solution Y <sub>33</sub> : Starting new activity Y <sub>34</sub> : Executing solution	
11	Networking Y <sub>4</sub>	Y <sub>41</sub> : Tollerance on differences Y <sub>42</sub> : Appreciating others Y <sub>43</sub> : Establishing networking Y <sub>44</sub> : Maintaining networking	

**Table 1. Variables and Dimension Involved**

Conceptually, QS-MOOCs was adequate and relevant if and only if they were scientifically provable,

technically feasible, economically beneficial, and socio-culturally adaptable (Sembiring, 2017). This configuration had direct effects on critical thinking, creativity, and networking in accordance with Indonesia 4.0. Having finalized the conceptual framework, the study comes to elaborating and defining the operational framework. It was defined first the origins of QS-MOOCs was 7P and it led to innovation competencies (Sembiring and Rahayu, 2019). Having conceptually defined variables and dimensions engaged, they are easier to comprehend as exhibited in Table 1.

Operationally, presage ( $X_1$ ) was defined as the first factor of QS-MOOCs that has a well-designed platform and it was methodically arranged by first considering user expectation. Pattern ( $X_2$ ) was defined as the second factor that has a flexible format and arranged in a well-paced segment and complete. Process ( $X_3$ ) was defined as the third factor considering the pedagogical aspect that it was inclusively and systematically arranged to assure it is functional. Product ( $X_4$ ) was defined as the fourth factor putting user as the center of the interaction, well-presented, and appealing with premium quality. Presage, process, and the product was inspired by Biggs (1993).

Correspondingly, practicability ( $X_5$ ) was defined as the fifth factor innovatively developed so it gives advantage, affable, and manageability from a user perspective. Prospective ( $X_6$ ) was defined as the sixth factor that has novelty and it is universally connected to the user as it includes relevant and current relevant insights. Power ( $X_7$ ) was defined as the seventh factor that inspiring user with high satisfaction. Pattern, practicability, prospective, and power were adopted from Sembiring (2018a). These definitions were partly adopted and modified from Downes (2013), Lin et al. (2015), Littlejohn et al. (2016), Margaryan et al. (2015), and Hood and Littlejohn (2016).

QS-MOOCs ( $Y_1$ ) was operationally defined as a condition where the ultimate product of MOOCs should be scientifically provable, technically feasible, economically beneficial, and socio-culturally adaptable (Sembiring, 2017 and 2019). Besides, critical thinking ( $Y_2$ ) was defined as the power of QC-MOOCs to deliver critical analysis, estimating risk, evaluating the solution, and influencing the decision making process to the users. Creativity ( $Y_3$ ) was defined as the function of QS-MOOCs to provide ability in introducing a new idea, a new solution, starting a new activity, and executing a solution. Networking ( $Y_4$ ) was defined as the potency of QS-MOOCs to support a sense of tolerance on differences, appreciating others, establishing a network, and maintain the network. These last elaborations were partly inspired by Bialik and Fadel (2015) and Liao et al. (2017).

At this stage, dimensions/attributes elaborated are fundamentals followed from the conceptual framework. It is then utilized as a basis to propose the operational framework. Prior to launching the operational frame, it is worth noting that QS-MOOCs ( $Y_1$ ) were determined by 7P ( $X_1$ - $X_7$ ). QS-MOOCs ( $Y_1$ ) was to deliver innovation competencies. Innovation competencies are related to Making Indonesia 4.0 as an approach in preparing golden generation towards 2045 (100 years of Indonesia as an independent nation) viewed from

Universitas Terbuka tradition.

## Research Design and Hypotheses

Next is to establish the operational framework by considering the grand design (Figure 1) and the variables/dimensions involved (Table 1). This framework is utilized as a basis to determine the design, methodology, analysis, and inferring the conclusions (Figure 2).

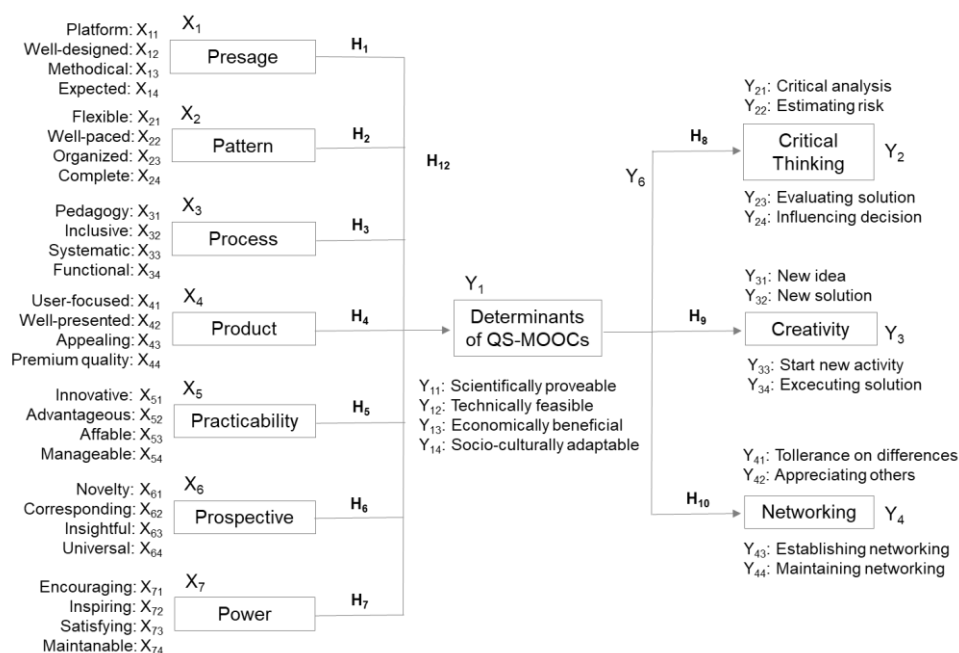


Figure 2: The Operational Framework

This inquiry uses mixed methods: exploratory design (Creswell and Clark, 2011). It is prearranged under qualitative first and then followed by a quantitative approach. Two kinds of instruments were developed. They are a list of questions for the interview and focus group discussion (qualitative process) and questionnaire to accumulate data from respondents (quantitative purpose). Table 1 and Figure 2 underlined the basics of QS-MOOCs related to developing innovation competencies and it includes scientific, technique, economic, and socio-cultural attributes.

QS-MOOCs (Y<sub>1</sub>) was assessed by perceiving dimensions/attributes of: X<sub>1</sub> (presage: platform, well-designed, methodical, and expected), X<sub>2</sub> (pattern: flexible, well-paced, orderly, and complete), X<sub>3</sub> (process: pedagogy, inclusive, systematic, and functional), X<sub>4</sub> (product: user-focused, well-presented, appealing, and premium quality), X<sub>5</sub> (practicability: innovative, advantageous, affable, and manageable), X<sub>6</sub> (prospective: novelty,

corresponding, and universal), and X<sub>7</sub> (power: encouraging, inspiring, satisfying, and maintainable).

An instrument for qualitative processes included four specific queries. (1) What are the conceivable factors (dimensions/attributes) with respect to developing QS-MOOCs. (2) How the behaviors of factors involved interrelated are exemplified. (3) How QS-MOOCs are tightly related to the idea of Making Indonesia 4.0. (4) What are the basic ideas that QS-MOOCs relevant to developing human capital through Universitas Terbuka tradition.

The instrument for quantitative approach consisted of 77 statements [(32x2)+(1x12)+1]=77] and Likert Scale (1-5) related to QS-MOOCs satisfaction and their importance degree; with 17 statements to validate independent variables (dimensions) with respect to QS-MOOCs as moderating variable (Table 1). The questionnaire is explored by considering variables/dimensions engaged inspired by Shahzavar and Tan (2011). Purposive sampling was chosen to select four experts for qualitative purposes and simple random sampling to determine eligible respondents for quantitative purposes (Cochran, 1977). A survey was started to collect data from respondents (Fowler, 2014). An important-performance analysis and customer-satisfaction index (IPA-CSI) were emulated and applied to simultaneously measure the satisfaction level of QS-MOOCs along with their importance degree (Wong et al., 2011). Structural-equation modeling (SEM) is applied to detect relations power among variables engaged (Hair et al., 2009 and Marks et al., 2005).

This inquiry establishes and then scrutinizes ten hypotheses (H<sub>1</sub>-H<sub>10</sub>, Figure 2). QS-MOOCs were influenced by: presage (H<sub>1</sub>), pattern (H<sub>2</sub>), process (H<sub>3</sub>), product (H<sub>4</sub>), practicability (H<sub>5</sub>), prospective (H<sub>6</sub>), and power (H<sub>7</sub>). Furthermore, critical thinking (H<sub>8</sub>), creativity (H<sub>9</sub>), and networking (H<sub>10</sub>) were influenced by QS-MOOCs. These 10 hypotheses will be examined under the SEM technique to validate relations amongst variables/dimensions engaged. The validation is aimed at examining the significance level of the relations and it is used to scrutinize the power of relations afterward.

Respondents=142 (631)	%	%	%	%	
Faculty of	Education = 45	Social = 18	Economics = 19	Sciences = 18	
Echelon	One = 0	Two = 2	Three = 2	Four = 3	Non-Ech
Work Experience year	1–5 = 3	6–10 = 19	11–15 = 30	16–20 = 38	≥ 21
Age year	≤ 30 = 2	31–40 = 14	41–50 = 27	51–60 = 44	≥ 61
Involved in OER year	< 2 = 1	2–3 = 16	4–5 = 36	6–7 = 32	≥ 8
Position	Prof = 1	Senior = 18	Junior = 77	Assistant = 1	Candidat
Background	S3 = 11	S2 = 89	Office	Central = 53	Regional

**Table 2: Respondents Characteristics**

## Results and Arguments

Prior to conferring the result, good to note the highlight of respondents' characteristics (Table 2). This will

induce our perception of how to interpret the outcomes in a more proper way.

The population was 631 academic staff of Universitas Terbuka; 142 of them were accomplished the questionnaires. Almost half of the respondents are from the Faculty of Education. They all can be categorized as experienced and senior staff with five years or more involvement in MOOCs. More than half are working in the central office and the rest are domiciled in other 40 regional offices. Most of them are aware of MOOCs as academic at the University and part of the academic community related to Indonesia 4.0. This implies insights accumulated were satisfactory.

The hypothesis analysis. The statistical analysis reveals that three of 10 hypotheses examined are not validated by the analysis (Figure 2). They are: presage ( $H_1$ ) and process ( $H_3$ ) with respect to QS-MOOCs and so is QS-MOOCs to networking ( $H_{10}$ ), as the  $p\text{-value} \leq 1.96$ , for  $\alpha=5\%$ . Whereas the seven hypotheses are authenticated, as the  $p\text{-value} \geq 1.96$ , for  $\alpha=5\%$ . The validated hypotheses are: pattern ( $H_2$ ), product ( $H_4$ ), practicability ( $H_5$ ), prospective ( $H_6$ ), and power ( $H_7$ ) with respect to QS-MOOCs and so is QS-MOOCs to critical thinking ( $H_8$ ) and creativity ( $H_9$ ).

Now. Let us reveal the satisfaction level of QS-MOOCs and the degree of their importance resulted from IPA-CSI analysis. The analysis engenders attributes related to the relevant quadrants to know their behavior. Graphically, IPA-CSI Chart has four quadrants (Q).  $Q_1$  indicates QS-MOOCs attribute is at a low level while the degree of its importance is high.  $Q_2$  indicates both QS-MOOCs attribute and the degree of its importance are being placed at a high level.  $Q_3$  indicates QS-MOOCs attribute and degree of its importance are at a low level.  $Q_4$  indicates QS-MOOCs attribute is in the low level of importance, high in satisfaction (Deng and Pierskalla, 2018).

**$Q_1$  [Concentrate Here].** Three out of 32 attributes (Table 1 and Figure 2) fall in this quadrant. They are: economically beneficial ( $Y_{13}$ ), complete ( $X_{24}$ ), and innovative ( $X_{51}$ ). This implies that the University must notice these attributes seriously. They are important but low in satisfaction. It implies that most faculty have already been aware of the movement related to Indonesia 4.0, the QS-MOOCs should be economically beneficial, complete, and innovative.

**$Q_2$  [Maintain Performance].** There are 24 attributes fall in this quadrant. They are: platform ( $X_{11}$ ), well-design ( $X_{12}$ ), and expected ( $X_{14}$ ); flexible ( $X_{21}$ ), well-paced ( $X_{22}$ ), and organized ( $X_{23}$ ); inclusive ( $X_{32}$ ) and systematic ( $X_{33}$ ); user-focused ( $X_{41}$ ), well-presented ( $X_{42}$ ), appealing ( $X_{43}$ ), and premium quality ( $X_{44}$ ); advantageous ( $X_{52}$ ), affable ( $X_{53}$ ), and manageable ( $X_{54}$ ); novelty ( $X_{61}$ ), corresponding ( $X_{62}$ ), insightful ( $X_{63}$ ), and universal ( $X_{64}$ ); encouraging ( $X_{71}$ ), inspiring ( $X_{72}$ ), and satisfying ( $X_{73}$ ); scientifically provable ( $Y_{11}$ ), technically feasible ( $Y_{12}$ ), and socio-economically ( $Y_{13}$ ) adaptable. The University must take care of these attributes as they are the best basics of QS-MOOCs. Attributes fall in this quadrant are the strengths and pillars of promoting QS-MOOCs in Universitas Terbuka in terms of Indonesia 4.0. Besides, these 24 attributes should become the pride of the University as a basis of developing QS-MOOCs. Providentially, most respondents have been aware of these

attributes as an assurance to provide QS-MOOCs.

**Q<sub>3</sub> [Low Priority]**. Three attributes fall in this quadrant. They are: functional ( $X_{34}$ ), manageable ( $X_{54}$ ), and maintainable ( $X_{74}$ ). The university should classify these as the next focus after concentrating to maintain critical points in  $Q_2$ . Any attribute falling into this quadrant is not critical and poses no threat. The University may redirect resources to attributes fall in  $Q_1$ , shift them into  $Q_2$ .

**Q<sub>4</sub> [Possible Over Kill]**. Two points as members of this quadrant. They are: methodical ( $X_{13}$ ) and pedagogy ( $X_{31}$ ). Attention to attributes in this quadrant can be less focused. The university can save costs by redirecting them to take up vital spots by anticipating no attributes will fall into  $Q_1$  and keep maintaining fundamental spots in  $Q_2$ .

Having positioned attributes in accordance with IPA-CSI chart, it is time to relate loading factors to observe the power of relations each variable under SEM to work out the outcomes (Marks et al., 20015 and Hair et al., 2009). Five critical upshots need to be elaborated further.

1. The first was related to the variables/dimensions directly influenced QS-MOOCs. They are: product ( $X_4$ ) followed by power ( $X_7$ ), practicability ( $X_5$ ), pattern ( $X_2$ ), and prospective ( $X_6$ ). While QS-MOOCs are not influenced by both presage ( $X_3$ ) and process ( $X_3$ ) and so is QS-MOOCs with respect to networking ( $Y_4$ ); see Figure 2.
2. The second is on the order of attributes in the product ( $X_4$ ): user-focused ( $X_{41}$ ), well-presented ( $X_{42}$ ), premium quality ( $X_{44}$ ), and appealing ( $X_{43}$ ). The order of attributes in power ( $X_7$ ): inspiring ( $X_{72}$ ), encouraging ( $X_{71}$ ), satisfying ( $X_{73}$ ), and maintainable ( $X_{74}$ ). The order of attributes in practicability ( $X_5$ ): advantageous ( $X_{52}$ ), manageable ( $X_{54}$ ), innovative ( $X_{51}$ ), and affable ( $X_{53}$ ). The order of attributes in the pattern ( $X_2$ ): well-paced ( $X_{22}$ ), complete ( $X_{24}$ ), flexible ( $X_{21}$ ), and organized. The order of attributes in prospective ( $X_6$ ): universal ( $X_{64}$ ), novelty ( $X_{61}$ ), corresponding ( $X_{63}$ ), and insightful ( $X_{63}$ ).
3. The third is related to relations power of moderating variable and dependent variables. QS-MOOCs has significant effects on critical thinking ( $Y_2$ ) and creativity ( $Y_3$ ); networking ( $Y_4$ ) to QS-OER was excluded by the analysis.
4. The fourth is the order of attributes in QS-MOOCs: socio-culturally adaptable ( $Y_{14}$ ) followed by technically feasible ( $Y_{12}$ ), economically beneficial ( $Y_{13}$ ), and scientifically provable ( $Y_{11}$ ).
5. The fifth concern is on the rank of attributes within critical thinking ( $Y_2$ ): critical analysis ( $Y_{21}$ ), influencing the decision ( $Y_{24}$ ), estimating the risk ( $Y_{22}$ ), and evaluating solution ( $Y_{23}$ ). The rank of attributes in

creativity ( $Y_3$ ): new idea ( $Y_{31}$ ), new solution ( $Y_{32}$ ), executing solution ( $Y_{34}$ ), and start a new activity ( $Y_{33}$ ).

Before validating comprehensive conclusion under the mixed methods, we need to reflect whether SEM output is methodically in “good-fit” category. If so, it is reliable to utilize the analysis and engender loading factors to confirm the power of interrelations (Table 3).

<b>Goodness of Fit</b>	<b>Cut-off Values</b>	<b>Results</b>	<b>Notes</b>
<i>RMR</i> Root Mean Square Residual	$\leq 0.05$ or $\leq 0.10$	0.08	Good Fit
<i>RMSEA</i> Root Mean Square Error of Approximation	$\leq 0.08$	0.08	Good Fit
<i>GFI</i> Goodness of Fit	$\geq 0.90$	0.91	Good Fit
<i>AGFI</i> Adjusted Goodness of Fit Index	$\geq 0.90$	0.91	Good Fit
<i>CFI</i> Comparative Fit Index	$\geq 0.90$	0.88	Marginal Fit
<i>NFI</i> Normed Fit Index	$\geq 0.90$	0.91	Good Fit
<i>NNFI</i> Non-Normed Fit Index	$\geq 0.90$	0.92	Good Fit
<i>IFI</i> Incremental Fit Index	$\geq 0.90$	0.90	Good Fit
<i>RFI</i> Relative Fit Index	$\geq 0.90$	0.89	Marginal Fit

**Table 3: The Goodness-of-Fit of the Tested Framework**

The analysis confirmed they were considered satisfactory. Seven were in good-fit and two in marginal-fit categories (Table 3). It means the validated framework was dependable. Likewise, three estimations ought to be explored. The first is on the gap obtained using an exploratory design. The second is the reasons adjacent to the respondents’ characteristics. The third is on the implication of findings for the future query.

*First.* QS-MOOCs were qualitatively interrelated with 7P. The moderating variable was interconnected with independent variables. There were two dimensions of independent variables (presage and process) were not quantitatively interrelated, and so is QS-MOOCs to the dependent variable (networking). This implied that qualitative and quantitative results varied despite they did not substantially contradict one another. The exploratory design was conducted by synthesizing related theories and end up with hypothesis development. A quantitative frame is then established prior to hypotheses interpretation (Creswell and Clark, 2011) to assess the qualitative aspects of exploratory findings. Before building the operational, the conceptual framework should be first established as it will be statistically scrutinized. The results showed three hypotheses were not approved. The order of dimensions/attributes in the initial framework was disharmony as compared to the quantitative upshots. The quantitative imperfectly approved qualitative discoveries.

*Second.* Most respondents were reasonably qualified in MOOCs (table 2) observed from background, position, working experience, age, and qualification. The majority have had adequate experience in MOOCs. It is then plausible that they might be able to foresee QS-MOOCs as a good attempt to developing critical thinking and creativity. It is unfortunate that networking is not included as the way of developing human capital in Making Indonesia 4.0. As the respondents are all academic, mainly involved in teaching and learning, they are able to foresee how QS-MOOCs is suitable to enhance the strength of the nations by



equipping human capital to improve their critical thinking and creativity through ODL approach.

*Third.* Future research can involve users/experts from other institutions. There must be a balance between qualitative and quantitative outcomes. Whatever we do, it is important to bear in mind that we are in the position to prepare and promote effective QS-MOOCs. These efforts are to promote lifelong learning to the world, especially for preparing Indonesia golden generation on the road to 2045 (100 years of Indonesia as an independent nation).

### **Conclusions**

The University has been in service since 1984 with 1.6 million graduates and serving 300,000 students per semester. It is believed that Universitas Terbuka is on the right path to contribute through the provision of QS-MOOCs towards Making Indonesia 4.0. The study is conclusively able to clarify determinants underpinning QS-MOOCs: product, power, practicability, pattern, and prospective. The result is also able to expose how and in what behaviors they were interrelated one another. QS-MOOCs through Universitas Terbuka is relevant to develop critical thinking and creativity provided they are complete, innovative, and economically beneficial related to Making Indonesia 4.0. This can be attained by prudently maintaining 24 attributes in  $Q_2$  and shifting three attributes in  $Q_1$  into  $Q_2$ .

The study has discovered slight variations between qualitative and quantitative approach. Three of 10 hypotheses were invalidated. This implied the established qualitative framework was imperfectly approved by quantitative analysis. Further inquiry is therefore needed by enlarging the scope of the study and inviting other communities from other related institutions as respondents and/or experts. This is to find motives why they are varied and at the same time searching for an approach to make the consequences closer under exploratory design.

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## Educational Data Mining to promote active methodologies: analysis of learning patterns in Syphilis courses at AVASUS

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### Abstract

The increase in enrollment of online education in Brazil is currently a phenomenon. Between 2000 and 2013 online education in public institutions increased from 5,287 to 515,405 students. Today, only the Virtual Learning Environment of the Unified Health System (AVASUS abbreviation in Portuguese) already has more than 340,000 users, 729,000 enrollments in 173 courses. It is important to say that OERs that we design and offer at AVASUS for the Ministry of Health are aimed at contributing to online lifelong learning for healthy living and well-being. These students have increased the records of activities and actions performed in the AVASUS Databases, in which, they are already approaching the 1 Terabyte mark. The problem is that records are most often used only during the execution of a curricular component and almost always for monitoring and defining student outcomes. From this scenario, the general problem of this project arises that is to develop technologies that capture, interpret, validate and return to the student different training and updating possibilities to obtain a desired competency. For this, we analyze important data that can subsidize computational resources that allow to investigate the temporal patterns of learning of the students and the aspects related to the courses, for example, their training paths and quality of learning objects. Using Learning Analytics and Educational Data Mining (EDM) techniques, we analyze three basic aspects of learning patterns: Cognitive, Metacognitive, and Resource Management data. Through the use of EDM it was possible to discover the most commonly patterns of use presented by the students and to classify them according to the type of self-regulated learning strategy adopted. For this

study, we used courses aimed at combating Syphilis, currently one of the diseases that receive the most attention by the Brazilian Ministry of Health for prevention and health promotion due to its alarming numbers of infection and epidemiology. In this sense, it is essential to research two well-known processes and guiding the formalization of courses and contents operated through AVASUS technologies: the promotion of active methodology and student engagement. Preliminary data in the selected courses point to a 40% improvement in the time taken to develop the desired competence, a reduction in the congestion rate (those that do not conclude) by 30%, and a success rate of 70% after track development based on student data. This research is still under development for the 300,000 AVASUS students.

**Key Words:** Learning Analytics, Educational Data Mining, On Line Education, AVASUS, Lifelong Education

## Introduction

E-learning has in Brazil in the last 15 years its great rise. Data from the Brazilian Society for Distance Education point to an increase of more than 500 times the number of students and new enrollments in this modality in the country, following a worldwide trend of increases in new information and communication technologies for the educational process.

E-learning has experienced a significant increase in the offer of courses in the most diverse areas, levels and formats, an aspect that coincides with the beginning of the use of Information and Communication Technologies (ICT) as mediators of this process, mainly the Internet and the Learning Management System (LMS).

The increase in enrollments in the e-learning can be verified through data from the Statistical Synopsis of Higher Education, produced by the National Institute of Educational Studies and Research (INEP abbreviation in Portuguese), which show that between the years 2000 and 2005 the e-learning increased from 5,287 admissions to 127,014, reaching 431,597 in 2011 and 515,405 in 2013.

As such, the number of enrollments is not enough, e-learning in Brazil has expanded its areas of expertise, reaching as soon as technical areas, as well as its ability to simulate, increment and communicate new elements through increasingly sophisticated and intelligent virtual environments. These environments, which were initially intended only for the availability of virtual interaction and content availability tools, have, with

the advent of the analysis and mining of large data, understood the forms of teaching and analyzed the ways of learning of the students.

The Federal University of Rio Grande do Norte (UFRN abbreviation in Portuguese), has been at the forefront of the development of pedagogical materials and content available to be worked and interacted in e-learning since 2003, with undergraduate and postgraduate courses in several areas, with emphasis on Human, Exact and Biological Sciences.

As part of this effort and in partnership with the Laboratory of Technological Innovation in Health (LAIS abbreviation in Portuguese), since 2013, both SEDIS and LAIS, develop a important project to improve, amplify and re-program their virtual environments and new proposals to meet the area of health and the training of professionals focused on health education.

### **The AVASUS**

Learning Management System of the Unified Health System (AVASUS abbreviation in Portuguese) was developed based on the Moodle (Modular Object-Oriented Dynamic Learning Environment). Moodle is a open source learning platform available under the GNU General Public license.

Because it is open source, Moodle can be customized and modified for the needs of those who install it. Its modular feature allows you to create plugins and themes without the need to modify its central code, also allowing integration with external applications, among other possibilities. In addition, Moodle has a great scalability, being able to support from few users, to millions (Moodle, 2019).

Taking advantage of all these characteristics, AVASUS was developed, initially in a pilot project, and is currently in version 2.0. It has an enormous amount of users, close to reaching the mark of the 400,000 users registered. The total number of courses exceeds 180 and the number of enrollments are close to 800,000, with more than 400,000 certificates issued.

Therefore, the notion of the size and importance of this environment in the training of health professionals in Brazil, serving all 27 states of the country, especially with contents related to prevention, health promotion, worker health and health care.

Since 2015, AVASUS was required to develop, qualify, implement and analyze, computational elements of comprehension of the student profile, teaching materials and the media developed especially for the set of courses related to the combat of Sexually Transmitted Infections, particularly to Syphilis, on the occasion of the project "Sífilis não!", a project also developed in LAIS and that gathers in one of its goals the mass education and communication through the mapping as well as the analysis of learning of the students contained within the itineraries of related knowledge with IST, and syphilis.

### ***Project "Sífilis Não"***

It is important to understand why there is currently a project in Brazil to combat Syphilis and the training of professionals to this end, with the development of learning analytics techniques to improve the short-term performance of the practice of health professionals in the networks health care.

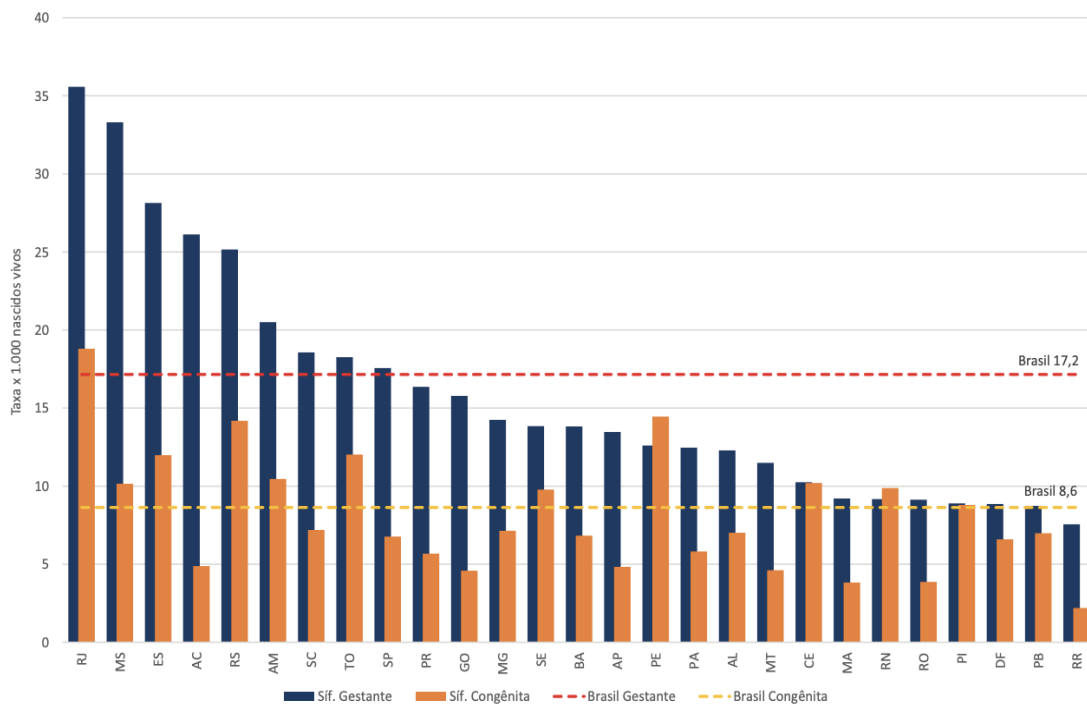
Syphilis is highlighted in these proposals, as this infection in the last decade has shown an increase of approximately 5,000% in their cases, according to data from the Ministry of Health.

Thus, in comparison with other types of epidemics, this is an alarming fact, since in addition to having extremely high transmissibility data, its epidemiological rate is overcoming many other types of epidemics, including other Sexually Transmitted Infections (STIs), overloads the public health system in many aspects.

Comparing with the data from the year 2016, there was a 28.5% increase in the detection rate in pregnant women, 16.4% in the incidence of congenital syphilis and 31.8% in the incidence of acquired syphilis, which increased from 44/100,00 in 2016 to 58 cases per 100 thousand in 2017.

According to the Epidemiological Bulletin of Syphilis (2018), in congenital syphilis, Porto Alegre, Recife, Natal, Fortaleza, Manaus, Rio de Janeiro, Salvador, Teresina, João Pessoa, Florianópolis, Maceió, Campo Grande, Belo Horizonte, Palmas, Vitória, São Luís and Porto Velho showed a higher incidence rate than the

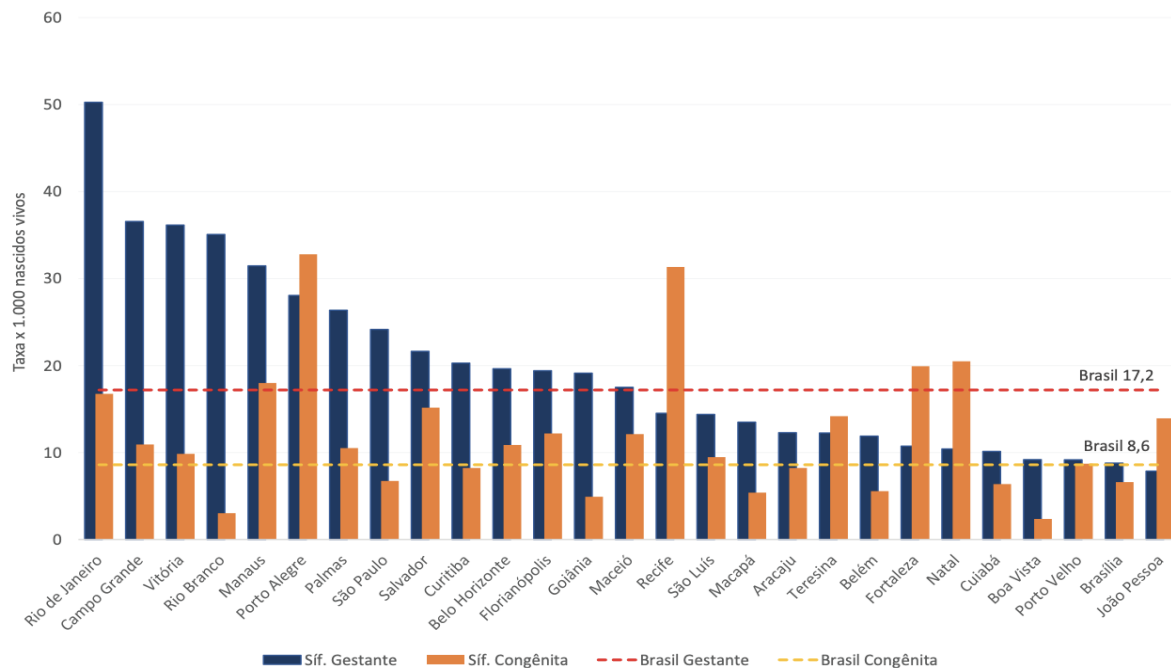
rest of Brazil, observing that the cities of Recife, Natal, Fortaleza, João Pessoa, Porto Alegre and Teresina had a higher incidence rate of congenital syphilis than those of syphilis in pregnant women. (Image 1)  
 In 2016, in addition to these cities, Maceió and Aracaju also presented congenital syphilis rates higher than those of syphilis in pregnant women.



**Image 1: Rates of congenital syphilis by State. Source: Notification System of Sinan (Sinan), updated on 06/30/2017.**

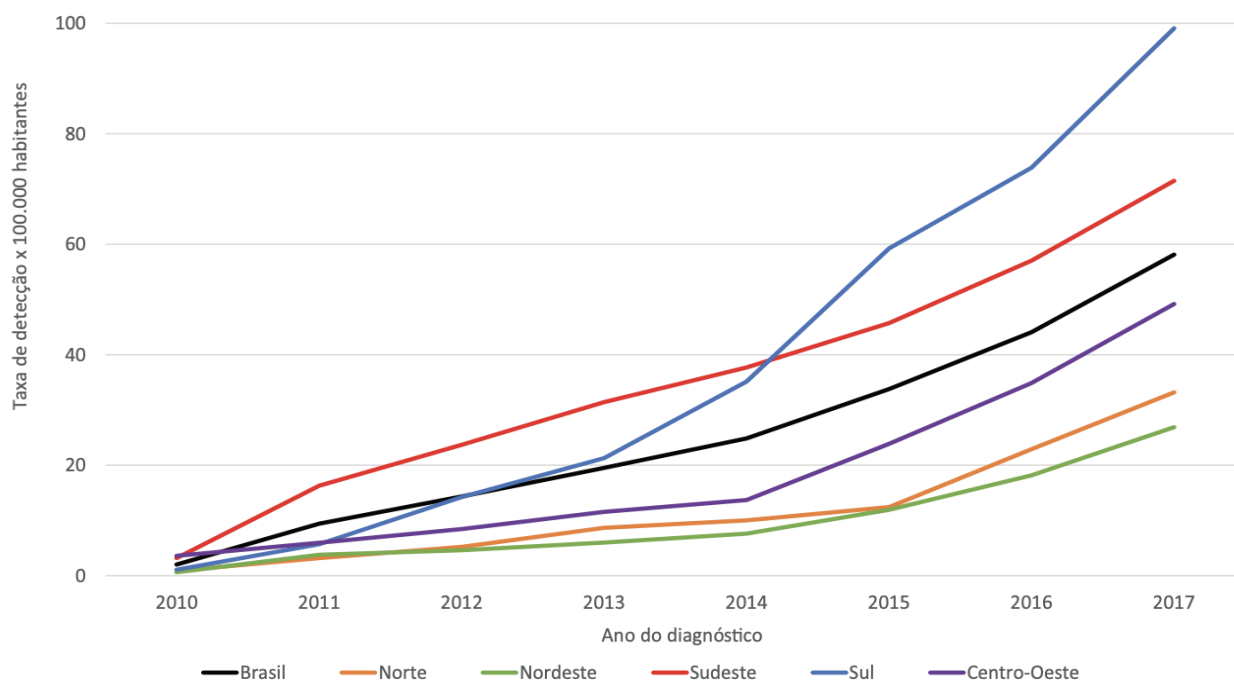
Congenital syphilis data are more serious than those of acquired transmission, since in most cases it surpasses the average of gestational syphilis and acquired syphilis, in an upward trend, accelerated and recurrent increase, as shown in the graph below:





**Image 2: Growth rate of congenital syphilis compared to maternal syphilis by State. Source: Notification System of Sinan (Sinan), updated on 06/30/2017.**

According to the Epidemiological Bulletin of Syphilis(2018), when analyzing the historical series of reported cases of syphilis, 249,852 (39.9%) of them occurred in men and 376,886 (60.1%) in women, of whom 169,339 (44.9% %) reported as acquired syphilis and 207,547 (55.1%) reported as syphilis in pregnant women, showing growth in all regions of Brazil since 2010, the initial year of compulsory notifications.



**Image 3: Growth rate of all types of syphilis, by historical series in Brazil since 2010. Source: Notification System of Sinan (Sinan), updated on 06/30/2017.**

### ***Syphilis combat by courses***

From the general situation of syphilis in Brazil and the epidemiology linked to it, there is in fact a need to create and strengthen the health care and promotion network, especially among health professionals who need to support and strengthen the fight against sexually transmitted diseases with a focus on prevention, treatment and knowledge about the disease, forms of transmission and transmission.

The project of training, development and follow-up of courses directly related to the general proposal to combat syphilis. Currently 7 courses on AVASUS are focused on or related to the fight against Syphilis:

- **Primary Health Care, Family Health Strategy and Territorialization:** has a 30-hour workload and 1501 enrolled students. This module addresses the work process in family health care, reflecting on the process of territorialization, bonding, coordination of care, and the attached population;
- **National LGBT Comprehensive Health Policy:** has a workload of 45 hours and 5201 students enrolled. This module was organized in a partnership between the Ministry of Health and the State University of Rio de Janeiro through the UNA-SUS, contributing with health professionals and SUS

workers to carry out their care, promotion and prevention actions with quality, guaranteeing the LGBT population access to integral health;

- **Expanded Clinic and Matrix Support:** has a workload of 30 hours and 7104 students enrolled. This module will discuss the expanded conception of health and also its organization of the work process, together with clinical management tools, as well as the concept of Matrix Support and its application by the teams of the Family Health Support Centers and the Support Centers Psychosocial, in addition to the concept of Unique Therapeutic Project;
- **Observation in the Health Unit:** has a workload of 30 hours and 649 students enrolled. It is a module that was initially offered for specialization classes in Family Health Care and was open to the general public. In it is presented to the student how the Health Unit works in the organizational structure of the Unified Health System, SUS. The student will be able to know the Health Unit as a point of attention in the Network of services, with information on organization and functioning, aiming at improving services and improving quality and access;
- **Syphilis: Have a seat here comes information!:** has a workload of 5 hours and 821 students enrolled. It is a module that brings together the ten episodes of the web series "*Senta que lá vem informação!*" Produced for the Sífilis Não Project. There are interviews and conversations that present information about Syphilis, as well as the correct way to diagnose and treat it;
- **The care of people with HIV/AIDS in Primary Care:** has a workload of 120 hours and 8527 students enrolled. The course is designed to train health professionals from the basic network for shared care of people living with HIV/AIDS, focusing on Primary Care, linking it to other points of attention of the SUS network. The course uses a problematizing methodology, whose cases will be presented in comics, to guide the various topics covered. The contents are organized in four units and permeate all aspects related to the care of people living with HIV/AIDS, from combined prevention to the use of TARV. As the infection of the patient with HIV/AIDS occurs in a similar way to that of the patient with Syphilis, this module can be correlated and its knowledge also used in this case;
- **A Virtual Visit to the 2nd International Conference on Health Innovation:** it has a workload of 45 hours and 170 students enrolled. It is a module that highlights the debates held at the 2nd International Conference on Health Innovation promoted by the LAIS, focused on the evolution and modernization of solutions for health systems and combating diseases and endemics, such as the problem of syphilis, and thereby promote the reduction of costs and investments both at the national and global levels.

In these courses the entries are continuous and without specific calendar. In addition, students do not have specific deadline to finish the courses and their workload has no daily limit, nor monthly, only full term.

The general data of the courses, until the end of June are:

<b>Course</b>	<b>Enrollments</b>	<b>Completed</b>
A Virtual Visit to the 2nd International Conference on Health Innovation	249	80
The care of people with HIV/AIDS in Primary Care	8,616	4,559
Syphilis: Have a seat here comes information!	930	513
Observation in the Health Unit	658	356
Expanded Clinic and Matrix Support	7,123	3,941
National LGBT Comprehensive Health Policy	5,232	3,075
Primary Health Care, Family Health Strategy and Territorialization	1,595	850
<b>Total</b>	<b>24,403</b>	<b>13,374</b>

**Table 1: Enrollments and completions from Syphilis area's courses**

Faced with the numbers of users in these courses and the cycles of enrollment, any type of analysis of course format and performance can only be performed by data mining.

In this context, Data Mining has been emerging for the investigation of educational records. With this technique it is possible, for example, to discover patterns of use in AVASUS, as well as to map the behavior patterns of a class, tutors and students. This area of research is called Educational Data Mining (EDM), which can be classified as a sub-area of Learning Analytics. EDM is defined as the area of research that has as its main focus the development of methods to explore datasets collected in educational environments.

Thus, in Learning Analytics research, a list of self-regulated learning strategies indicative of actions taken by students during their training process can be observed.

Today the researchers classify as Cognitive, Metacognitive and Resource Management. Through the use of EDM in LMS records, we found patterns of use most commonly presented by students and classified them according to the type of self-regulated learning strategy adopted.

***AVASUS e Learning trails: LA models applied to learning***

In AVASUS, the analysis of learning through technology, is seen in a way to customize the journey of each student according to concrete data. It is through this investment of increment of technological interpretation that the learning analytics can interpret individually the course, the difficulties and the habits of studies of the students. In addition, the educator becomes capable of making sound pedagogical decisions and

reorienting practices to better address mapped needs, measuring the impact of these changes in the digital classroom and, in a broader context, the impact of large-scale education.

The first innovation of this environment was to think of content through Active Methodologies and problematization. Active methodologies and pedagogy of problematization create teaching models, which value dialogue and demystify reality. With this, the objective is the social transformation through a conscientizing and critical practice. In this context problematizing is not restricted to just presenting questions, going beyond these until arriving at the discussion of the conflicts that are part and keeps the presented problem.

The first intervention in the environment so that he could along with the content favor the student is to make it more practical and functional. As the base engine of the environment, we use the Moodle API (Application Programming Interface), with several changes in it as addition of new features as well as database configurations. Development services for adaptations and changes are contained in the following dimensions:

- **Deployment of the functionality:** sending messages using the integrated messaging API with functions of the local function library. The programming takes into account the context of system profiles, turning the back-end into a room where a student can communicate with the teacher;
- **Creation of activity modules** such as the dependent task module and mural. Each module requires the creation of registration and editing forms added to the creation of new tables and fields in the database for the persistence of the information that is passed by the users through the front end, all of this together with changes of business rule proposed by the contractor;
- **Validation of activity creation forms** using sever-side type processing languages, such as PHP and client-side, such as javascript;
- **Assignment of values to environment constants** that serve as reference parameters for functions used in modules that are contained within a module unit. A module unit can contain multiple modules and these modules must share information in common;
- **Adapting the local library** of the modules units, adapting the returns of their functions;
- **Change and create queries**, procedures and functions in the database using the SQL language;
- **Adaptation of SQL queries** to functions of module libraries and module units, as well as new procedures calls and functions stored in the database.

AVASUS learning analytics are based on Big Data and Moodle native table analyzes, with plugins developed to control or access user elements or linked to users. Basically, AVASUS uses technologies that allow you to

compile and relate large amounts of data, producing relevant information based on them. It then makes it possible to make future predictions based on the previous behaviors.

For the data mining analyzes in syphilis control courses, data related to other courses were included in order to study the variables of access, permanence, use of tools and success in completing the courses or their respective itinerary. Two blocks of courses were considered. The block 1 contains current courses of the AVASUS but that are not within the block of courses to combat syphilis. Block 2, the 7 courses to combat syphilis. The objective was to monitor, recognize and analyze the learning difficulty data of students in block 1, change the media and the profile of the courses for students in block 2 and analyze the results of improvements.

The idea at this stage is to understand which improvements or changes in the users' learning profile have a direct influence on the use of groups of students and the types of activities that the students perform.

Based on the mining of the AVASUS database, a series of difficulties was registered for the students, especially in the types of contents that were available for learning. In the free courses, not related to syphilis group courses, it was verified that:

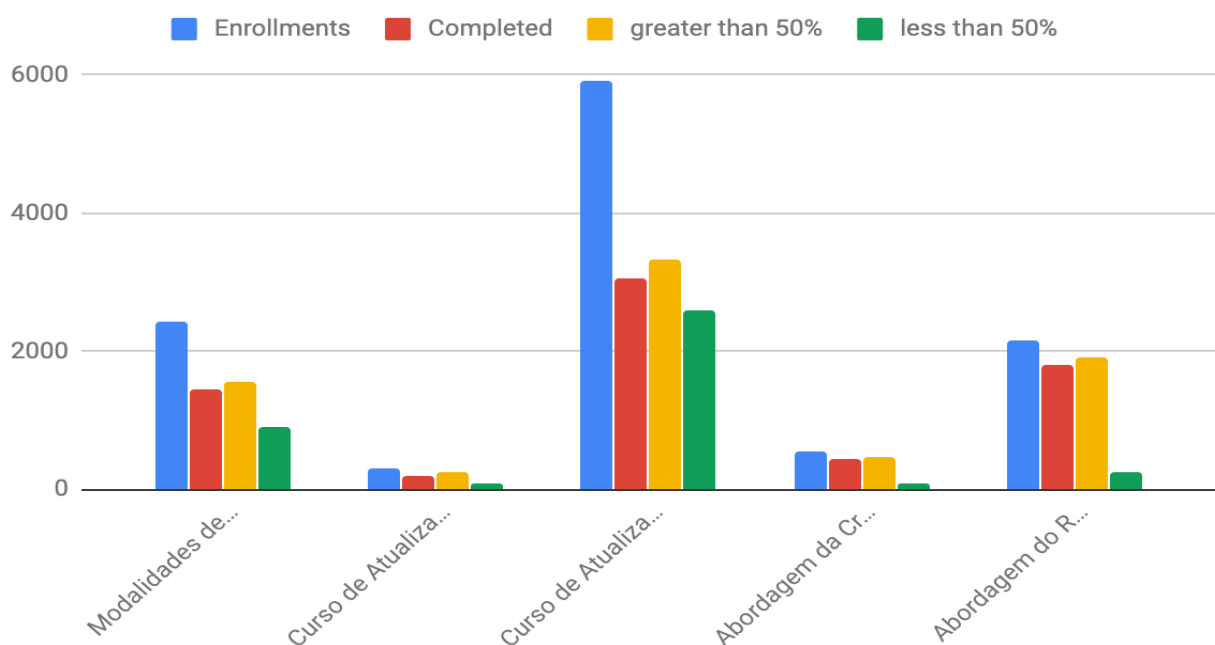
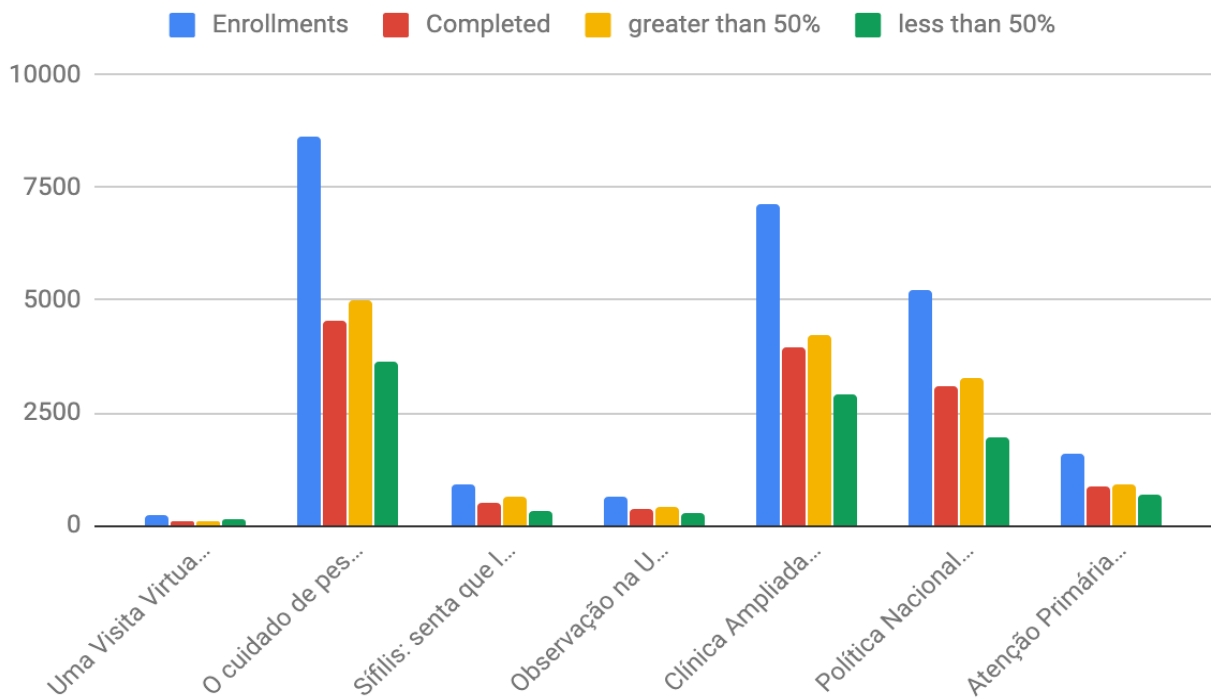
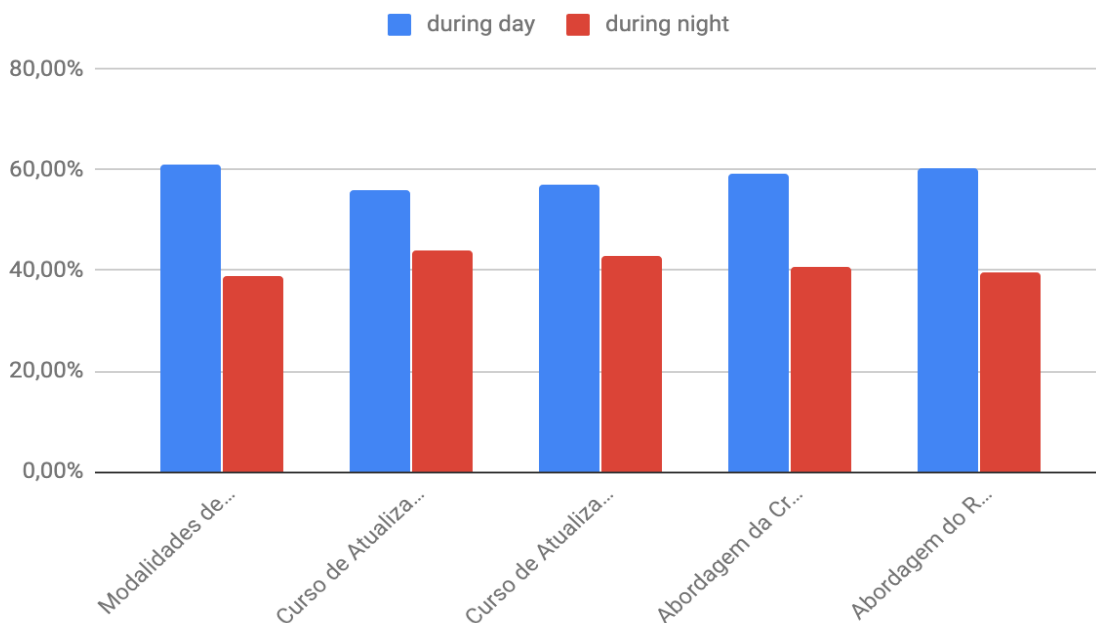


Image 4: Pre-intervention courses

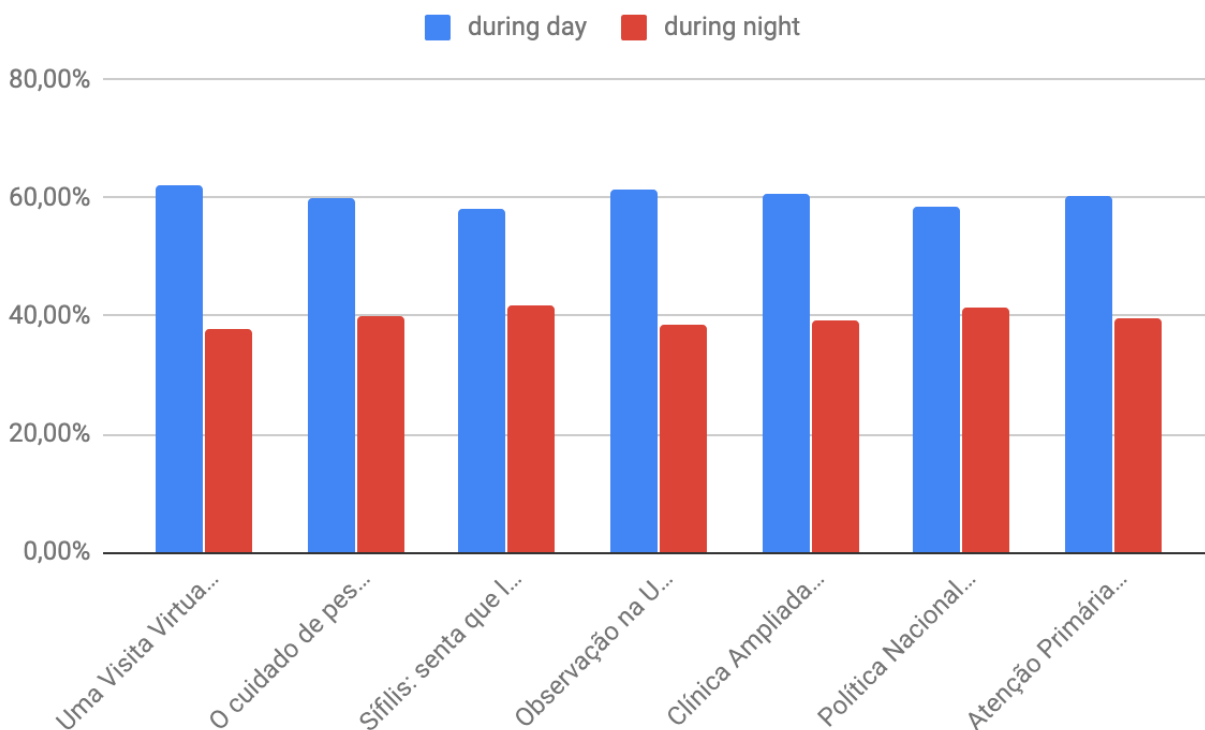


**Image 5: Learning analytic intervention courses**

The relationship between enrollees and graduates after indicating the syphilis courses for profiles of workers more linked to professional practice, provided the lowest distance between enrollees and graduates decreasing evasion and increasing the level of the graduates by more than 60%.



**Image 6: Pre-intervention courses - access**



**Image 7: Courses after the intervention - accesses**



The courses in block 1 tended to have less distance between students' accesses by day and night because they do not find specific contents that favor their respective performances. In the courses in block 2, students further mark their entries at specific times because they have specific methods and workload balanced enough to draw a recursive study, so they access more during the day than the evening, even considering the practical content

Finally after the analysis of the more than 24 thousand students enrolled in block 2 compared to the first block reveal a curious fact. If we analyze the achievement in terms of completion, in the relation between material diversity and completion levels, the courses in block 1 has 60.8 of the students in conclusion, while in the courses of the other block there are 54.8. Even in the data of achievement, considered between more and less than 50%, the courses in block 1, presents more students with completion of more than 50% of the courses, reaching 59.7% of the students while in block 2, the quantity of students with achievement greater than half reaches a little more than 53%. However, when crossing two other variables, the average completion time with the quantity of materials available, even considering the time load, the courses in block 2 perform better than that of block 1, both in decreasing the average time to perform the course, and the permanence of the user on the platform. The average completion from the courses from the block 2 was 8,72 days while in the block 1 was 30 days, even with less hours and content. This indicates that even in courses with more content, but based on indicative content by profile and in the diversity of transmigration, students tend to complete the courses in a shorter average time than students who do not have material diversity. This causes students to access courses less than 50% faster, but they give up or interrupt their courses, increasing the average completion time in case of block 1 reaching more than 100 days for some scenarios, whereas in block 2 the largest time was 28 days in average time.

## Conclusion

To perform this research, some structured data mining algorithms were used, grouping not only by student profile but also functional clusters. The intervention libraries installed in the AVASUS considered dynamic groupings, as there were improvements in levels of achievement, permanence, average time and student evaluation, mining libraries considered the best and worst scenarios simulating data of better use and better use of the student considering, professional profile, sex and age.

The proposed method should be improved and incorporated into the AVASUS system procedure in the next 12 months to ensure that the described variables are safe for the treatment and improvement of student profiles and improvement in established performance.

The methods of learning analytics point to better evaluation - 100% of the courses in block 2 had a maximum evaluation performed by the students according to the material, system, availability and support of the system - and the best rate of success of the users.

However, when related to block 1 with block 2, the data of completion of course and achievement above of 50% in a shorter time, are in all the better simulations. This occurs both because there is a numerical difference in the blocks of courses, that is, block 2 has more courses than block 1, or because the elements of transmigration tend to be more effective when the time series considers a longer time interval.

In this way, the mining algorithms for cross-checking the data of learning analytics, even if they are data separation and clustering to classify them, although they do not have elements of effective database library for intervention and process automation, already point to a diagnosis in the type of student, support, subject and materials needed for communication and a global education of a professional inserted in methods of lifelong learning.

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## Carpe Diem for Transformation

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### Abstract

The Carpe Diem Learning Design Methodology (Carpe Diem) has been beneficially and extensively adopted in many universities throughout the world. The methodology enables fast and effective collaboration between academics, professional staff and other stakeholders for re/design of modules or new/refreshed programmes, in the service of improvements and future-proofing for students' learning. This paper briefly outlines the approach including visioning the future for graduates, authentic assessment, threshold concepts, the 5-stage model, e-tivities, storyboarding and action planning.

Some universities are now seeing Carpe Diem as a key enabler in their strategic drive to transform educational provision on a large-scale in their institutions, in addition to progressive and collaborative learning design. We explore the application of Carpe Diem in a major educational transformation programme at Stellenbosch University (SU) in South Africa, where the intent included innovation, creativity and addressing students' changing needs. We summarise some key outcomes of a Carpe Diem intervention as a catalyst for Stellenbosch's educational transformation. Our action research demonstrated that the impact of an original one-week collaborative Carpe Diem experience, covering all faculties and ten major degree programmes, was sustained over the following 12 months. It created acceptance and strong interest across the campus in transforming learning and proved a fitting catalyst for Stellenbosch's programme renewal initiatives.

We offer a summary of recommendations for those who wish to move beyond valuable learning design, to enable key catalysts and create watersheds to scale-up and extend strategic renewal efforts.

**Keywords.** Carpe Diem learning design, institutional transformation, future-proofing students' learning, pedagogy, renewal.

## Introduction: About Carpe Diem

The methodology is called ‘Carpe Diem’—meaning ‘seize the day’. Carpe Diem Learning Design was established in the year 2000 as an initiative using agile project development to design innovative student-centred courses, deploying well researched pedagogical processes (Salmon, 2011, Salmon & Wright, 2014) and productively incorporating new technologies. It became clear that the collaborative processes engaged academic and professional staff in new, supportive and more acceptable ways, providing them with a vehicle to work together and opened their eyes to new teaching possibilities (Vlachopoulos, 2018). It also actively and successfully promoted teamwork, especially between academics, technologists and librarians (Sputore et al., 2016, Oakley, 2016). The methodology was extensively researched and then extended through a (UK) Higher Education Academy funded project from 2005 (Armellini et al., 2009) and has since continued to be adopted by many institutions and countries for MOOCs, online and blended learning (Usher, et al., 2018).

There are two types of Carpe Diem methods - one offering ‘programme design’, for whole degrees through future visioning, threshold concepts and authentic assessment (Villarroel, et al. 2017). The other tackles ‘module design’ including detailed storyboarding (Salmon & Wright, 2014) and prototyping of online activities (e-tivities) (Salmon, 2013). Both are suitable for the refresh and redesign of courses (from campus to blend or online), as well as future proofing new developments. Both deploy Carpe Diem principles of:

- Scaffolding and student-centredness (Salmon, 2011);
- Cross-professional and disciplinary collaboration, development and feedback (Salmon & Wright 2014);
- ‘Start with the end in mind’ i.e. future visions and missions, then creating a design brief for student outcomes and explicit value (Salmon, 2019);
- Visual and systems thinking, including storyboarding for pedagogical processes and curriculum structures (Lewrick, et al, 2018);
- Well researched evidence-led pedagogical processes including authentic assessment (Villarroel et al. 2017) and threshold concepts (Land et. al, 2017, Currie, 2017, Timmermans & Meyer, 2017) and the 5-stage model, e-tivities and active online learning (Salmon, 2013);
- Fast, agile and action based, including rapid prototyping (Dilan & Aydin, 2019).

There are extensive openly available video resources and handbooks to be found at [www.gillysalmon.com/carpe-diem](http://www.gillysalmon.com/carpe-diem).

## **Carpe Diem for institutional transformation**

In institutions where Carpe Diems have been undertaken at scale, the approach has proven to be suitable for all disciplines and levels of learning. In addition, Carpe Diem ensures that the academic-lead is constantly respected as the knowledge owner; hence wider acceptability and indeed motivation can be observed, making a contribution to acceptable transformation and renewal efforts; ultimately opening doors for the university to achieve wider reshaping for the future (Posselt, et al, 2019). In addition, Carpe Diem has a demonstrated impact on the quality of students' learning and their outcomes. For example, Carpe Diem was extensively deployed at the University of Western Australia over 3 years (more than 300 teaching units and modules were designed or redesigned) resulting in collaborative transformation and an upturn in student satisfaction and experience ratings, hence directly demonstrating positive transformation impact (Oakley, 2016).

### **Case Study: About Stellenbosch's transformation**

In 2017, the Vice-Rector (Learning and Teaching) at Stellenbosch University (SU) in South Africa started a strategic programme renewal process to enable all ten faculties to increase their use of ICT-enabled, innovative, future-focused, integrated and inclusive pedagogies. This strategy emphasized review and renewal of academic programmes for achievement along those lines.

SU needed to consider implementation methodologies that had evidence of achieving learning transformation. It also needed to simultaneously reflect the sensitivities of the South African context and wished to ensure that control and accountability were kept with the programme and module leaders.

Following research, SU chose the Carpe Diem Learning Design methodology. In addition to the pedagogical benefits, SU was interested in the framework of Carpe Diem which is based on a 'resource' definition of strategic change (Salaman & Asch, 2003), focusing on development of capability through collaborative effort, identifying the institution's core capabilities and existing strengths i.e. what it is good at, what makes it special, what can it do well and differently.

### **The Carpe Diem week**

In May 2017, SU provided a week-long Carpe Diem experience to its staff. Each of the ten faculties at SU nominated one academic programme for renewal. The workshop was set up in a large off-campus venue,

near the University. Each faculty group had their own tables, wall space and resources to work as a team in so-called “pods”.

Day One (Monday) was used by the facilitator to brief the support, technological and leadership staff who would assist the faculty teams for the rest of the week. Day Two (Tuesday) was the ‘Programme level day’, while Days Three and Four (Wednesday-Thursday) was for working at modules level. Day Five (Friday) was for feedback, further discussion by the SU leadership team, research, evaluation and action planning. Over one hundred staff attended one or more sessions during the week. There was a high level of commitment, participation, engagement and retention of interest from the participants. The energy level remained high and sustained throughout the workshops.

At the end of Day Two, each pod had collaboratively created a ‘rich picture’, (Berg & Pooley, 2013). This image was largely graphical and symbolic with limited wording and often quite artistically - each one depicting the future graduates and new aspirational missions for their respective programmes. The pods then proceeded to create curriculum and mode-of-learning storyboards, planning pacing and scaffolding of the learning processes (over several years), agreements on the allocation of course credits, threshold concepts and authentic assessment commentaries, detailed task-based action plans and ‘Footprints to the Future’ (i.e. messages and reminders to the modules designers).

In addition, opportunities for sharing amongst the pods were created, when the faculty teams provided feedback to each other, which ultimately contributed to increased collaboration across the institution. This enhanced partnership effort is one of the key drivers for programme renewal to become more fully embedded within the institution.

During Day Three and half of Day Four, the Module Carpe Diem process was fully deployed. It resulted in the re-design of 15 modules across the 10 programmes. Participants used storyboards to align their new ‘design briefs’ with Stellenbosch’s learning-centred principles. These storyboards included calendars with agreed course calendar locations for face-to-face learning and teaching (including lab work and placements), electronic resources and interactions, frequent and effective feedback and the allocation of assessments. The teams learnt more about and applied the 5 stage model (Salmon, 2011) and included e-tivities (Salmon, 2013). Participants in the module pods visibly enjoyed the development and prototyping of online interactive activities (e-tivities) and having the opportunity to trial each other’s prototypes and developments in real time.

Day Five included the action planning to evaluate, involve and sustain impacts through discussions with management and other stakeholders. This feedback was included in the conceptualisation of an evaluation study of the intervention and its impact submitted for ethics approval for research at SU. This mixed mode study continued over a period of one year (Mullarkey & Hevner, 2018). Survey results (one month and 12 months after the event) and interviews with stakeholders (six months after the event) were triangulated for rigour, understanding, interpretation and confidence (Flick 2017).

### **Outcomes from action research**

#### *Survey results: June 2017*

One month after the Carpe Diem workshops, a survey was distributed to all participants of the May 2017 workshops. 54 delegates completed the survey of which 47 had attended all three days (the programme day and the two module days).

Survey questions asked about the value of the workshops for both module and programme renewal. Ten of the participants indicated that Carpe Diem workshops were “indispensable” for module renewal and 16 participants indicated that they were “indispensable” for programme renewal. The majority of the participants believed that the workshops were meaningful for both module and programme renewal.

Participants identified aspects that were particularly useful for them:

- The Carpe Diem method is easy to use, flexible and enables rapid planning by academics who typically have limited time to engage in programme and module renewal, and the approach can easily be adapted within a specific context.
- The visual mapping method enabled them to have ‘the end in mind’ whilst also ‘working backward from outcomes to pedagogical design’, to create more coherence within modules and programmes.
- Dedicated time and structured sessions within a creative space to reflect on their programme renewal design and take current and future design into account.
- Carpe Diem provided a framework to see the ‘bigger picture’. They could also create a ‘roadmap’ with milestones for both module and programme renewal.
- The facilitator’s guidance and skills.
- The collegial sharing with colleagues from their own and other faculties creating synergies and learning from each other, accompanied by the appreciation of the institutional nature of the



programme renewal initiative. This created a sense of common purpose, whereas previously, programme design was often seen as an isolated ‘administrative’ process.

- The focus on ‘threshold concepts’, which were used extensively during the workshops, and also as motivator to influence colleagues around programme renewal, who had not had the benefit of the workshops.

Some of the less positive feedback included:

- Some participants noted the fast pace of the workshop, which was difficult to maintain when working with large numbers in the teams.
- Some participants did not enjoy the hands-on activities.
- Some participants felt that shorter sessions would have been preferable.
- One faculty felt that it was less suitable for them because their programme was complicated and difficult to pull apart in this way.

#### *Six months after the event*

One of the researchers undertook a semi -structured interview with Dr Antoinette van der Merwe, Senior Director: Learning and Teaching Enhancement at Stellenbosch University, 6 months after the Carpe Diem week. The most important issues that emerged included:

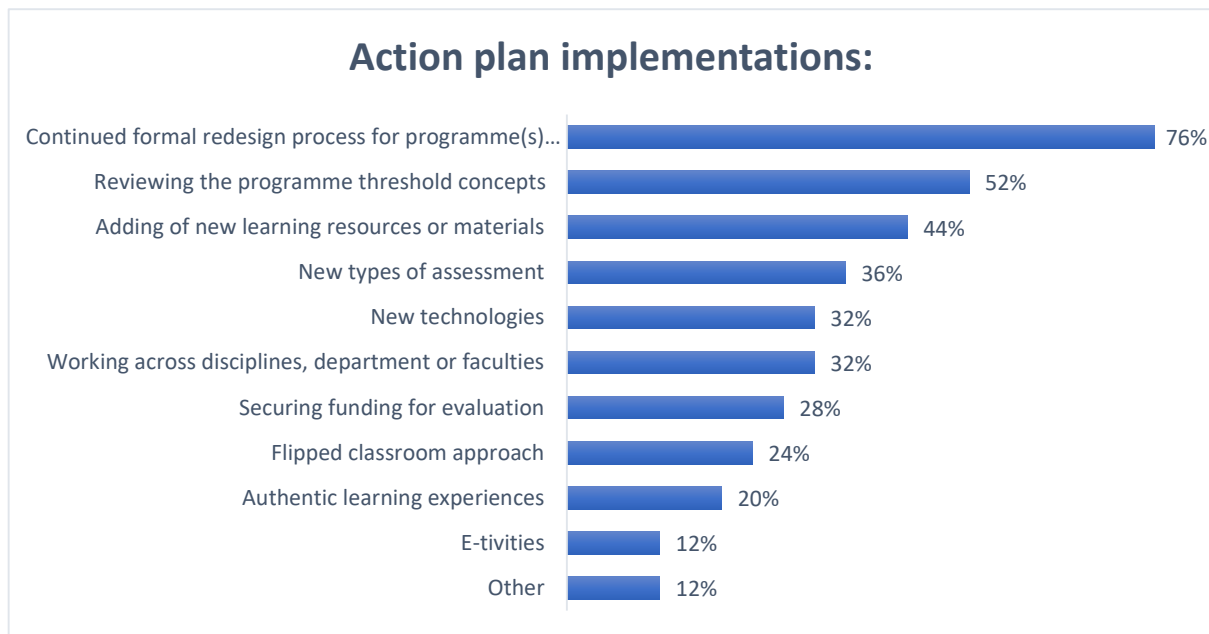
- Most of the participants were energised by the Carpe Diem intervention and greater cohesion between staff had resulted in shared agreements for the way forward.
- It was difficult for some of them, where the most radical changes were suggested, to convince and engage other colleagues who did not attend the workshops.
- To sustain the outcomes of the intervention, the Vice-Deans’ Forum for Teaching and Learning now meets once a term to discuss programme renewal initiatives.
- Funding has been secured which allows for the buy-out time of lecturers, and to undertake further planning workshops and research.

#### *Survey after 12 months*

To determine the more lasting impact of the intervention, a survey was sent out 12 months after the workshops to 76 participants who attended all or some of the three days. 25 participants, from all faculties but one, completed the survey.

The majority of the respondents (76%) had deployed their action plans drawn up during the Carpe Diem workshops to continue with programme renewal in their respective faculties (Figure 1). Three elements that

received the most attention were programme-level threshold concepts (52%), adding new learning resources (44%) and new types of assessment (36%).



**Figure 1: Elements implemented from the Action Plan created in the Carpe Diem workshops**

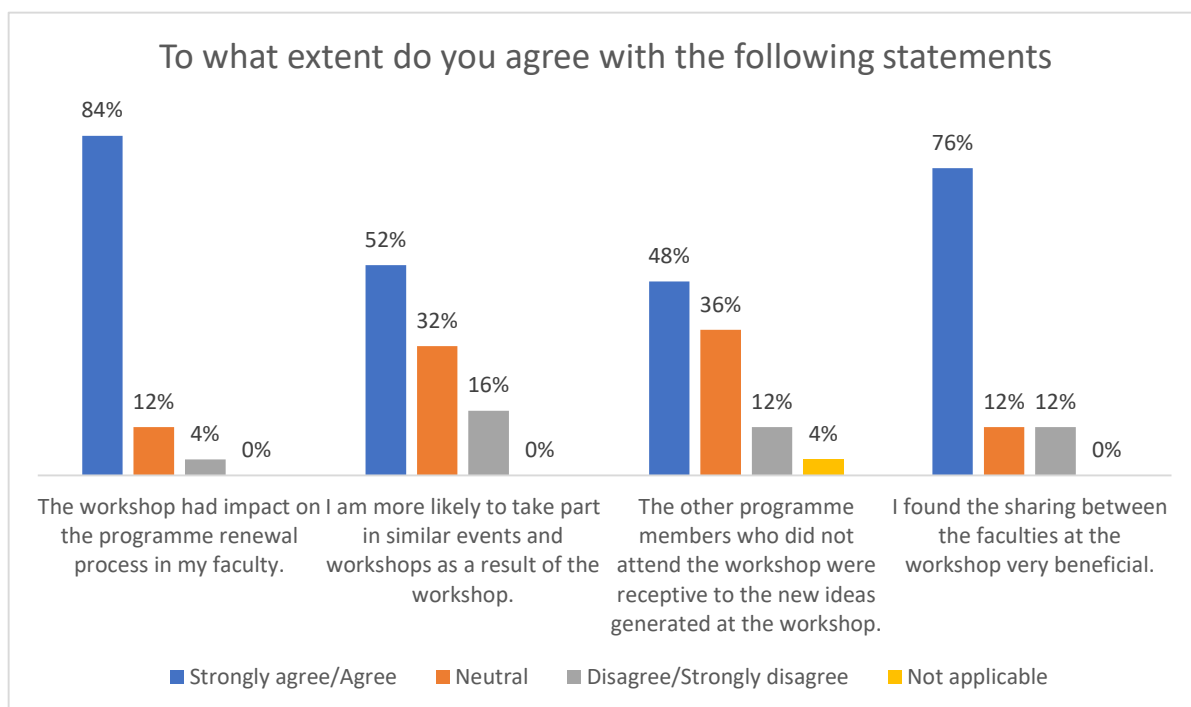
When asked why the participants did not implement all aspects of their action plans, participants cited time constraints, that some programmes are still in the planning and development stages or that other elements of their action plans will be addressed at a later stage.

It is clear from Figure 2, that the intervention did have the intended catalyst as impact could be seen one year after the workshop and much work was ongoing, both in terms of the programme renewal process as well as the sharing between faculties. The majority of the respondents strongly agreed or agreed with the following two statements:

- The workshop had an impact on the programme renewal process in my faculty (84%).
- I found the sharing between the faculties at the workshop very beneficial (76%).

There was a somewhat lack of engagement and acceptance of programme team members who did not attend the workshops, that became evident during the feedback at this point. This was also confirmed by the survey results with only about half of the respondents (48%) indicating that those who did not attend the workshop were receptive to the new ideas generated at the workshop.

Two further aspects support the enduring influence of the Carpe Diem experience.. First 68% of the respondents indicated that they still use the skills that they acquired during the workshop. Second, 80% of the respondents indicated that the workshop changed their view on module and programme design; it clarified and gave structure as to how to go about starting the redesign process. These skills and the framework will continue to stand them well for other programmes and modules.



**Figure 2: Statements on the Carpe Diem after 12 months**

### Transformation to date

SU planned the Carpe Diem as a catalyst, not only to improve learning design but also within a comprehensive programme renewal process. It was envisaged as a ‘Watershed’ moment that would have a lasting constructive impact.

It is clear from the various feedback and ongoing actions after the workshop that it did indeed have this effect:

- Carpe Diem was confirmed as an appropriate methodology for learning design in the South African context; it provided the necessary and practical framework, but also allowed for contextualisation of specific knowledge areas and the environment. Many participants provided feedback that it was “indispensable” in this regard, despite initial concerns that the facilitator was not South African and possibly not sensitized to South African issues. At the time, this concern was addressed through detailed discussions before the intervention between Prof Salmon and SU representatives.
- It promoted collaboration across various faculties, departments and disciplines which is still sustained through regular workshops, supported by opportunities to receive funding for programme renewal work.
- Carpe Diem visibly contributed to the SU transformation agenda in terms of new teaching and learning approaches and aligned to the strategic intent to be innovative, future-focused and inclusive. This is sustained through a strong commitment from senior management and dedicated resources for programme renewal.
- There was an increased use of ‘e-tivities’ after the workshops, which aligns with SU’s intent to offer more blended learning opportunities for students.
- Many of the faculties report that they still refer back to the ‘rich pictures’ containing visualizations of the ‘graduates’ of the future and the threshold concepts they would need during their programme design activities.

We conclude that the workshops were a catalyst which gave the holistic programme renewal project great momentum. As can be seen from the feedback from the participants, the impact went beyond the learning design to also include cross-faculty collaboration and community building around educational transformation. The participants also became aware of the institutional nature of the programme renewal initiative and realized that they were not alone in their programme renewal efforts, and that there is strong institutional support for their initiatives. Carpe Diem provided them with the frameworks to engage in programme renewal activities in a structured way.

## Recommendations

Based on the SU experience, some recommendations for other higher education institutions who want to initiate a similar transformation include:

- Clearly communicate and demonstrate the strategic intent and senior leadership support for the initiative and include representatives from all faculties in the first big event to promote whole-institution collaboration and engagement.

- Brief participants before the workshops so they can prepare, without overburdening them, and share the potential value of and outcomes intended for the workshops.
- Start at the academic *programme* level and then proceed to the *module* level Carpe Diem workshops, to allow academics to first visualize the ideal programme graduate before working on the module detail.
- During the module workshops introduce academics to simple frameworks and quick ways of prototyping.
- During the workshops, ensure that there is ample opportunity for sharing and discussions amongst colleagues of the same faculty, but also across the faculties.
- Ensure that each faculty leaves the workshops with plans containing follow-up actions and activities for which they take ownership and responsibility.
- As soon as possible, include a workshop within the faculties for participants who did not attend the full Carpe Diem intervention event to introduce them to the frameworks used and to obtain their engagement in the action plans generated at the workshops.
- Formulate a plan to ensure regular follow-up, continuous engagement, support and funding to sustain the momentum and impact of the workshops.
- Consider some action research to enable and value their plans at the point they are delivered to students.

## Summary and conclusions

As we move to even more challenges in terms for meeting relevance in concepts and modes of learning for students for the future, combining visioning, systems thinking, creativity and collaboration with design approaches continues to be a key requirement and our best hope for accelerating transformation of higher education (Lewrick et al 2018, Salmon, in press 2019).

If a face-to-face and large-scale intervention such as Carpe Diem is planned, it is worthwhile getting as many people as possible involved in the short sharp ‘seizing the day’ activities. The benefits are a sense of changing their minds about what is possible and great possibilities for new relationships and collaborations across the schools, faculties and whole institution through the shared vocabulary and the visual take-aways. This impact goes well beyond outcomes usually experienced in regular professional development activities. Clearly, to enable sustainability, effort needs to continue to be put into implementation and support over a long period of time - probably much longer than our initial action research has continued. In addition to ensuring engagement from academics and overall ‘raising the bar’ for their potential for pedagogical understanding and design work on their teaching, the next stage should be to explore the impact on student learning.

### *Ethics & Thanks.*

All data used in this study was de-identified to ensure the confidentiality and privacy of participants. Ethical approval was obtained from Stellenbosch University, Project No. TL 2018 – 7525. The authors and researchers thank the many members of staff from SU who took part in the learning design interventions for their sustainable work and insightful feedback.

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## Designing of OER Based on PBL: A Humanitarian Approach for the Learning of Programming at the Brazilian LAIS

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### Abstract

The training of human resources has been deficient in different educational areas. This is evident from the growing presence of prevailing, but avoidable, worldwide adverse events. In Brazil, the increase in cases of dropout from higher education, especially in the courses of Exact and Technological Sciences, such as Engineering, Design and Information Technology, brings to the education professionals the challenge of elaborating a training model that can be used in these environments, alongside a set of actions, an effective measure concerning the evasions and in the promotion of a formative and humanitarian process in programming, contextualized, a disciplinar and engaged in learning. Thus, the Laboratory of Technological Innovation in Health of the Federal University of Rio Grande do Norte, has developed actions that are based on Computational Thinking and go beyond the frontiers of knowledge in education, emphasizing health education and programming teaching, seeking a active methodology of innovative formation that allows humanitarian training in programming, combining concepts, techniques and also mobilizing the feelings and emotions of learners. All this, with the objective of enabling the understanding and reflection on practical and effective actions at work. Therefore, inspired in the participatory culture, this study combines concepts of pedagogy, neuroscience and Problem Based Learning, in the construction of Open Educational Resource, collaborative, flexible, adaptable and reusable, as methodology for the elaboration of technology-mediated courses, especially in the audiovisual documentary standard, for human training in programming, for students and researchers of the Laboratory of Technological Innovation in Health.

**Key Words:** Open Educational Resource, Humanitarian Training Process, Active Teaching Methodology, Problem Based Learning.



## Introduction

The challenge of Higher Education Institutions, which train professionals is to prepare them with the knowledge, skills and attitudes to act in a qualified way on the needs that will be presented in their profession. The way of teaching has evolved through time, and all transformation passes through restlessness, reflections, and changes of conception. When attending an undergraduate course in any area of knowledge, the student has in the university the study and in the practical activity, the work. In order for this process to occur interactively between the teaching autonomy and the potential of the students in the construction of their knowledge, there have been changes in traditional face-to-face teaching.

This modality of teaching is centered on the teacher, who, through knowledge, creates a flow of communication, compromising the critical thinking of the student, who, in most cases, only assimilates what is presented to him, without much questioning. This scenario has undergone modifications over the years, and the active participation of the student in his / her learning has been more productive than only the information of the teacher. This process of change in education has brought challenges to breaking with structures established in the classroom teaching models. With the changes, students have been delegated to build their learning independently, integrating it with what has been learned a priori. Changes in teaching can be shared among diverse groups of students in a multidisciplinary way. This method of teaching can fill the needs of traditional classroom teaching.

One of the tools used to modify the concepts of traditional teaching is Problem Based Learning (PBL) of English Problem Based Learning (PBL) - figure 1 - in which learning starts from problems or situations with the purpose of generating doubts, imbalances or intellectual disturbances. As an active learning methodology, this method contains strong practical motivation and cognitive stimulation to generate creative solutions and the permanent application of educational actions that privilege previous students' knowledge, promote group research and forge an investigative learning environment, through the emergence of doubts, the construction of hypotheses and experiments.

Therefore, we address some research questions: how to promote student education in a contextualized and not just theoretical? which methodology should be applied to the context of interdisciplinary training ?; how to develop computer systems to promote health education and more humane health?

In this way, the Laboratory of Technological Innovation in Health - LAIS, Federal University of Rio Grande do Norte - UFRN, has been progressively developing training actions, using Problem Based Learning (ABP), as an active learning methodology in order to promote, in a collaborative and contextualized way, the training of the students involved in the project, which are from several areas of knowledge. Thus, changes in teaching-learning can be shared among different groups of students. We believe that this teaching method can overcome some of the shortcomings of traditional classroom teaching.

### **Evasion in Higher Education**

The evasion in Brazilian undergraduate courses has been causing concern to public and private agencies. This phenomenon has negative consequences both for institutions that fail to receive funds and for the labor market that suffers from the lack of skilled labor, since the evaders will find it difficult to get a job vacancy because they do not qualification requirements. This phenomenon is widely studied and its main causes are still not concrete.

According to the definition of the MEC, in the 2009 Census, evasion is: the definitive departure of the course of origin without completion. The evasion of these students generates social and private costs for the country. The former are more difficult to measure, since they indicate on the one hand that Brazilian workers remain poorly qualified and, on the other, that the availability of vacancies in public institutions, although free, does not contribute effectively to the training of researchers and technicians qualified for the country, since many definitely interrupt their studies (PEREIRA, 2003). According to NOGUEIRA (2011), the financial losses caused by the dropout in the study done in higher education in 2009 amount to around 9 billion, based on the calculation of the researcher of the Lobo Institute for the development of Education, Science and Technology, Oscar Hipólito, based on data from the Census of Higher Education, released by the Ministry of Education in 2010.

In Brazil, the data that refer to evasion are alarming. According to data from the School Census (2017), among several courses, the Northeast Region received a total of 846,362 students in universities in higher education and the state of Rio Grande do Norte 86,499 new enrollments. Of this amount, the same School Census refers a total of 233,153 graduates in universities in Brazil and a total of 13,419 graduates in universities in Rio Grande do Norte, data that are worrying and worthy of follow-up and actions. Considering the above context, we can see that on the problems caused by the phenomenon of evasion, there are no variables or information to identify concrete reasons that lead students to avoidance. Several reasons are cited, among them the absence of a methodology that associates theory with practice and that effectively leads the student to

learning. Thus, this proposal of methodology using an open educational resource encompasses a training that is part, among a set of actions, of an effective action in the face of evasion and in the promotion of a formative and humanitarian process in programming, contextualized, multidisciplinary and engaging the Learn

### **Open Educational Resource as a Learning Strategy**

Open Educational Resources (OER) are characterized as freely available and open digital materials for the general community for the purpose of teaching, learning and research "[HYLEN 2006] and [ATKINS 2007]. An OER can encompass learning resources such as learning objects, teaching materials and educational modules; tools such as systems to support the development, reuse and delivery of learning content; and implementation resources, such as intellectual property licenses to promote open publication, reuse and dissemination of educational content. [CAPE CITY DECLARATION, 2007]. The simplest definition of the concept of Open Educational Resource is any educational resource (including curriculum maps, course materials, textbooks, Internet videos, multimedia applications, podcasts, and any other materials designated for use in teaching and learning) available openly for use by educators and students, without the need to pay copyright or license fees.

According to Flocruz's OER Guide, this concept arose with great potential to support the transformation of education. While its educational value is based on the idea of using resources as a method of full communication of the curriculum of didactic courses (that is, resource-based learning), its transforming power comes from the ease with which such resources, when can be shared over the Internet. It is important to note that there is only one fundamental difference between OER and all other educational resources: your license. Thus, an OER is an educational resource accompanied by a license that facilitates its re-use, and possibly adaptation, without the need to seek permission from the copyright holder.

There is an OER movement, which builds on the idea that knowledge is a public good, was inspired by the free software movement, and believes that technology, and in particular the Internet, provide a great opportunity for all to share and reuse this knowledge [HEWLETT FOUNDATION 2012]. In Canada, for example at the Athabasca University Library, libraries use open educational resources such as online tutorials, mass online courses - MOOC, virtual environments for autonomy of user learning, systems, specific courses and information services and etc. Based on this learning ecosystem that is based on participatory and collaborative culture to promote meaningful learning, it is that the model was chosen for this proposal.

## Significant Learning

This proposal also aligns pedagogy concepts related to David Ausubel's Significant Learning. The ideas of Ausubel, whose initial formulations are from the 1960s, are among the first psychoeducational proposals that try to explain school learning and teaching from a framework far from the principles of behavior. When the school content to be learned can not connect to something already known, what Ausubel calls mechanical learning, that is, when new information is learned without interacting with relevant concepts in the cognitive structure. Thus, the person decorates formulas, laws, but forgets after evaluation. Ausubel's theory of learning proposes that students' prior knowledge be valued so that they can construct mental structures using, as a medium, conceptual maps that allow to discover and rediscover other knowledge, thus characterizing a pleasurable and effective learning (PELIZZARI, 2002). ). Learning is much more meaningful as new content is incorporated into a student's knowledge structures and acquires meaning for it from the relationship with their previous knowledge. On the contrary, it becomes mechanical or repetitive, since this incorporation and attribution of meaning has occurred less, and the new content is stored separately or through arbitrary associations in the cognitive structure (PIZZARZI, 2002).

Considering what Ausubel postulates about the way in which meaningful learning occurs, the Active Learning Based Learning (PBL) methodology has been established in order to follow the learning process and its development.

## The importance of a Training that considers Mental Mechanisms in Decision Making (Neuroscience and Learning)

Speculation about the human mind goes back to ancient philosophers. We emphasize René Descartes, who defended the man like being a dual being, having a rational soul, whose function is only to think, and a body. According to Descartes, everything that is not rational, like passions and emotions, does not come from the soul but from the body. All of Descartes's thinking is based on pure rational speculation.

Philosophy remained for a long time as the great reference in the discussion of the relation mind and body and the functioning of the human mind until, in the second half of the century, XX, the cognitive science appears evidencing a new perspective of investigation of this subject, namely, as it gives the human knowledge. Thus, scholars from different areas of knowledge such as psychology, anthropology, linguistics engage in this research with empirical research as a foundation, differently, of philosophy and having the following fundamental presuppositions. They are: a) belief in the possibility of analogies between the computer and the human mind, in other words, the comparison between artificial intelligence and human intelligence as a way of understanding the working mechanisms of the human mind; b) the belief that human

beings act on the basis of cognitive models that are representations (symbols, images, rules) internal to our physical and social environment. A significant milestone is the research developed by the neuroscientist António Damásio and presented in the work "The error of Descartes". In it, Damásio (2012) presents arguments based on the systematic analysis of clinical cases, neuropsychological analysis of patients and on anatomo-physiological studies, in favor of the fundamental importance of the emotions for decision making.

According to Damásio (2012), the decisions are made based on previous knowledge and experiences of the individual and are permeated by factors related to emotions and feelings. That is, decisions are not made on the basis of a "pure reason", but based on what he calls "somatic markers". That is, in the process of making a split the individual first makes a prior selection of stock options under the influence of somatic markers, which do not always act in a conscious way, and can act in the veiled decisions. Such markers are "a special case of the use of feelings generated from secondary emotions. These emotions and feelings have been linked by learning to anticipated future results of certain scenarios "(DAMASIO, 2012, p.163). In other words, in the process of reasoning the mind is not empty. It is replete with images constructed from the lived experiences that enter and leave our consciousness. Somatic markers result from the integration of sensations of the external world (specific categories of stimuli) with information (sensations) of the body (specific categories of somatic states). They are created during the process of education and socialization.

Somatic markers are thus acquired through experience, under the control of an internal system of preferences and under the influence of an external set of circumstances which include not only entities and phenomena with which the organism has to interact, but also social conventions and ethical rules. (DAMASIO, 2012, p.167)

In the light of the above on significant learning and what postulates neuroscience through Damásio (2012) on the process of decision making and lifelong learning, also considering the contribution of learning styles (KOLB, 2007) for the promotion of a human learning environment whose center is the apprentice, this proposal chose Problem Based Learning (PBL) as an active method of monitoring students' learning.

### **Problem Based Learning (PBL)**

One of the major goals of higher education institutions is to adequately train students so that they can perform their duties with safety and quality in the chosen profession. However, educational thinking has been changing significantly in recent years, since institutions have realized the need to adopt alternative teaching methods to foster better student development, moving from methodologies centred on traditional

didactic instruction to student-centered methodologies. In fact, it becomes more important to solve problems than to remember facts (PUCHER; MENSE; WAHL, 2002).

Problem Based Learning (PBL) is a student-centered teaching methodology that prioritizes the value generated through problem solving. According to the PBL, students use their previous knowledge, discuss, interact, seek new knowledge and integrate their results with a group, with the help of a tutor. Unlike traditional methods, where students passively receive information from the teacher, the PBL values not only what the student learns, but also the form he learns. In it, students are the main actors of their learning, developing critical thinking about their choices and learning to manage their own learning, while gaining better communication skills by working in teams (BORGES et al., 2014). In addition, studies show that the intrinsic and extrinsic motivations are relevant when the students begin the execution of a project, and that very interesting results are obtained when the students themselves choose their work (PUCHER; LEHNER, 2011).

Initially introduced in the health area of McMaster University in Canada in 1969, the PBL methodology has already expanded to other fields of teaching and has been employed in computer science courses in which students often deal with project execution, where they apply their technical knowledge and are involved in team processes (PUCHER; LEHNER, 2011). According to research conducted in the Czech Republic to evaluate the ways of teaching web pages in 9 universities, the monologue form, that is, the traditional teaching method in lectures, was the least used (KUCERA, 2015).

In this context, the Laboratory of Technological Innovation in Health (LAIS), located at University Hospital Onofre Lopes (HUOL), has a base called School of Programming, which relies on the PBL methodology. In this place, students from different UFRN courses, such as Biomedical Engineering, Mechanical Engineering, Materials Engineering, Computer Engineering, IT and Design, work together to solve health problems in a transdisciplinary approach, which is in agreement with the observed in other works, such as Lee et al. (2017).

These problems can originate in the hospital itself or may be external, from the identification of a gap or fragility by a health professional. When identified, the problem is referred to the School of Programming and the students discuss and interact in groups to solve it. In this process, they enhance their communication skills through customer meetings, while learning to develop software. Students, who are not developers, perceive the impact of their activities and feel they are participants in the process, so that they are also motivated to learn (RABELO et al., 2018). This process can be observed in Figure 1.

### Fluxograma de atividades e informação na Escola de Programação

Aprendendo a desenvolver sistemas computacionais baseado em problemas de saúde em um ambiente hospitalar

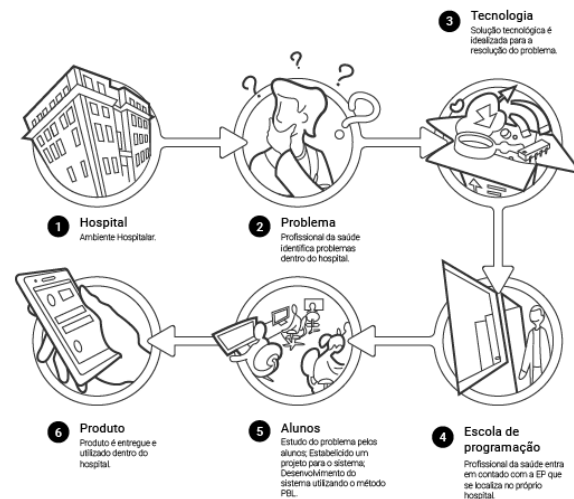


Figure 1 - Flowchart of activities of the School of Programming.

Source: Rabelo et al. (2018)

## Learning Styles in intersection with the PBL to promote Significant Learning

The application of learning theories in the problem-based teaching-learning process is not a trivial task. There is no "magic key" that can ensure that all efforts to promote learning succeed, as learning situations are always associated with specific contexts that go well beyond theories and principles. However, this does not mean that the body of knowledge produced on the learning teaching process should not be considered and, mainly, that no subsidies can be provided to guide the construction of effective pedagogical actions.

It is due to the complex nature of the said process, which will be based on the theoretical foundation built in the areas in question for the construction of the pedagogical design of the methodology of student training for the development of computational systems. The starting point is LeFever's (2003) understanding that all effective learning follows a natural process that starts from the learner's previous feelings, needs and knowledge, through contact with real problems, followed by the reception of new knowledge related to real problem situations and ending with the creation of new knowledge and solutions. This process is called a "learning cycle".

According to LeFever (2003), each apprentice tends to feel more comfortable with a certain stage of this cycle. However, for effective learning they will have to go through all the stages of the cycle. LeFever states that "it is not just that each person has more affinity with a particular style, but rather that each style contributes to the total learning process. (2003, p.26, our translation). According to LeFever (2003), the understanding of the learning cycle and the characteristics of the students corresponding to the different learning styles, allows the creation of better conditions for the teaching of any content.

This requires that all students, with their different learning styles, participate in the process as a whole and not only in that stage in which they best fit. This understanding of the learning process resembles Kolb's (1984) conception regarding the existence of a learning cycle for which every learner must pass, being an aspect of extreme relevance in our study. According to Kolb (1984), effective learning is an experimental process of a cyclic nature, divided into four stages. That is, the learning cycle goes through the following phases: concrete experience, reflexive observation, abstract conceptualization and active experimentation. They are ways in which we capture information and transform it. These ways of learning can evolve into stable patterns called "styles" by Kolb (1984) which characterize the specific mode of each learner. The individual experience of each learner makes him develop one particular learning style more than another.

Based on this understanding Kolb (1984) highlighted the following styles of learning: Amateur, whose focus is the execution / experimentation; divergent, whose strong point is the imagination (confronts situations from different perspectives); assimilator, whose work tool is induction, creating general laws / theoretical models; convergent, whose central point is the practical application of ideas. Learning styles are actually part of a learning process. Kolb (1984) also highlights the central role of experimentation in this process as a direct result of immediate experience. The author also highlights Lewin's (1965) understanding that learning is facilitated when environments promote tension and conflict between immediate and concrete experience and analytic detachment. Kolb (1984) thinks of learning in terms of process rather than outcome.

Based on this understanding of learning as a process, we understand that it also involves cognitive aspects that refer to skills and problem solving skills, which should be considered in the construction of effective teaching strategies. Thus, the active methodology of problem-based learning in intersection with the theory on learning styles, manages to establish parameters and methodological solutions that, collaboratively, can make possible a teaching-learning process that is more accurate, dynamic and contextualized. According to Campos (2003), since the 1970s an improvement in the knowledge of learning psychology emerged showing the importance of its active participation in the incorporation of knowledge. The physiology of memory and



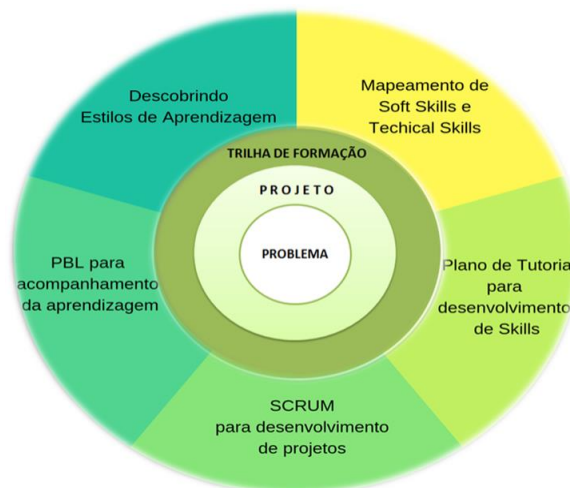
its development tend to favor the understanding of the importance of previous experience in the acquisition of new knowledge. The BPA has developed within this context and

### Methodology

In response to the need to cope with high evasion rates and, at the same time, the need to promote actions that promote human lifelong learning, health education and programming, LAIS has developed and implemented a pilot project to response to these problems, which was called Base School of Programming.

### Construction of an Open Educational Resource on the Methodology used in the LAIS School of Programming

Considering the results already achieved and the expertise acquired progressively and over time, to give continuity, greater reach to the need for permanent human formation in health, the LAIS programming school has been elaborating an Audiovisual Open Educational Resource in documentary format.

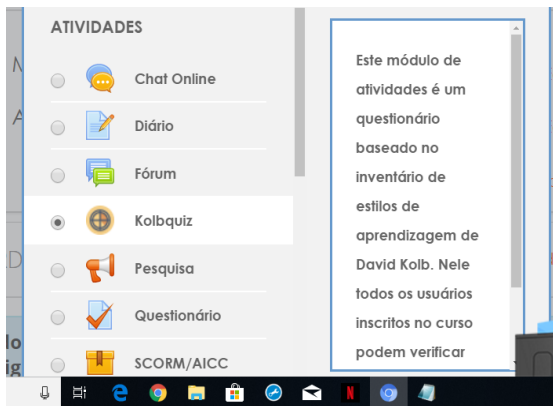


**Figure 2:** PBL-based Programming School Learning Accompaniment Methodology

Source: Authors own

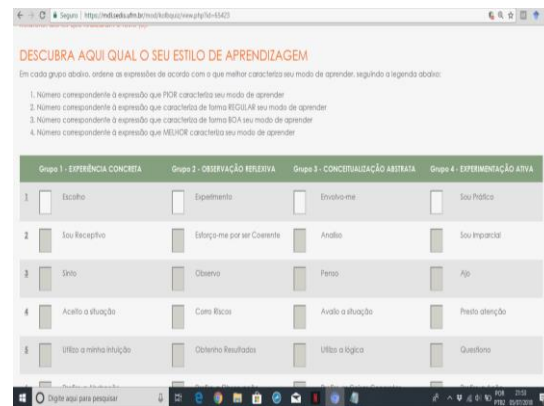
### Step 1: Discovering Learning Styles

In order for the student's prevailing learning style to be known, a computational tool was developed called "Kolb Quiz" (Figure 3), housed in the moodle platform (<https://mdl.sedis.ufrn.br/mod/kolbquiz/view.php?id=65423>) and used by LAIS / UFRN. This tool is composed of nine questions (Figure 4), adapted from the Honey-Alonso Learning Styles Questionnaire (CHAEA) by Catalina M. Alonso, Domingo J. Gallego and Peter Honey.



**Figure 3:** Kolb Quiz Tool

Source: Moodle Mandacaru



**Figure 4:** Kolb Quiz Questions

Source: Moodle Mandacaru

Thus, after answering all questions, the tool is able to indicate the predominant learning style of each student. With the help of this information and interview, the profile of skills and characteristics is identified and the group of learners and developers of computer systems will integrate it, according to figure 5.



**Figure 5:** Learning styles interfacing with problem-based learning.

Source: Authors own

## Step 2: Mapping Soft Skills and Technical Skills

Difficult skills are teachable skills or skill sets that are easy to quantify. Usually, you learn hard skills in the classroom, through books or other training materials or at work. Difficult skills tend to be the main point of differentiation between candidates in the world of work. However, only proficiency in technical skills does

not guarantee success in the long run, making it necessary for any professional in training to develop soft skills. Examples of Hard / Technical skills include: Computer Programming, Degree Degrees, Foreign Language, Equipment Operation, and Specialized Certifications.

Soft skills are subjective skills that are much harder to quantify. They relate to how you relate to and interact with other people. Subtle skills are important because they allow students to become better candidates for upward mobility and managerial roles when in the workplace. The development of light skills aims to achieve and maintain long-term career success.

Examples of soft skills include: Communication, Flexibility, Leadership, Curiosity, Creativity, and Work Ethics



**Figure 6:** Some Hard / Technical Skills and Soft Skills desired

**Source:** [http://www.pathwaystoaviation.org/hard\\_and\\_soft\\_skills](http://www.pathwaystoaviation.org/hard_and_soft_skills)

Thus, in a second phase, we seek to map the set of abilities that the student already possesses. Upon entering the School of Programming project, the student is interviewed and from this interview, using the Coggle collaborative tool, this mapping of his Technical and soft skills is done, as shown in Figure 7.

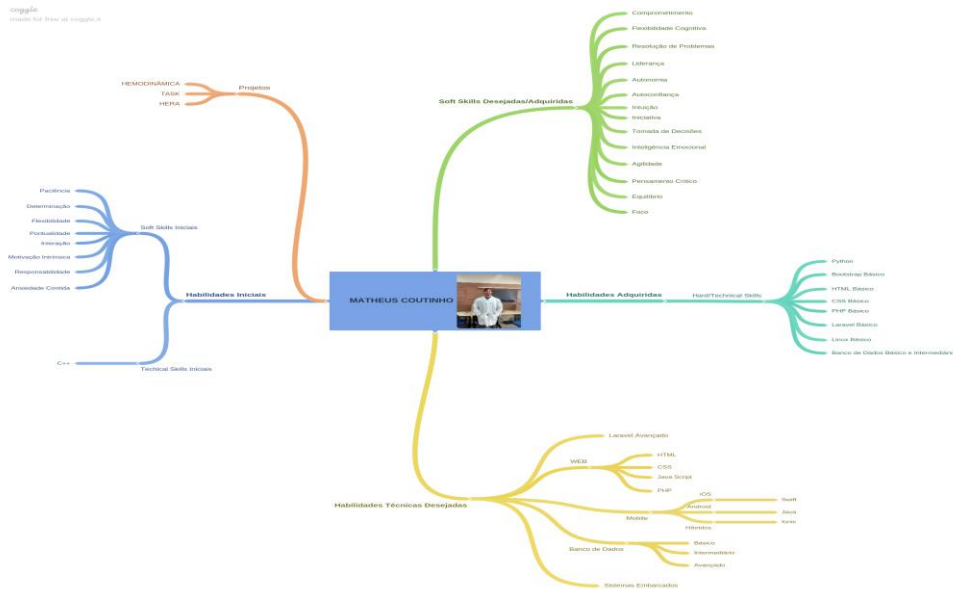


Figure 7: Mapping Skills of an EP / LAIS student using Coggle

Source: Authors own

### Step 3: Tutoring Plan for Skills Development

Then, in step 3, the individualized tutoring plan is jointly planned, with the aim of fostering learning actions that will guide the development of the skills necessary for the development of humanitarian training, technical training and project development.

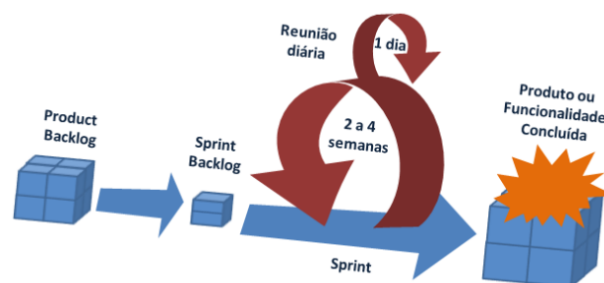


Figure 8: Model of Tutoring Plan used by the School of Programming

Source: Own Authorship

#### Step 4: SCRUM for project development

Scrum is an agile methodology for project management and planning. In Scrum, the projects are divided into cycles (15 days in the LAIS Programming School) called Sprints. Sprint represents a Time Box within which a set of activities must be performed. The features to be implemented in a project are kept in a list that is known as Product Backlog. At the beginning of each Sprint, a Sprint Planning Meeting is held, that is, a planning meeting in which the Product Owner prioritizes the Product Backlog items and the team selects the activities that it will be able to implement during the starting Sprint. Tasks allocated in a Sprint are transferred from the Product Backlog to the Sprint Backlog. Each day of a Sprint, the team makes a brief meeting called the Daily Scrum. The objective is to disseminate knowledge about what was done the previous day, identify impediments and prioritize the work of the day that begins. At the end of a Sprint, the team presents the features implemented in a Sprint Review. Finally, a Sprint Retrospective is made and the team departs for the next Sprint planning. This restarts the cycle, shown in Figure 09.



**Figure 9:** Cycle of the SCRUM methodology

Source: <http://www.mindmaster.com.br/scrum/>

#### Step 5: PBL for learning follow-up

For continuous monitoring of the development of Soft Skills and Technical skills and direction of student learning, the PBL (Problem Based Learning) Form of the School of Programming is used. This form was made adapting the 7 steps present in the PBL methodology to the learning cycle present in this project. It is filled at each meeting, sprint and individualized studies, as well as at the end of each formative track of the disciplines set out in the curriculum. In this way, it is possible for the student to participate in the construction of his learning process with the help of the technical tutor and the pedagogical team.



FORMULÁRIO DE PBL DA ESCOLA DE PROGRAMAÇÃO

NOME DO PROJETO: NeuroRad

NOME DO CLIENTE: Manuel Moreira Neto

NOME DA EQUIPE DE TRABALHO:

- Gabriel Machado - Desenvolvedor Back-end
- Luca Pareja- Desenvolvedor Back-end
- Guilherme Pablo de Santana Maciel- Desenvolvedor Front-end
- Danieli Silva de Souza Rabelo - Learning Specialist
- Daniela Aisha Silva de Souza Rabelo - UX/UI Designer

PRAZO DE ENTREGA: 15/07/2019

REGISTRO de TAREFAS PBL DA EP	ANOTAÇÕES DO GRUPO
1 Esclarecer/REGISTRAR os termos difíceis	Manual de identidade visual
2 Listar os problemas percebidos (conhecimento prévio, o que entendem sobre)	<ul style="list-style-type: none"> <li>• Compreender o fluxo do funcionamento do projeto.</li> <li>• Combinar a documentação com os entregáveis, consultando o P.O para sanar dúvidas.</li> </ul>
3 Sistematização das principais sugestões obtidas na REUNIÃO.	Reunião com o P.O.: <ul style="list-style-type: none"> <li>• Primeiras telas desenvolvidas para o sistema.</li> <li>• Fazer leitura dos artigos que incentivaram o P.O a fazer o sistema.</li> </ul>



FORMULÁRIO DE PBL DA ESCOLA DE PROGRAMAÇÃO

	Reunião com o time: <ul style="list-style-type: none"> <li>• Fazer leitura dos artigos que incentivaram o P.O a fazer o sistema.</li> </ul>
4 Quais os objetivos de aprendizado percebidos nessa reunião? (Verificar lacunas de conhecimento e/ou Tópicos essenciais para entender o problema)	<ul style="list-style-type: none"> <li>• Amadurecer a noção de logística e modelagem do Projeto do NeuroRad.</li> <li>• Conhecer as ferramentas pedagógicas que ajudam na educação sobre Neurrorradiologia.</li> </ul>
5 Precisou pesquisar em alguma fonte para prosseguir com o trabalho?	( ) Sim ( x ) Não
6 O que ficou resolvido nesta reunião?	Reunião com o P.O.: Começar a Sprint e fazer caso de uso clínico.  Reunião informal com o time: montar a historia de usuário para caso clínico.

Figure 10: PBL form for recording and tracking learning

Source: Authors own

### Expected results

Based on the results already achieved in the students' training cycle and in the development of technological solutions and systems applied to health, it is expected that the Open Educational Resource of this proposal, allows the amplification of the methodology, contemplating other researchers and institutions and in this way assist them in the application of their research to succeed from shared knowledge in this ecosystem.

### Conclusion

The proposal of the construction of an Open Educational Resource on the methodology applied in the School of Programming of the LAIS is one of the actions of innovation in health and human formation of the laboratory and of the Federal University of Rio Grande do Norte, which has been progressively contributing to the of the teaching-learning processes, especially through an own methodology model that is based on active methods such as the PBL and supported by the educational assumptions of the development objectives of the 2030 agenda. It is hoped that by amplifying this project, - the reduction of dropout rates in university courses is obtained from the motivation for learning and the promotion of meaningful learning.

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## A Command-Line based Exam Generation System for Computer Science Education

Motofumi T. Suzuki<sup>1</sup>, Yoshitomo Yaginuma<sup>1</sup>, Haruo Kodama<sup>1</sup>

<sup>1</sup>*The Open University of Japan*

### Abstract

We have developed a software system that allows teachers to create exams for introductory computer science classes. The system was designed for learning “data structures,” and it can generate figures for online educational systems. A data structure is a data organization, management and storage format that enables efficient access. It is very important for students to learn knowledge of data structures including arrays, stacks, queues, linked lists, binary trees, hash tables, heaps and graphs. A binary search tree is one of the important data structures, and students in computer science should also know about features of binary search trees. Also, students should be aware of several operations for handling binary search trees. For instance, insertions and deletions of nodes in the binary search trees are important operations, and students should be able to build a binary search tree by inserting a list of numerical data. Another important concept regarding the binary search tree is “traversal.” There are three major traversals including, (1) pre-order traversal, (2) in-order traversal, and (3) post-order traversal. Students should be able to identify the output of each traversal from the binary search tree. Practice for students is required to learn these operations, and a set of sample exams are mandatory. Our system can generate these exam sets automatically, which thus automates various exam making tasks normally done by teachers. The exam sets consist of questions and answers, and they are reliable compared to normal teacher generated exam sets, because the system can automatically and reliably verify questions and answers. Our system has been used for several exams the last few years. Approximately 600 students take the exams every year. After the exams are conducted, the answers and hints generated by our system are made available to the students. The students are able to study these exam questions by viewing the digitally created visual binary search trees. After our system was introduced, the number of students who asked questions about the exams definitely decreased, because the exam hints generated by our system help students with self-learning.

**Keywords:** Data Structures, Exam Generation System, Binary Search Tree, Command-line Based System, Online Educational Systems

## Introduction

Online education has become a promising platform in recent decades as it acts as a powerful platform for learning knowledge. Intensive research has been conducted on computer aided education and exam systems (Zhang,Zhuang,Yuan, & Zhan, 2006), (Trivedi, 2010), (Zhenming, Liang, & Guohua, 2003), (Sarrayrih, & Ilyas, 2013). Various web-based exam systems have been developed, and these systems have made the evaluation of online educational exams more reliable and effective. Although there are many effective web-based educational system platforms, it still takes significant time and effort to create exam questions and related figures and diagrams. We have developed a software system that allows teachers to create online exams for introductory computer science classes. The system was designed for learning “data structures,” and it can generate figures for online educational systems. A data structure is a data organization, management and storage format that enables efficient access. It is very important for students to learn knowledge of data structures including arrays, stacks, queues, linked lists, binary search trees, hash tables, heaps and graphs.

## Binary Search Trees

A binary search tree is one of the important data structures, and computer science students should be very familiar with features of binary search trees. A binary search tree is a data structure with the following characteristics. The subtree on the left side of nodes contains only nodes that have keys smaller than that of the node. The subtree to the right of the node contains only nodes with keys greater than that of the node. The left and right subtrees must also be binary search trees. Thus, in a binary search tree, the leftmost node holds the minimum and the rightmost node holds the maximum. Students should know the properties of binary search trees, and they should be able to create a binary search tree from a certain data set. Figure 1 shows an example of a binary search tree with 7 nodes.

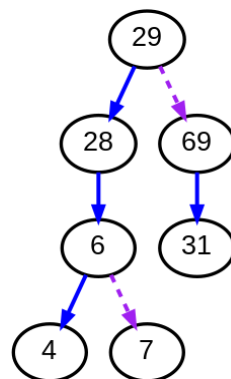
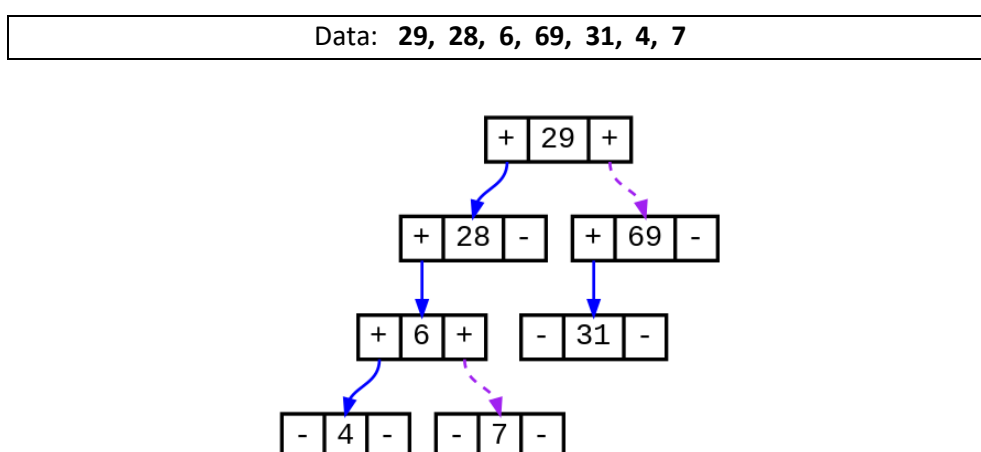


Figure 1: An example of a binary search tree

Also, students should be aware of several operations for handling binary search trees. In particular, nodes related to operations including searches, insertions and deletions are very important. Search operations need to find the node in the binary search tree in which the node's value equals the search key value. To find the key node from the binary search tree, start comparison from the root node towards the leaf node. If the node is less than the key value, search for the node in the left subtree. Otherwise, search for the node in the right subtree. The same process is repeated for each node until a search key value is found or the comparison of the search key value and the node value reaches a leaf node.

Insertion operation is related to the search operation since a new node has to be inserted into the proper location in the binary search tree. Start searching from the root node, then if the node is less than the key value, search for the empty location in the left subtree and insert the node. Otherwise, search for the empty location in the right subtree and insert the node.

It is important for students to learn the properties of binary search trees well, and they should be able to build a binary search tree from the given data set. It is convenient for students to use practice exam data sets if they are available. If a software system generates random data sets and corresponding binary search trees, these data sets can assist with self-learning. Our system can generate an image of a binary search tree from a randomly generated numerical data set. *Figure 2* shows an example of a data set and the corresponding binary search tree. In the figure, a sequence of the data is inserted into a binary search tree. A sequence of data contains 7 integer values which include 29, 28, 6, 69, 31, 4 and 7.



**Figure 2: An example of a data set and the corresponding binary search tree**

Our system was designed as a command-line based system in consideration of system portability. For instance, our system can run on various systems including Windows, Linux and macOS. *Figure 3* shows example commands to generate a binary search tree. There are three commands, the first command “bst-rand” generates random numbers for a binary search tree, and the numbers are stored into a specified file. The second command reads an input file containing numerical data, inserts that data as nodes, and builds a binary search tree in computer memory. The binary search tree information is converted into nodes and edges and stored into a file. Files are stored based on the DOT language format. This DOT language can be handled by the software “Graphviz”.

```
$ ./bst-rand Data/node.txt 10 365 -r
$ ./bst-vizf Data/node.txt Data/bst.dot 1
$ dot -Tpng Data/bst.dot -o Data/bst.png
```

**Figure 3: An example command to generate a binary search tree**

*Figure 4* shows some portions of code generated from the “bst-vizf” program, and graph drawing information is stored to a file. “Graphviz” is open source graph visualization software, and it includes various software tools. One useful software tool is the “dot”, which is the third command used in *Figure 3*. The “dot” enables users to draw layered drawings of directed graphs. In this example, a PNG format digital image of a binary search tree with 10 nodes is generated, and the output image is similar to that shown in *Figure 5*

```
digraph BST {
graph [label=" "];
node [
  fontsize="20",
  shape="record",
  height="0.1"
  fontname="Courier New",
  penwidth="2.5"
];

"node029" [label="<f0>+ |<f1> 29 |<f2>+"];
"node028" [label="<f0>+ |<f1> 28 |<f2>-"];
"node069" [label="<f0>+ |<f1> 69 |<f2>-"];
"node006" [label="<f0>+ |<f1> 6 |<f2>+"];
"node031" [label="<f0>- |<f1> 31 |<f2>-"];
```

```

"node004" [label="<f0>- |<f1> 4 |<f2>-"];
"node007" [label="<f0>- |<f1> 7 |<f2>-"];

"node029":f0 -> "node028":f1 [penwidth="2", style="solid",
color="blue"];
"node029":f2 -> "node069":f1 [penwidth="2", style="dashed",
color="purple"];
"node028":f0 -> "node006":f1 [penwidth="2", style="solid",
color="blue"];
"node069":f0 -> "node031":f1 [penwidth="2", style="solid",
color="blue"];
"node006":f0 -> "node004":f1 [penwidth="2", style="solid",
color="blue"];
"node006":f2 -> "node007":f1 [penwidth="2", style="dashed",
color="purple"];
}

```

**Figure 4: Some portions of code generated from the program “bst-vizf”**

Our command line program “bst-rand” can generate various random numbers for binary search trees. A variation of random numbers is controlled by command line arguments and switches. As shown in the Figure 3, the first argument is a file name for the intermediate file to store random number information of a binary search tree. The second argument is the number of nodes to generate, and the third argument is a random seed. A random seed is a number used to initialize a random number generator. Setting the random seed is helpful if the program is required to reproduce results, as all the random numbers generated will always be the same.

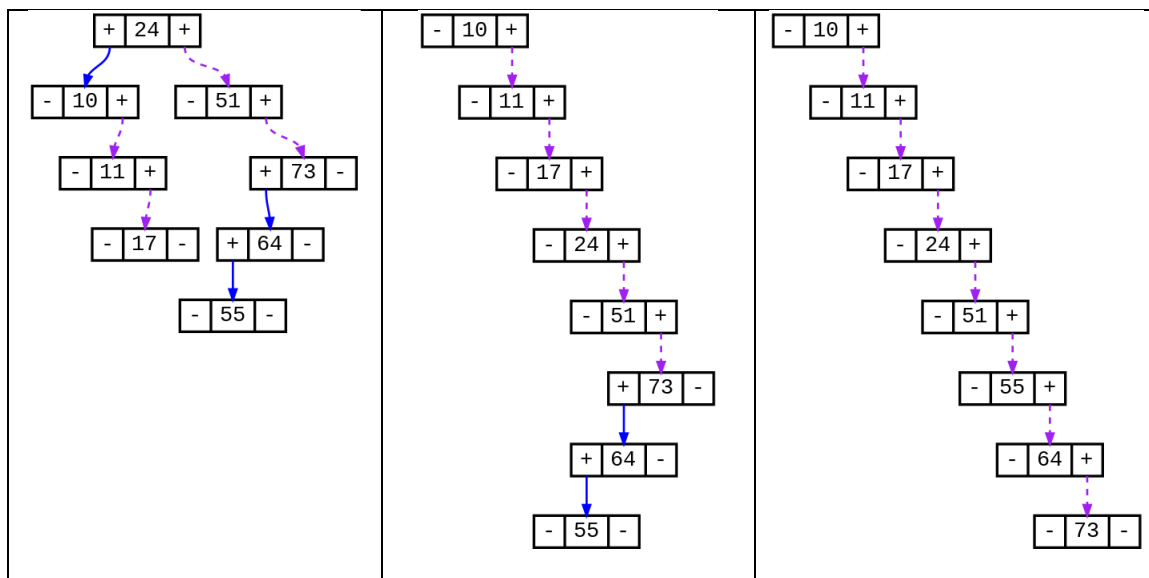
Table 1 shows a list of command line switches for the program “bst-rand.” Command line switches are arguments that begin with a minus character. The switch “-r” stands for “random” and random integer numbers are used for a binary search tree generation. The maximum and minimum of the random numbers are limited by environment variables BST\_MAX and BST\_MIN. The environment variables are normally initialized during system startup by the system initialization scripts. If these environment variables are not set as a default, BST\_MAX is set to 100 and BST\_MIN is set to 10. The program “bst-rand” concerns duplication of random numbers, because in general, binary search trees do not allow duplicates while others add the same values as a right node. The program simply avoids generation of duplicate random numbers by using a technique for shuffling array index values. The switch “-p” stands for “partial” and partially sorted data sets are used for generating a binary search tree. The switch “-s” stands for “sorted” and sorted data

sets are used for generating a binary search tree. In other words, a sequence of random numbers in ascending order is used.

-r	Random integer numbers are used for a binary search tree generation.
-p	Partially sorted data sets are used for generating a binary search tree.
-s	Sorted data sets are used for generating a binary search tree.

**Table 1: Command line switches**

The order of node insertion is important when a binary search tree is created. The shape of a binary search tree depends on the nodes inserted into the tree. Even though the system uses the same node data set, the tree shape will be different if the node insertion order is different as shown in *Figure 5*.



**Figure 5: Various binary search trees generated from an identical data set**

In the figure, three binary search trees were generated by the program, and each tree was generated by three different switches, "-r" and "-p" and "-s". When accessing nodes in a binary search tree, it is very important whether the binary search tree is balanced or not. This affects the time required for node operations including search, insert, and delete. The tree created using "-s" is not balanced, and such an unbalanced tree is similar to the single linked list. For example, searching for a node from the unbalanced binary search tree approaches the time complexity of  $O(n)$ , while a balanced tree has a time complexity of  $O(\log n)$ . Our program can easily make various types of binary search trees simply by changing the switch, thus students can easily practice and learn the difference between balanced and unbalanced trees. Students

can also learn the time complexity of a binary search tree related to search, insert and delete. Our system can generate these figures automatically, which thus automates various exam making tasks normally done by teachers.

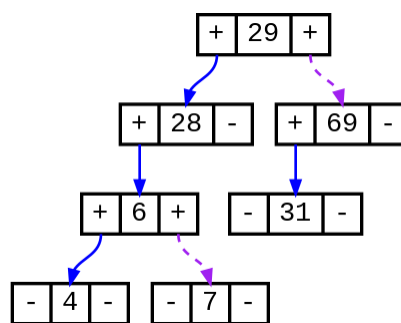
Another important operation regarding the binary search tree is traversals. Traversing a tree means visiting every node in the binary search tree. There are different ways of traversing a binary search tree, depending on the order that the nodes are visited. There are three major traversals which are in-order traversal, pre-order traversal, and post-order traversal. Students should know the differences between these traversal techniques, and they should learn how to trace these traversals from a given binary search tree. *Figure 6* shows a binary search tree and its corresponding traversals (in-order, pre-order, post-order). Our system can automatically compute these three traversals, so students can easily determine if they have correctly computed the traversal output manually. Often these computations require knowledge of "recursion" or "stack", and these are slightly complex processes for many students, thus students require a lot of practice. Our system can automatically and reliably produce questions and answers.

```

data
29, 28, 6, 69, 31, 4, 7

traversals
pre-order: 29 28 6 4 7 69 31
in-order:  4 6 7 28 29 31 69
post-order: 4 7 6 28 31 69 29

```



**Figure 6: Traversals (in-order, pre-order, and post-order)**

In terms of creating test questions, a binary search tree with a large number of nodes will usually not be necessary. Ten or fewer nodes would be sufficient for general exam questions. Using our system, the binary search tree is created in dynamically allocated memory, so basically it is possible to create a binary search tree with a relatively large number of nodes as long as the memory capacity permits. *Figure 7* shows a binary

search tree with 100 nodes, and it is not easy to draw such a diagram manually. If the binary search tree has hundreds and thousands of nodes, our system will be much more effective and useful. Our system can draw diagrams in a few seconds using binary search trees with more than 10,000 nodes.

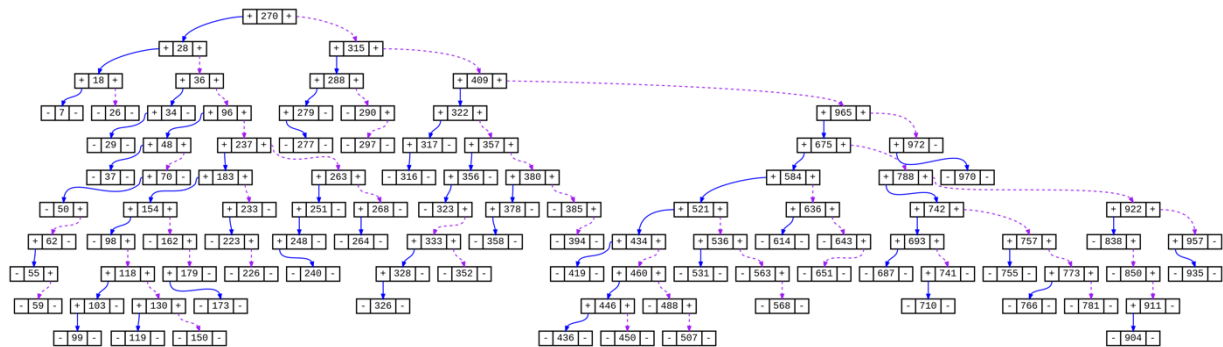


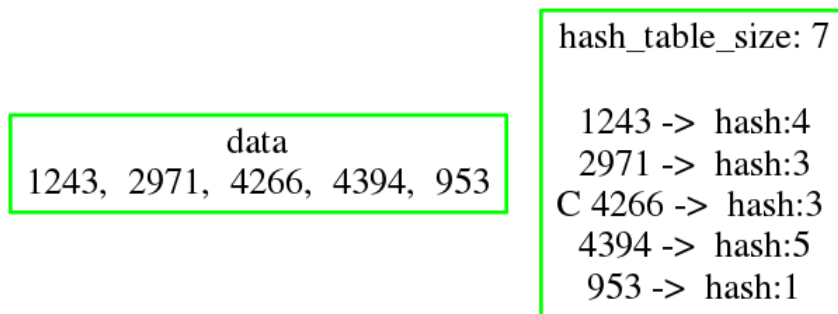
Figure 7: A binary search tree with 100 nodes

## Hash Tables

Hash tables are important because they enable high-speed data access such as search, insertion, and deletion. In order for students to create efficient software, it is important to understand the structure and operation of hash tables. For a hashing technique, large keys are converted into small keys by using hash functions. The values are then stored in a hash table. The idea of hashing is to distribute entries uniformly across the hash table. Each element is assigned a key, and the hash function computes an index that suggests where an entry can be found. The element is stored in the hash table where it can be retrieved using a hashed key. A hash function can be used to map a data set of an arbitrary size to a data set of a fixed size. The values returned by a hash function are called hash values. It is important that hash functions cause few collisions. Collisions occur when pairs of elements are mapped to the same hash value. Also the hash function should compute a uniform distribution across the hash table and should not result in clustering. Students should be able to learn the characteristics of hash functions and calculate simple hash functions from given data. Students can learn the structure of the hash table by understanding these calculations. Our system automatically generates data sets for students to practice hash function calculations. It also calculates hash values corresponding to the generated data and calculates whether there is a collision in the given hash table. In addition, it is possible to visualize data where a collision has occurred. *Figure 8* shows output from our command line program “hash-table”, and it allows users to set a number of data sets, the size of the hash table, and ranges of data set values. Currently, a very simple module arithmetic based hash function is



implemented, and only a numerical data set is allowed for the program. In the future, other hash functions will be implemented, and the system will be extended to handle string data sets.



**Figure 8: A hash table and hash values**

## Stacks and Queues

Stacks and queues are the most basic data structures, and many important algorithms use these data structures. Students need to have a thorough understanding of these data structures. In the stack, it is necessary to understand push and pop operations, and the queue, enqueue and dequeue operations. Our system generates a series of operations on the stack, such as push and pop, and the student can learn about how the state of the stack changes depending on the operation. Figure 9 shows an example of a series of stack operations, and corresponding states of the stack. Similarly, our system can also generate exam questions for operations related to queues. Although these operations are relatively simple, drawing the diagrams associated with these operations is time consuming. If such a figure can be generated automatically, the load on teachers can be reduced. In addition, it is a format that can be read by software applications such as Graphviz, and it is possible to customize a diagram using Graphviz.

#	op.	stack
1	push 100	100
2	push 300	100, 300
3	push 200	100, 300, 200
4	pop	100, 300
5	push 100	100, 300, 100
6	push 400	100, 300, 100, 400
7	pop	100, 300, 100
8	pop	100, 300
9	pop	100

**Figure 9: A series of stack operations**

## Conclusion

Our system can generate these exam sets automatically, which thus automates various exam making tasks normally done by teachers. The exam sets consist of questions and answers, and they are more reliable compared to normal teacher generated exam sets, because the system can automatically and reliably verify questions and answers. Since our system is a simple command-line based system, it is highly portable to many operating systems including Linux, Windows and macOS. Our system can generate various figures and diagrams for data structures including arrays, stacks, queues, linked lists, binary search trees, hash tables, heaps and graphs. In particular, with regard to binary search trees and hash tables, it is possible to create various forms of diagrams. Various binary search trees can be generated using our system. The system can control (1) the number of nodes in the binary search tree, (2) the digit size of each node, (3) the height of the binary search tree and (4) the shape of the binary search tree. The system guarantees productions of a unique value for each node, and it avoids duplication of nodes. The system can control the shape of the binary search tree by partially sorting the data values of inputs. When sorted data are used for inputs, the binary tree tends to be a linked list, and the shape changes to linear.

Our system has been used for several exams the last few years. Approximately 600 students take the exams every year. After the exams are conducted, the answers and hints generated by our system are made available to the students. The students are able to study these exam questions by viewing the digitally created visual binary search trees. After our system was introduced, the number of students who asked questions about the exams definitely decreased, because the exam hints generated by our system help students with self-learning.

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## Web tools and Student Generated Content: An Indicator of Engineering Student Graduate Attributes

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### Abstract

In response to skills required by employers, growing emphasis has been placed on South African universities to identify appropriate graduate attributes (GAs) which students need to develop over the duration of their studies. Against this backdrop, heightened awareness has arisen of changes required in teaching strategies in engineering education at a University of Technology (UoT) in the Western Cape in South Africa. This paper reflects on an innovative intervention where two lecturers in different engineering departments at the UoT designed a project for fourth year students. Open access web tools (screencasting and wikis) were used to create curriculum material for the two engineering courses, and these simultaneously assisted students to develop GAs. A mixed method study on the intervention commenced in July 2018 and data collection started with an online survey (n=57) which took place in November 2018. Thereafter, two focus group interviews (n=3 and n=6) took place in February 2019. The research lens focused on four areas of interest, namely 1) the role of the web tools and GAs; 2) student generated curriculum content and GAs; 3) the factors that influenced the process and 4) active learning that developed students GAs when web tools were used. Internal validity (reliability) was assured by Cronbach's alpha in the quantitative phase of the study. Data saturation and peer review assured validity in the qualitative phase of the study. Results of the precursor study provided the data for this reflection. The most significant finding that emerged from our reflection is a recommendation to include reflective steps in the process when web tools are used to produce student generated content (SGC) and develop GAs. This paper concludes with the limitations of this study and recommendations for future research. Ethical clearance to do this research was obtained through institutional channels.

**Keywords:** Web tools; Graduate Attributes; Student Generated Content

## Introduction

This paper reflects on the experiences of two academics at a South African university of technology (UoT) where increasing emphasis has been placed on the identification and development of appropriate graduate attributes (GAs) (Winberg *et al.*, 2017) in students. Moreover, significant developments in South African Higher Education (HE), such as the Fees Must Fall (#FMF) movement highlighted that transformation is required in two key areas namely the use of technology and curriculum design (Langa, 2016). Consequently, heightened awareness of changes required in teaching strategies in engineering education arose at the UoT.

In a pedagogical intervention, open access web tools (screencasting and wikis) were used by students to develop course material and simultaneously assist the students with the development of GAs. To evaluate the success of the online intervention, data collected through mixed methods was examined through four research lenses namely 'web tools and GAs', 'student generated content (SGC) and GAs', 'factors that influence the process' and 'active learning and web tools'. The analysis and discussion of the findings were reported in another paper, also written by the authors of this paper and presented at the Research in Engineering Education Symposium in Cape Town South Africa in 2019. Essentially, findings of the precursor study to this paper suggest that the use of web tools by students to generate curriculum content is an appropriate and effective method to achieve institutional GAs. In addition to the acquisition of domain specific knowledge, students reported developing soft skills that are required by employers but are not specifically taught at universities.

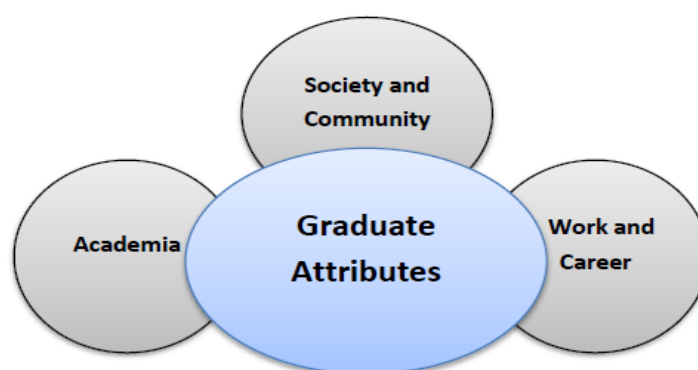
This paper presents a reflective perspective on the pedagogical process followed by Cheryl and Bronwyn, the two lecturers in different engineering departments at the UoT, in the precursor study. Our reflections are grounded in the overview of literature presented in the following section, and positions this research in relation to the need for graduates with new skills and capabilities to not only cope with the modern technological working environment, but also be able to transform lives (their own and others) and society. Following authors such as Fawley, Dyson, Tyler and Wakefield (2016), this paper primarily reflects on the process followed and the learning that we as a collective, academic staff and students, can draw from, as we move our teaching practice to a more blended approach, which is more relevant and appropriate for the transforming requirements of the South African HE landscape.

## Theoretical Framework

### *Graduate Attributes*

Consensus among authors (Fawley *et al.*, 2016; Moradpoor, 2014; McCabe, 2010; Barrie, 2004; Bowden, Hart, King, Trigwell and Watts 2000) was noted on GAs being qualities, abilities, skills, knowledge and understandings that a university community agrees its students should develop during their time with the institution. These extend beyond disciplinary content knowledge and are applicable to a range of contexts. This is aligned with the view of Snowball and McKenna (2017), who claim that development of GAs ultimately make students part of the community of knowledge creators and members of a community of practice, rather than outsiders who passively receive knowledge, which is controlled and mediated by educators.

Essentially GAs represent the intersection of three aspects of the student experience during the time of study in university (Moradpoor, 2014), as depicted in *Figure 1*. These aspects are (1) Academia, (2) Society and Community and (3) Work and Career. Academic attributes refer to the type of students and researchers the students are or can be. Society and community attributes indicate students' contribution to society and citizenship and work and career attributes refer to employability traits and skills. Moradpoor (2014) explains that GAs could be different between different universities even between different courses and different levels within a university; they should all retain an overall cohesion and refer to learning, teaching or research. Therefore, irrespective of the course or the level of study, relevant GAs should be identified, tailored and finally embedded in all courses within a given university.



**Figure 1: Graduate Attributes (Moradpoor 2014)**

Significantly, Willey and Gardner (2008) found that a competency gap between the skills required by employers and those developed by students during their courses at universities exists. In response to Willey and Gardner (2008), research by Frawley *et al.* (2016) reported that GAs can be developed through a web

tool assignment whereby students “*need to explain key concepts to peers*”. Frawley *et al.* (2016) found that such an assignment contributes to the development and expression of a number of GAs which include a student’s ability to communicate ideas, skills in multimedia, creativity, teamwork and self-directed learning which thereby essentially closes the competency gap mentioned above. The precursor study upon which we reflect in this paper was guided by the process followed by Frawley *et al.* (2016) since it was an endeavour to ensure that the institutional GAs were met. The GAs of the UoT where this research took place are ‘Technological Capability and Foresight’, ‘Resilience and Problem Solving Capability’, ‘Relational Capability’ and ‘Ethical Capability’.

#### *Critical Pedagogy and Student Generated Content*

Consistent with other studies (Mayaba, Ralarala & Angu, 2018; Rugganan & Spiller, 2014), our reflections draw on the ideas of Freire (1972) in an exploration of the process we followed to facilitate the development of GAs. Freire (1972; 1984) proposes a problem-posing pedagogical approach, also referred to as critical pedagogy, as an alternative to the traditional educational model which he calls as ‘banking education’. Discussing Freire (1972; 1984), Gachago (personal communication, May, 15, 2019) opines that he severely criticises the banking model of education as this model lacks dialogue and critical thinking. She argues that with banking education, knowledge is ‘*transmitted as a corpse*’. She describes it as dead knowledge, disconnected from the learners, produced by others, and imposed upon learners. With banking education, learners are considered to be empty and passive receptacles awaiting a knowledge deposit. This approach alienates learners from their own cultural realities and domesticates them into compliant objects. This underpinning philosophy constitutes a foundation concept in our precursor study since we employed critical pedagogy (with a problem-posing intervention) in that study to facilitate the development of GAs and thereby transform our learners. Freire (1972; 1984) therefore provided a lens for our reflections.

Freire’s critical pedagogy encompasses educational approaches that are focused on empowering learners to be full participants in democratic society. This is achieved through educational practices connected to learners’ own experiences, address issues directly and are immediately relevant to learners and their communities. Moreover, critical pedagogy draws on what learners already know to create something new (Saxon & Vitzthum, 2019). In the context of our study this entailed the production of student generated content (SGC) made with web tools.

A web-based tool (web tool) is defined by Warren (2019) as an application or software program that runs on a web browser. Thus the wiki feature of a learner management system (LMS) and screencasting (screencast-

o-matic) are web tools. The only user requirements to operate a web tool are an internet connection and an internet browser to be installed on the user's device. Software enables the web tool to be installed and executed on a remote server, which is accessed via the web browser. This specialised software also provides desktop-style application functionality through the user's web browser frontend. A primary benefit of browser-based web tools is it is not required of the user to purchase any software as in the case of locally installed desktop applications. A further advantage of web tools is the remote hosting aspect. Implications of remote hosting are the web tool can be accessed from anywhere in the world and less storage space used on the user's computer.

The advent of Web 2.0 has greatly increased the potential production and use of SGC (Snowball & McKenna, 2017), such as wikis, blogs and podcasts, in HE. They assert that SGC is not only associated with higher order learning outcomes and greater student engagement, but it also allows educators to bring student experiences and voices into the centre of the community of practice. Essentially, this acknowledges the importance of students' prior experiences in knowledge production. This view is consistent with Coulsen and Frawley (2017) who advocate that when students generate multimedia, it places the student at the centre of their learning. Thus, SGC is a move away from passive (banking) instructional methods. Importantly, students who produce or co-author learning material gain benefits such as technology skills, creativity, and the ability to communicate knowledge and work collaboratively. Furthermore, the production of some types of learning materials, for example screencasts, can be very motivating to make in cultures celebrating multilingualism (Coulsen & Fawley, 2017). This is significant in the context of our reflection since precursor study on which we reflect takes place in the Western Cape in South Africa. According to Western Cape Government (2019), the Western Cape has three official languages, namely English, Afrikaans and isiXhosa.

#### *Factors That Influence Transformation in Online Projects*

Previous research (Garcia, Noguera & Cortada-Pujol, 2018; Fawley *et al.* 2016) suggests that the autonomy and self-sufficiency that students experience when taking part in online project to develop SGC leads to ambiguous feelings. This is consistent with findings of our precursor study. We found that our students felt both empowered, yet insecure at times and in need of guidance and peer to peer collaboration to ensure that they did not get lost during the process. This literature guides our own reflection on the process we followed and its contribution to inform our teaching practice as we aim to deepen our understanding of innovative application of educational technology. With reference to other factors that promote transformation, Garcia *et al.* (2018) concluded that students value, and want to be involved in decision-making concerning the design of their courses. Furthermore they also value process elements such as the

closeness of the learning situation to the professional real context, collaborative work and being able to use of new resources and procedures even though the initial learning curve was steep for them. Significantly however, the authors report that although students said that they felt engaged in the project where they produced SGC using web tools, the students were only able to provide a partial judgement on what they did as opposed to a holistic view. Several authors (Garcia *et al.* 2018; Fawley *et al.*, 2016; Bovill, Bulley & Morss, 2011; Bovill, Morss & Bulley 2009; Davidson & Young, 2005) concur that students require training on how to give useful feedback so ensure a successful co-creation process which will ultimately lead to transformation in students and lecturers. Lecturers on the other hand need to learn how to be responsive to the feedback given by students. Garcia *et al.* (2018) recommends that time must be devoted to building a shared vocabulary to enable genuine dialogue and mutual understanding between parties.

A key issue highlighted by both Garcia *et al.* (2018) and Cameron and Tanti (2011) is that lecturers must become more self-aware and relinquish some control to ensure the success of a co-creation project. They found that students more readily assume the role of co-designers when students understand and accept that their views will be taken into serious consideration. The co-design process becomes richer and more fluid and facilitates transformation. Furthermore, the authors also report that in contrast to this, a key issue that hinders transformation is an indecisive or poorly defined project brief and assessment criteria. Without a well-defined project brief and assessment criteria students are unable to take control of the environment where learning activities occur.

## Methodology

An interpretivist constructivist epistemology serves as the framework for our reflective study. This approach is described by Probst (2016) as “*unusual*” by virtue of researchers holding dual roles of providing research data and analysing the data themselves. Probst (2016) suggests the merit of researchers’ taking the place of participant in that it is an approach which fosters richer meanings of research findings through reflexivity, an appreciation for mutuality and the co-construction of knowledge that cannot be learned by simply reading about it. She opines that this practice adds value due to its capacity to foster ethical conduct, thereby endorsing the orientation of our case studies.

Both Cheryl and Bronwyn are exit level lecturers in the Faculty of Engineering and are considered to be online champions with significant blended learning experience (Gachago 2017). Cheryl teaches Transportation Engineering in the Department of Civil Engineering while Bronwyn teaches Statistics in the Department of Industrial and Systems Engineering. A precursor research study to this study took place from July 2018 until



February 2019 in which each lecturer presented their respective final year BTech classes with a semester project which entailed the production of course material facilitated by a web tool. In August 2018, Cheryl requested her students produce a group wiki on a prescribed topic that had already been taught in class. Students were provided with a project brief, instructional wiki videos and a sample wiki. A rubric was provided to assess the content of the wiki report, technical functionality, individual and group contribution. The students were verbally informed that their wikis had to be of good enough quality for other students to use as an educational resource. They were also informed that their permission would be requested should their wiki be selected for re-use to teach other students. The project ran for five weeks and entailed peer-to-peer and lecturer to student feedback. Wikis closed in mid-October 2018. This semester project constituted 15% of their final year mark.

Simultaneously, Bronwyn asked her students to create two 15 minute long screencasts on a topic already covered in class. Students worked in groups and the two screencasts needed to be in two different local languages (either English and isiXhosa or English and Afrikaans). Students were given the rubric that would be used to assess the English screencast. The students were informed that screencasts needed to be of good enough quality for other students to use as an open educational resource. Therefore, students were requested to grant permission to re-use their screencasts to teach other students. Groups submitted a draft English screencast, and Bronwyn gave them feedback. Only the final English screencast was marked by Bronwyn. The translation of the other language screencast was peer-marked by other groups of students (only translation, not content) in a half blind peer review process. Screencasts were completed and submitted in October 2018. This semester project constituted 15% of their final year mark.

Following the submission and assessment of student projects, a mixed method approach was adopted to collect data from students. Data collection commenced in November 2018 with an online survey (n=57). Alpha Cronbach's coefficient was used to ensure internal validity of the likert scale data. The findings of quantitative data analysis provided the basis for the development of the qualitative data collection instrument. Two focus group interviews were conducted in February 2019 (n=3 and n=6). Interviews were conducted by an interviewer who was not the lecturer of the students being interviewed to eliminate bias and ensure the validity and reliability of research data. Interviews were transcribed, coded and thematically analysed. The analysis of precursor study data, our personal observations of the research process we followed and on-going conversations culminated in the write-up of a reflective narrative (Merriam 1998) which describe the teaching practices and lecturer reflections on the intervention. The conceptual framework presented in the literature review section of this paper serves the research lenses for our reflections. Ethical clearance for this study was granted through institutional channels.

## Reflection on Practices During the Intervention Process

### *Graduate Attributes as an Outcome of Our Intervention*

As we reflected on GAs as an outcome of our intervention, we remained mindful of Moradpoor's (2014) argument that GAs are different between different universities and even between different courses and different levels within a university. Irrespective of this, we reflected on our context and the process we followed to facilitate the development of 'Technological Capability and Foresight', 'Resilience and Problem Solving Capability', 'Relational Capability' and 'Ethical Capability' in our students. Our study noted correlation between the use of web tools and 'Technological Capability'. Guided by Frawley *et al.* (2016), we believe that it is the experience hosted by that web tool which develops 'Foresight'. A retrospective examination of the process we followed allowed us to see that in our context, 'foresight' enabled adaption to the experience and efficient completion of activities. The technological nature of our intervention promoted this GA.

Our students also developed 'Resilience and Problem Solving Capability'. Our intervention underscored that lecturers must remain visible and supportive, however must simultaneously relinquish control and allow students opportunities of discomfort. This promoted self-efficacy; a measure of resilience and problem solving capability in our students, toward achieving their role as co-designers. Student vulnerability exposes real learning needs of the student. Consistent with the findings of Cameron and Tanti (2011), in our context this obliged the lecturers to become self-aware and flexible to respond to student learning needs.

The design of our intervention fostered 'Relational Capability' due to group work being mandatory. Holistically, the process was a positive experience for students; however they also reported grappling with *relational* experiences and stated that they felt tested by the degree of honesty and brevity required for peer review in both the screencast and wiki experiences. The production of SGC demonstrated 'Ethical Capability'. In our reflection we noted that students mentioned that awareness that they we are creating products to be used by others motivated them to produce better products and this experience was very fulfilling for them. This dual act of caring and capability exemplifies the GA.

### *Critical Pedagogy During Our Intervention*

We believe that our intervention was a move away from the 'banking' approach (Freire 1972; 1984) as we drew from skills and knowledge that our students already possessed. Thus, dialogue formed a critical component of our pedagogy, especially during the inaugural stages of the project and students were given

the opportunity to engage with the project rubrics. In retrospect, we were able to see that as lecturers, we could have relinquished more control for a more empowering transformative experience for both the students and ourselves. From a reflective perspective, it emerged that essentially we remained the primary 'gatekeepers', partly because this was an expectation of our students and also due to our own insecurity.

With hindsight we recognise other forms of student contribution included staged feedback, peer-to-peer feedback as well as impromptu consultations with students to address challenges in the project. Allowing students to submit a draft project submission highlighted challenges which could be addressed before the final submission. The final submission confirmed whether earlier concerns had been addressed or demonstrated new concerns to be addressed in the next project cycle. The qualitative focus group interviews in our precursor gave our students a voice to safely share their personal opinions on the web tool intervention and reflect on their own transformation. From our reflections we realised that 'reflection' was an unintended essential step for the success of our intervention.

#### *Factors That Influenced the Process*

In consideration of the views of Garcia *et al.* (2018), Fawley *et al.*, (2016), Bovill *et al.* (2011); Bovill *et al.* (2009) and Cameron and Tanti (2011) we reflected on the factors which influenced our intervention process. We were able to identify elements which positively contribute to successful engagement in the area of problem based learning using a web tool. We feel that for pragmatic reasons it is useful that we present these findings as a list, which can be seen below:

- Engage in dialogue with students about your expectations and their expectations (this is a form of relinquishing control and power sharing);
- Based on discussions with students update the assessment, rubric and instructional material accordingly;
- Ensure that adequate training to use the web tool is part of the process;
- Allow for impromptu student consultations as the need arises;
- Provide formative feedback and create opportunities for peer review;
- Include student reflection steps in the process whereby the student can contemplate their progress before final submission and again after final submission;
- Include lecturer reflection steps in the process before final submission to assess progress and after final submission to evaluate if the outcomes have been met and identify areas of improvement;
- Be flexible in your pedagogy and openly acknowledge mistakes to students. This is important to build trust. Evaluate how mistakes influence the current assessment and adapt rubric accordingly;
- Be adept at using the selected project web tool.

## Discussion and Conclusion

The outcome of our reflection concurs with the findings of other studies (Garcia *et al.* 2018, Fawley *et al.* 2016, Cameron & Tanti 2011), stating that in addition to improving students' discipline specific knowledge, a web tool project contributes to the development and expression of a number of graduate attributes. Aside from the acquisition of domain specific knowledge, students reported developing soft skills required by employers but are not specifically taught at universities. However, a significant new theme that emerged from this paper is the need to reflect on the process when web tools are used to produce SGC and develop GAs. Students need sufficient opportunities to consider their learning process and thereby advance their competencies with respect to self-direction. This is a key enabler of transformation.

Similarly, we deduced that lecturers also reap benefit from critical reflection as it develops awareness and changes in attitudes and thereby promotes professional growth as teachers. It also improves the support that they are able to provide students. From our reflections we gleaned that a critical pedagogical approach with online web tools serves as a vehicle for transformation, and thereby offer a solution to problems faced in South African HE in particular, where there is an increasing call for decolonisation and improved pedagogical practices.

We acknowledge that this is a small case study conducted in two departments in the same faculty at a UoT in the Western Cape, South Africa. Thus, our findings cannot be generalised to all situations at different universities. We however recommend that the questions highlighted by this reflective study serves as a framework for further discussions.

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## Exploring the Factors Affecting the Effectiveness of Online Learning: Taking Art Courses as an Example

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### Abstract

In recent years, as online education has drawn more and more attention from society, the effectiveness of online learning has also been increasingly mentioned. Previous studies of factors for online learning effectiveness focused on human factors as the learner and teacher or technique factors such as the learning platform. Previous studies of online learning efficacy for specific courses focused more on language learning courses. Currently, there is less research on the effectiveness of online learning in art courses. The art discipline itself has characteristics of visual sensibility, and the learning achievements are mostly represented in art practice. These make it challenging to adapt art education to the online learning environment and to provide rich interactive critiques in the art creation. What are the factors that have influenced the effectiveness of online learning of art courses? Do disciplinary characteristics have a significant impact on the effectiveness of online art courses? This study takes case analysis methods as the primary research method and takes the online course “Chinese Traditional Landscape Painting” from OUC (The Open University of China) to examine online art learning effectiveness. This 63-day online course focused on the basic techniques and fundamental theories of traditional Chinese painting, attracting 1,286 adult learners with no prior experience in Chinese art from around the world to participate in the study. This study conducted a questionnaire survey to the participants of the course and a semi-structured interview with some learners who completed the course. Through interview data analysis, this research found four main factors affecting the effectiveness of online art course learning, including (1) Learning motivation, including the learning motivation of the learners and their learning expectation of the course; (2) Curriculum design, which integrates the characteristics of the discipline, including the course content presentation design, multi-evaluation design and learning community design; (3) Learning support services, including appropriate teaching team structure design, reasonable course schedule and effective learning support services; and (4) Technical environment, including the terminal selection, the usability of the technology platform. In the online art course, this study shows that the learning support service factor and the curriculum design factor embodying the art discipline’s characteristics are the most critical factors for online learning effectiveness.

**Keywords:** Online course, Art education, Learning Effectiveness, Impact factor, Online education, Exploration

## Introduction

The definition of effectiveness is the degree to which something is successful in producing the desired result or success. Some scholars (Wang, 2011) proposed that learning effectiveness includes three aspects. First, the effect of learning. Learners have achieved more than the original knowledge and skills through learning. Second, the efficiency of learning, the best learning effect that learners achieve with the minimal input in the process of learning. Third, the learning benefits, the learning targets achieved by learners to meet their learning needs.

In recent years, as online education has drawn more and more attention from the whole society, the effectiveness of online learning has also been increasingly mentioned. The report HarvardX and MITx: Four years of open online courses (Chuang, Ho, 2016) shows that 2.4 million users took at least one online course on HarvardX or MITx during 2012 to 2016, including 245 thousand certificates, the completion rate was around 10%. In a MOOC in journalism with five thousand learners in the University of Texas at Austin, only 5.6% of the students completed all the requirements and paid to receive their certificate (Liu et al., 2014). According to the search statistics of CNKI of China, there were 12 articles on online learning effectiveness in 2007, and 65 articles in 2018, of which 6.5% were about the effectiveness of online courses. The rising trend of online learning effectiveness reflects the increasing emphasis on the effectiveness of online learning by educators. However, the current research on the effectiveness of online courses is not sufficient. Why do most learners fail to complete online courses? Why are they not willing to engage in online learning interactions? These are all issues that need to be addressed.

At the same time, despite the increasing interest in online education, there are certain limitations to the research of learning effectiveness of specific online courses. On the website CNKI, 75% of research papers on specific online courses focus on language courses. Studies of other courses, especially for online art courses are rare. This study takes the “Chinese Traditional Landscape Painting” online course of the China Open University as an example. Through analyzing the course design method and its instruction process, this study explored the key factors affecting the effectiveness of learning in online art courses.

## Literature Review

### *Research Background of Online Learning Effectiveness*



Since the rise of online learning in the 1990s, the research of online learning effectiveness has been accumulated for more than 20 years and had achieved plenty of results. In 2010, a group of researchers from the Stanford Centre for International Studies conducted a meta-analysis of thousands of research papers published between 1996 and 2008 (Means et al., 2010). It concludes that learners in the online learning environment perform slightly better than the traditional classrooms. On the website of <http://www.nosignificantdifference.org> created by Thomas L. Russell, 92% of research articles considered online learning to be more effective or consistent than traditional face-to-face learning. Therefore, most researchers believe that online learning could achieve similar or even better learning effects than traditional learning, which confirms the effectiveness of online learning.

While studying the effectiveness of online learning, many researchers have explored their influencing factors. Most studies analyzed the impact factors of online learning effectiveness from three aspects: human factors, curriculum factors and technical factors (Swan, 2003; Wang, 2006; Hu, Zhao, 2015; Pandey, 2018). However, there are still some shortcomings in these studies. In March 2019, there were 350 research articles of online learning effectiveness in the website CNKI, and only 40 of them were empirical studies on specific subjects or online courses, and 75% of which were about language courses. It showed that current research on the effectiveness of online learning for practical courses is not sufficient, and the research on the practice-oriented online art courses is scarce.

#### *Research Background of Online Art Courses*

At present, the practice and research of online art courses are still at their beginning, with the following characteristics: (1) Limited practice of online art courses. In 2017, the Ministry of Education of China selected and released the first batch of 490 national-level MOOCs, including 14 in art, accounting for 2.8% of the total. On the Chinese MOOC platform iCourses ([www.icourses.cn](http://www.icourses.cn)) and CnMooc ([www.cnmooc.org](http://www.cnmooc.org)), there are about 1,800 online courses, among them, only 4.6% are the art courses. (2) Insufficient theoretical research on online art courses. Most of the current research is overview studies, the research questions are not focused on the specific problems and its solutions to online art education (Yu, 2015; Zhou, 2018). (3) Limitation of research path. Most of these studies are focused on the development and the characteristics of online art education (Kong, Chen, 2015), the type analysis of online art courses (Miao, 2018; Wang, Wang, 2018), and curriculum model research (Kong, 2016). Part of the study explored media tools for online art courses, such as the design orientations of various discussion boards in an online art and design courses of the UC Berkeley (Tang, 2016), and the instant messenger-based online discourse platform and its impact in an art pattern design course (Cheng, Jiang, 2015).

The relatively weak current situation of online art education research and practice may be due to the characteristics of the art discipline itself or may be a result of neglecting online education research by art education institutions. The process of artistic learning is also the process of art creating, and through it the student produces new insights and knowledge by assimilating the inner self and the environment, producing a personal aesthetic statement (Lowenfeld, Brittain, 1975). Art learners need to continually interact with the external environment to synthesize meaning and complete construction of knowledge. The learning achievements are represented in the art practice. In the article “Art Programs Build Models for Online Instruction” (Mangan, 2011), it quotes a cautious attitude from traditional art education institutions towards offering online fine arts courses. Faculty and administration expressed anxiety, and the resistance was mainly based on three aspects: equitably assessing an art object from a flat digital photograph, duplicating the art studio environment on virtual space, and offering productive, interactive critiques in online courses. These views present the doubts of art educators on the effectiveness of online art courses, as well as the difficulties encountered in the implantation of practising art courses to the online environment.

### *Research Questions*

According to the above literature review, the effectiveness of online learning has yielded fruitful results, and there are also many studies of its influencing factors. However, the online art course research is still in the infancy, and theoretical research is insufficient. Therefore, this study hopes to focus on the instruction design and learning process statistic of an online painting course in visual art. The research question of this study is: What are the factors that influenced the effectiveness of online learning?

### **Research Methodology**

#### *Research Architecture*

This study adopts the case study method, taking the online art course “Chinese Traditional Landscape Painting” initiated by the Open University of China in 2018 as a research case. This online course focused on the basic techniques and fundamental theories of traditional Chinese painting. The study is based on course data, which includes learning behaviours data recorded on the course platform, the questionnaires data for the course learners and the records of semi-structured interviews with certain participants. Among them, the questionnaire results about learner’s satisfaction and the text of learner’s interviews are the subjective perception data of the course participants. The learning behaviour data and the learning completion in the

curriculum platform are the objective performance data of the learners. Through qualitative and quantitative analysis with these data, this study hopes to explore the relevant influencing factors of the online art course.

### *Participants*

Participants of this study were 1,286 learners (female: 1,022; male: 264) who had registered for the online art course “Chinese Traditional Landscape Painting”, which was delivered by the Open University of China. The learners were non-experienced adult learners who were interested in Chinese painting. The course ran from May to July 2018 and lasted for 63 days. At the end of the course, 59.95% of learners completed all the learning tasks, and there are 771 learners obtained the certificate at the end of the study. Most learners gave positive feedback in the post-study survey; the satisfaction of the course reached 4.5/5.

### *Data Collection and Analysis*

Combined with the existing research results, this study designed the pre-course questionnaire and the post-course questionnaire. The questionnaire mainly includes the following contents: (1) Characteristics of course learners, including occupation, age, gender, learning motivation and learning foundation. (2) The learning experience of learners, including such as learning preference, learning difficulties, learning satisfaction. In the questionnaire, the subjective question was designed by using a 5-point Likert scale. The study delivered the questionnaire by the WJX online survey platform (<http://www.wjx.cn>). The pre-course questionnaire was issued in May 2018, and 467 valid questionnaires were returned. The post-course questionnaire was issued in July 2018, and 384 valid questionnaires were returned. Since the questionnaire is only delivered sent to the participants of the online art course, and the WJX online survey platform had filtered out the invalid response, the final results of the questionnaire are of good quality and efficient. The data analysis in this study used the SPSS Statistics 17.0.

This study also interviewed eight learners who participated in the questionnaire survey. The semi-structured interview was online by WeChat or by phone. It took an average of 35 minutes for the interview. Sample interview questions included the following:

- (1) How do you compare learning in this online course with other face-to-face courses?
- (2) Do you feel that you have learnt a lot by studying this course?
- (3) What did impress you most during the learning process?

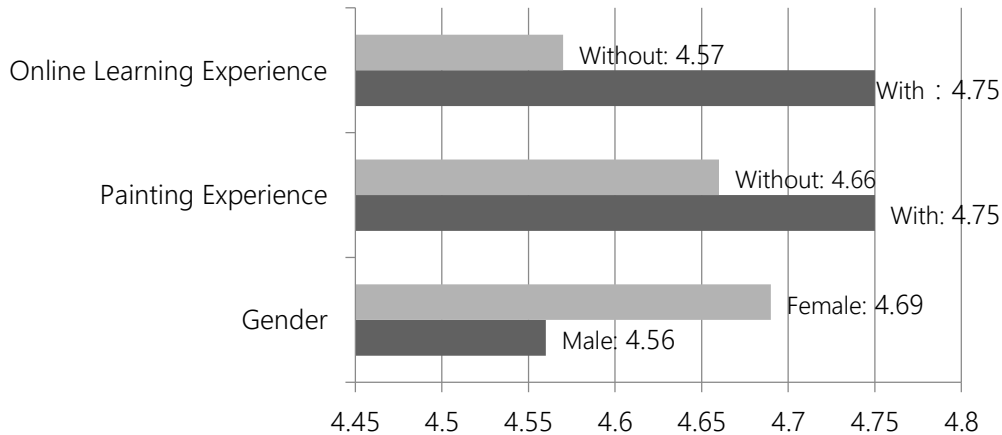


This research organized the interview content by using text analysis, and the result is an auxiliary and supplement of data analysis.

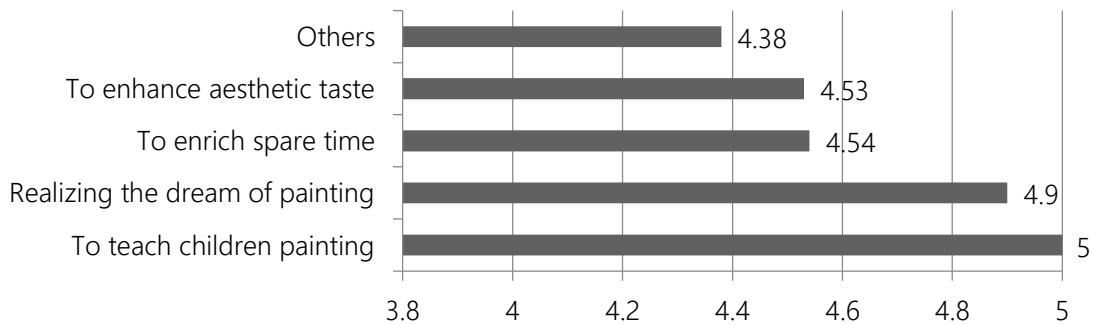
## Results and Finding

### *Learning Motivation*

Based on the previous research (Hu, 2015; Luo, 2011), this study has observed the influence of learners' demographic characteristics, learning motivation, and learning foundation on the satisfaction, of course. *Figure 1* shows the relationship between learners' characteristics and course satisfaction. *Figure 2* shows the relationship between learning motivation and learning satisfaction.



**Figure 1: Learners' characteristics and their course satisfaction (On a scale of 1-5)**



**Figure 2: Learning motivation and learning satisfaction (On a scale of 1-5)**

According to these figures, the learning satisfaction of the online art course is related to the learners' characteristics and their learning motivation. As 80% of the learners of this online course are female, they

have stronger learning motivation for this course, and their learning satisfaction is higher than male learners. The participants with painting and online learning experience are more satisfied than the ones without experience. In this study, the content of the online art course is mainly about painting practice. The learners whose learning motivation matches the objective of the curriculum have significantly higher learning satisfaction than the ones whose learning motivation is not clear enough or not closely related to the course objectives.

### Curriculum Design

Based on the previous researches (Dobbs, 1992; Cohen, 2013), the content of online art course should include the demonstration of art creation, communication between lecturers and learners, and the interactive community of learners' collaborative learning.

The course content includes various resources of different media and plenty of learning activities. Since the proportion of Chinese Internet users accessing the internet through mobile devices has reached 98.3% in 2018 (CNNIC, 2018), a mobile-based online platform for both Android and IOS system had been developed besides the PC course platform which commonly used in online education. Meanwhile, the online learning community had a mobile version based on WeChat, which is the most influenced mobile social media application in China (WeChat, 2017). Table 1 shows the correspondence of learning content and media selection.

Device	Position	Content	Feature
Mobile Platform	Main Course Platform	<ul style="list-style-type: none"> <li>• Micro-course</li> <li>• Discussion board</li> <li>• Live class</li> <li>• Work submission</li> <li>• Ranking</li> <li>• Learning behaviour record</li> </ul>	<ul style="list-style-type: none"> <li>• Fragmented learning</li> <li>• Teaching &amp; demonstration</li> <li>• General Q&amp;A</li> <li>• Excitation</li> </ul>
Mobile WeChat	Virtual Class Group	<ul style="list-style-type: none"> <li>• Discussion</li> <li>• Critique and comment</li> <li>• 10 seconds demonstration video</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborative learning</li> <li>• Synchronous interaction</li> <li>• Q&amp;A for specific questions</li> </ul>
PC Platform	Secondary Course Platform	<ul style="list-style-type: none"> <li>• Micro-course</li> <li>• Discussion board</li> <li>• Learning behaviour record</li> <li>• Personal learning data</li> </ul>	<ul style="list-style-type: none"> <li>• Connected with mobile data</li> <li>• Statistical and analysis of learning data</li> <li>• Educational management</li> </ul>

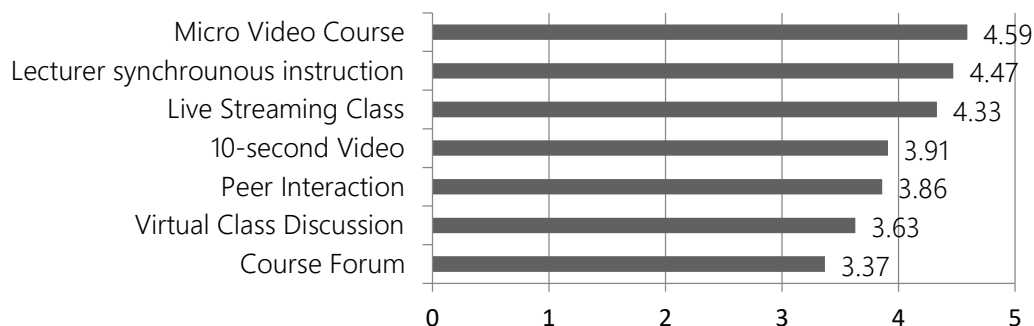
**Table 1: Learning content and media design**

Learning schedule	Mon. to Thu.	Watch the micro-course; Class discussion; Painting practice
	Fri. to Sat.	Complete weekly work; Class discussion
	Sun.	Submission weekly work
	Every other Sun.	Live steaming class
Lecturing time	7/24 Asynchronous discussion; Everyday 20:00 to 22:00 synchronous Q&A discussion	

**Table 2: Design of learning activities**

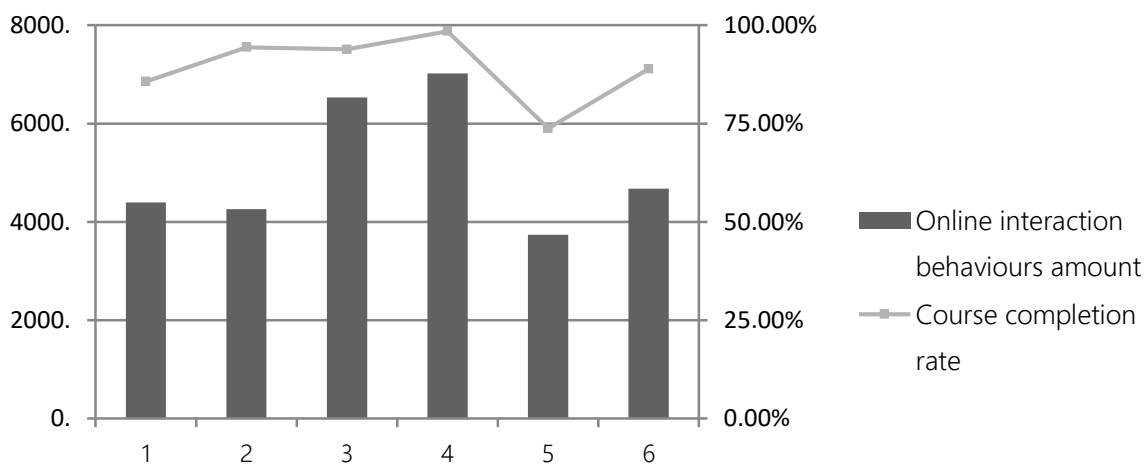
The learning assessment of the course has two parts: the painting work and the learning behaviour. The learners submit the assignments every week by uploading the photos of paintings through the mobile APP or PC platform. Lecturers assessed paintings according to a unified assessment criteria reference, and this score accounts for 80% of the weekly total scores. Tutors evaluated learning behaviour record according to every week learning behaviour data on the learning platform, and this score accounts for 20% of the weekly total scores. The weekly achievement score is 100 points and the total score of the course is 900 points. The learners needed to submit all assignments and reached 540 points or above, to obtain the course certificate.

In order to build an online learning community, this study had set up eight teaching area (S1 to S8) across the country based on the geographical distribution of learners, assigning all 1286 learners to 28 virtual classes. Each class had 25 to 50 learners, and it was equipped with two learning support team member, one lecturer who provides painting instruction and one tutor who assists the learning process. The 63-day course lasted for nine weeks. It required learners to participate in online learning activities in the virtual class and submitted a painting work per week. Table 2 shows the design of learning activities.



**Figure 3: Learner's rating of course contents and activities (On a scale 1-5)**

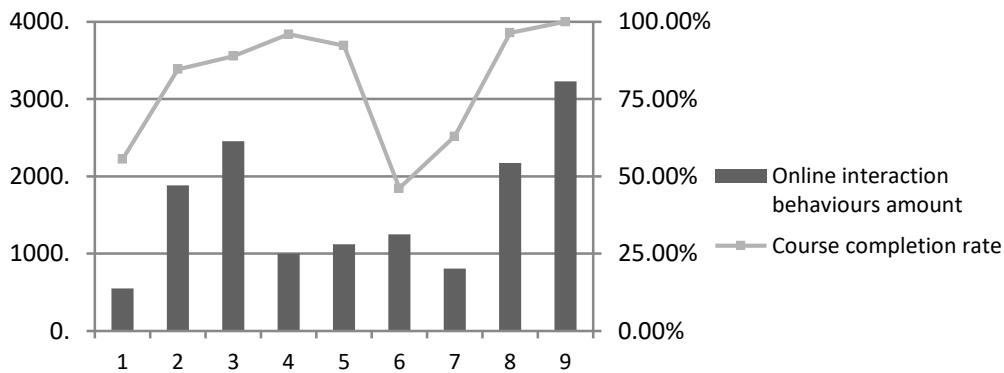
Figure 3 shows the learner’s satisfaction with different course content and learning activities. The top three most popular course design elements are the video course, lecturer’s synchronous instruction on WeChat, and the live streaming class on the weekend.



**Figure 4: Online interaction behaviours and the course completion rate of S2**

In this study, the online learning community was constructed through the mobile-based course platform and the WeChat virtual class group. The data shows the interaction in the online learning community was highly active. There is a total of 99,954 platform logs in the nine-week study, more than 25,000 posts in the discussion board on the mobile platform, and more than 90,000 synchronous discussion records of the virtual class group on WeChat. The research took 15 virtual classes of the teaching areas S2 and S6, which were the two teaching areas with the most learners, as an example to research the relationship between the interaction behaviours in the online community and the course completion rate.

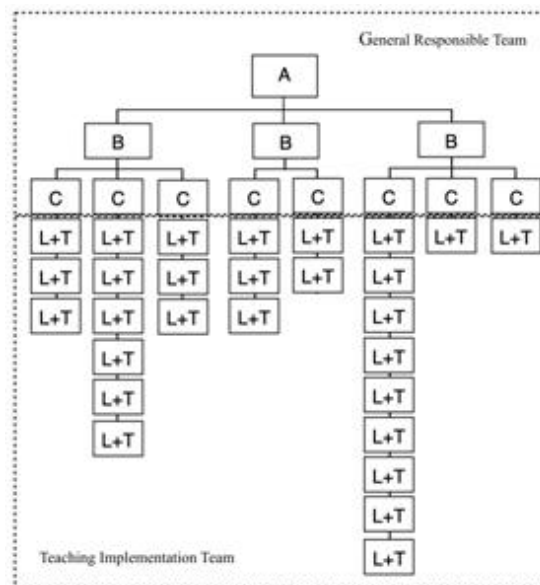
Findings presented in Figure 4 and Figure 5 suggest that in most virtual class (11/15), the number of online interaction behaviours in learning community had a positive impact on the course completion rate.



**Figure 5: Online interaction behaviours and the course completion rate of S6**

### Learning Support Service Design

The learning support team has a pyramid structure (Figure 6). Under the generally responsible team (A. Director, B. Director’s assistants, C. Group leader). The learning support team divides into two parts: teaching team (L. Lecturers) and assistant team (T. Tutors). Every virtual class has one teaching team member and one assistant team member to support learners.

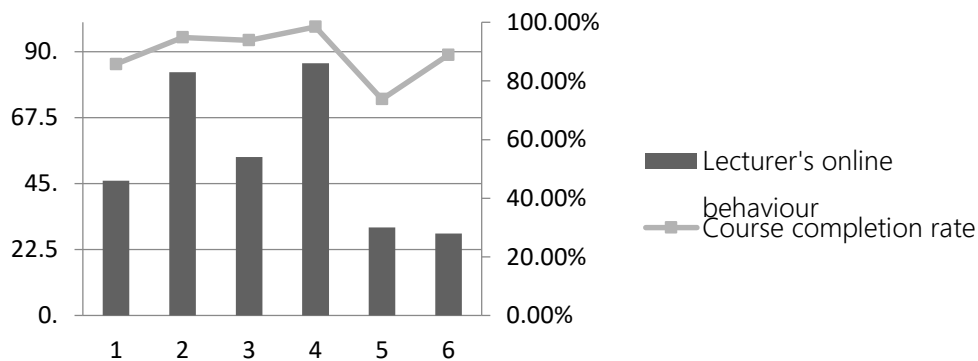


**Figure 6: Learning support team structure design**

Based on the data analysis, the high-intense service of the learning support team in this study effectively promoted the learning behaviours and learning effects. Taking an example of 6 virtual classes at teaching area S2, the positive relationship between the number of online behaviour of lecturers and the completion rate of



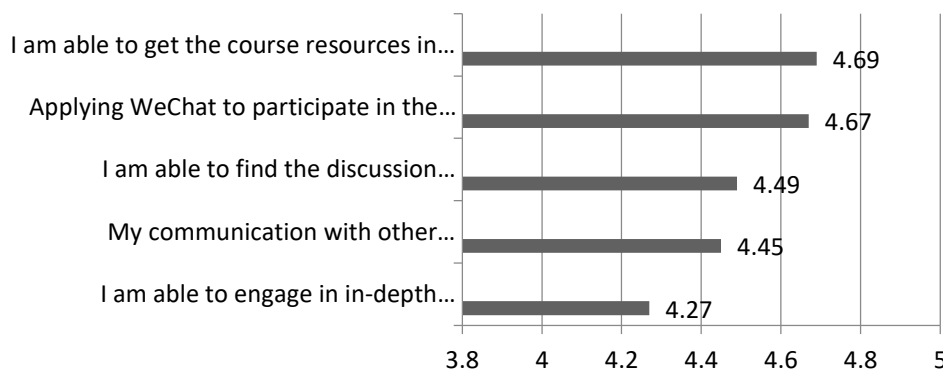
learners is as in *Figure 3*. And according to the survey of course content preference (see *Figure 3*), the lecturer’s instruction is the second highest in the evaluation scale ( $M=4.47$ ), the chief lecturer’s weekend live streaming class is the third ( $M=4.33$ ), indicating that the learning support service offered by the lecturer team is one of the most crucial incentives for learning behaviour in the online art course.



**Figure 7: Lecturer’s online behaviour amount and course completion rate of S2**

### Technical Environment

In this study, the learner’s device preference was fully considered in the course media design. Comparing to most online courses which based on the PC platform, this online art course had strengthened the mobile-based course content design by developing the mobile application as the main course platform. During the course, 95.43% ( $n=363$ ) of learning behaviour occurred on the mobile platform and WeChat class group, and only 26.04% ( $n=100$ ) of learning behaviours occurred on the PC platform. It shows that most learners are inclined to use a mobile device to participate in learning activities. *Figure 8* shows the learners’ satisfaction with the technical environment. They are most satisfied with the perceived ease of use of the technical environment of the course.



**Figure 8: Learner’s satisfaction with the technical environment**

## Conclusion

This research has concentrated on factors affecting the effectiveness of online art learning. By using the data processing and statistical analysis of the learning records and the results of the questionnaire, this study shows that the online art course can achieve a fair learning completion rate and ensure the learner's satisfaction and sense of acquisition, thus ensuring the learning effectiveness of the course. For the online learning effectiveness of the course, there are four main affecting factors, including (1) Learning motivation, including the learning motivation of the learners and their learning expectation of the course; (2) Learning support service, including appropriate teaching team structure design, reasonable course schedule and effective learning support services. (3) Curriculum design, which integrates the characteristics of the discipline, including the course content presentation design, multi-evaluation design and learning community design; (4) Technical environment, including the terminal selection, the usability of the technology platform. Among these factors, the learning support service and the curriculum design can directly influence the learning completion rate, and they are also the key elements for restoring the real learning environment and reconstructing the learning community in art learning. Therefore, this study shows that the learning support service and curriculum design are the most important affecting factors of the learning effectiveness of online art course.

However, this study is a case study of an online art course, limited by the content of the course. The research focused on the painting course in visual art. Other art education, such as performance art course has not discussed in this dissertation. Therefore, the research conclusion may require adjustments when applying in online courses of other art subjects. Besides, some of the research data were derived from the subjective judgments of interest-based adult learners. So these data may have some deviations due to subjective tendencies. Nevertheless, this research is still a useful attempt to study the effectiveness of online art courses.

### *Future Horizons*

This research has positive significance for the development of art disciplines in the Internet age. The long history of face-to-face apprenticeship of art education has convinced most art educators to be sceptical and cautious about online education. Hopefully, the results of this study about learning effectiveness of online art course will relieve some of these concerns and encourage more art educators to embrace the era of online education actively. The closer the integration of art education and information technology becomes, the more art learners will benefit.

In general, this study of learning effectiveness with the online art course “Chinese Traditional Landscape Painting” has made a beneficial attempt of development of online art education. It provides a useful reference to various online art courses for the Open University of China, other colleges and universities, and institutions of online education. The conclusion of this study shall be revised and improved through practice and theoretical research. Further study should be conducted to examine the change of factors and their relationship in different online art courses, in order to form a complete learning effectiveness model.

## 6. Acknowledgements

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## The Challenges Facing Distance Vocational Learning Arising From Migrations From the Rural Districts to Urban Centres: A View From Within the Open University of China

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### Abstract

China is a special country with a large population experiencing rapid and large-scale urbanization while comprising nearly one fifth of the world's population. Therefore, providing educational resources for farmer groups in China's urbanization can be regarded as a global challenge as one of the main social groups in the process of urbanization are farmers, who are becoming urban inhabitants as their futures change. Many of these farmers lack the knowledge and skills usually associated with living in urban centers. This can make it difficult for them to strike a balance between work and study. Distance education, based on modern information technology, is perceived to be one of the most effective ways to help such people to adjust their knowledge and skills set. In this study, 31 provinces and cities were organized into four categories, further divided into nine zones according to their main industries. Nine distance education resource frameworks were put forward and the key occupational and economic activities of the nine zones were identified in the College and University Undergraduate Major Categories and Guidance Major Categories for Advanced Vocational Schools. The paper discusses proposals for addressing existing problems and enhancing future development in relation to people entering particular occupational areas and following an appropriate course of study. On this basis, this paper, from a different perspective, with two examples discussed in the Open University, discusses the role of China's urbanization process, and important and irreplaceable role of distance education for social development.

**Keywords:** Urbanization, Distance Education, Differentiation, Vocational Learning

## Introduction

The 18th National Congress of the CPC report emphasizes the promotion of “the synchronized development of industrialization, digitalization, urbanization and agricultural modernization” (Report by Hu Jintao, 18th National Congress of the CPC). The pattern of modernization has followed the experience of other countries in that intensive urbanization has been an accompanying feature. There is a debate concerning rates of urbanization across China, partly arising because of the sheer scale of counting that is required. With a population estimated to be over 1.3 billion people, China’s urbanization rate by 2015 stood at 55.60%, much lower than the 80% seen in some developed countries such South Korea where the urbanization rate stands at 82.50%. At current rates millions of rural residents are moving into the cities. Places such as Chengdu and Wenzhou in very different parts of China have, in the past decade, turned from being small-scale cities into very large ones. According to the statistical data of China's Urban Construction Statistics Yearbook, China's urban land area in 2006 is 33,500 km<sup>2</sup>. And by 2012, it grew to 45,600 km<sup>2</sup>, a growth rate of 36.11%. Based on such estimates of China's expansion of urbanization this would be equivalent to the creation of one new ‘mega-city’ (exceeding 5 million population) every two or three years. Migrants who move into the urban setting will often need to transform from working in industries such as agriculture to working in service industries such as restaurants, as a taxi-driver or manufacturing in factories or small workshops. These flows of people from the countryside into the cities have created a need to reorient distance education to meet the needs of changing times.

Distance education, as expressed by one senior academic figure based in Beijing, is now perceived, “as a provider of learning opportunities and services to all the people who have the ability and desire to enter higher education” (YangZhijian,2013) and has a mission to meet, “the diverse needs of society and economy to enhance national strength, and promote equal access to education” (YangZhijian,2013). As a result of this changing social landscape, questions concerning what distance education should comprise of have become openly debated. For some this means pursuing a more academic pathway leading towards university entrance either through the Open University or another institution. Another route lies in pursuing a vocational pathway where the study is tailored towards preparation for a specific career. Additionally there are extensive basic skills study programmes designed to prepare students for the routes they prefer in the future.

This paper explores the employment situation facing people moving from rural areas into urban areas. This distinction is necessary as there are extensive areas of rural China which are not characterised by farming. Additionally this paper examines the changes taking place within leading industries located in different zones

and the spatial distribution of education resources available to workers from rural areas during their transition process. The paper provides evidence to support initiatives designed to improve distance education that meet the varied needs for social development among a changing the workforce.

### **An Analysis of the Evolution of Urbanization in Different Zones**

#### *Urbanization Rates: Changes in the Provincial Urbanization Level From 1978-2011*

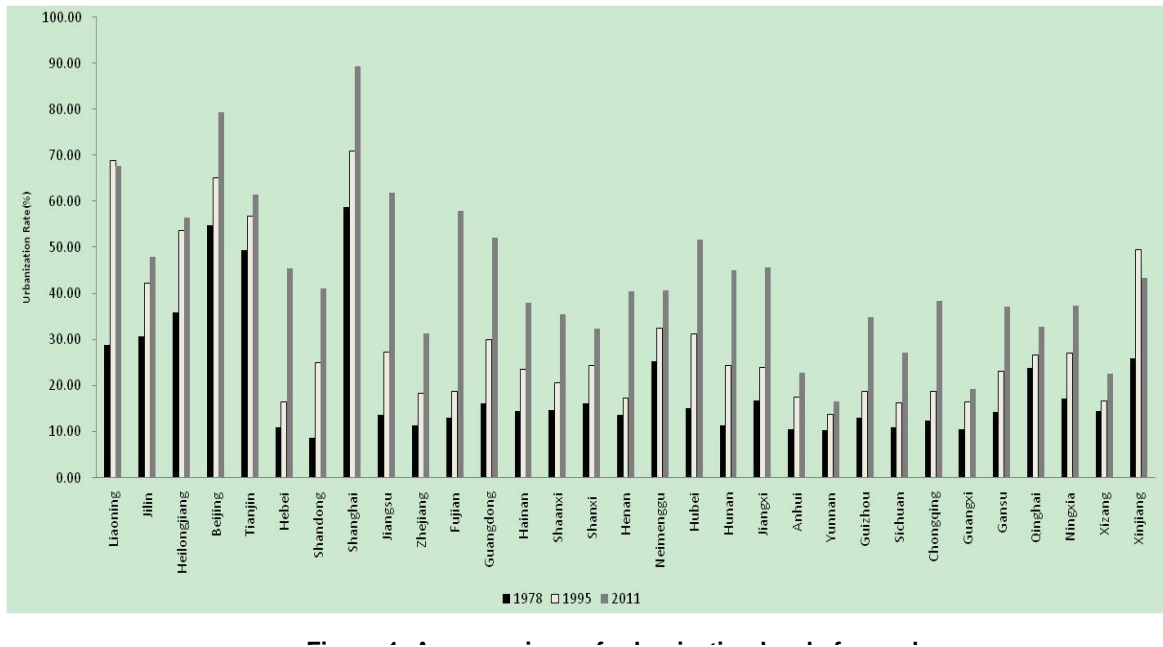
Simon Smith Kuznets defines urbanization as, “the change in population distribution between urban and rural areas” (Simon Kuznets,1989).The speed of urbanization refers to the average annual growth rate of the level of urbanization. Scholars from the United Nations and European and American countries that experienced the development of urbanization early on usually demonstrate the level of urbanization based on the proportion of the non-agricultural population as part of the total population(Yao Shimou, Zhu Yingming, Tang Maolin etc.,1999). This paper uses the same statistical approach.

$$I_n = \frac{U_{f_n}}{U_{z_n}} (n \neq 0)$$

In this formula,  $I_n$  represents the urbanization rate,  $U_{f_n}$  represents the size of the non-agricultural population, and  $U_{z_n}$  represents the size of the total population of the year “n” in a certain province or municipality. The bigger the  $I_n$  value is, the higher the level of urbanization in the province will be, and vice versa. This paper studies the level and speed of urbanization in 31 Chinese provinces and cities between 1978 and 2011. All the data on total population and non-agricultural population is taken from the 2012 Statistical Yearbook produced by National Bureau of Statistics of the People’s Republic of China. Population data for some cities that are not available with those for the years 1978-2011 was completed by searching statistical yearbooks from before 2011 and relevant materials from the websites of province or municipality-level statistical bureaus. Population numbers are is calculated to the nearest ten thousand.

The data from 1995 shows a marked increase in the national urbanization rate, up from the 20.13% in 1978 rising to 30.21%. The Shanghai administrative district remained top with its urbanization rate standing as high as 70.83%, followed by Liaoning and Beijing at 67.94% and 65.11% respectively. Provinces and cities surpassing 50% included Tianjin and Heilongjiang. Four provinces had a rate of between 30%-50%,and 12

provinces had a rate of between 20%-30%. 10 provinces and municipalities had a rate of less than 20%, an obvious decrease in comparison with 1978. Yunnan retained the lowest rate of urbanization at 13.64%.







By 2011, the changes to the urbanization rate are even more remarkable. The national urbanization rate had risen to 43.67%. Shanghai, a distinct administrative unit by itself, took the top spot with a rate of 89.32%, surpassing rates recorded in ‘developed’ countries, with Beijing standing at 79.33%. For nine provinces and municipalities the urbanization rate was above 50%. 17 provinces and municipalities recorded figures between 30-50%, accounting for more than half of the national total. Provinces and municipalities with a rate of less than 20% included Yunnan, Guangxi, Tibet, Anhui and Sichuan. Yunnan’s rate of urbanization rose from 13.64% in 1995 to 16.59%.

#### *Comparing the Urbanization Rate of Different Provinces*

European and American scholars have noted that the reference value of the “normal rate of urbanization is approximately within 0.4-0.6 percentage points each year” (Luo Zhigang, 2007). By taking into consideration the early start of urbanization in European and American countries and the level of cultural, scientific and industrial systems at that time, Chinese scholars including Yao Shimou, Li Guoping, and Luo Zhigang have conducted in-depth studies examining the characteristics, classifications and rates of urbanization in relation to the reality of China’s current level of development.

Following the classification model developed by Yao, Li and Luo, at present, it is possible to make the general conclusion that: 0.4-0.8% per year indicates a constant average speed of urbanization; a rate of 0.8-1.5% indicates rapid urbanization; 1.5-2.0% indicates high speed urbanization; 2.0-4.0% indicates ultra-high speed urbanization. Provinces experiencing a rate of 0.4% per year are deemed to be in the initial stages of urbanization (Qiu Guosheng, 2002; Zhu Tizhen, 2002).

Based on the urbanization rate of each province and municipality between the years of 2000-2011, the formula to calculate the speed of urbanization is as follows.

$R_i$  represents the speed of urbanization of the province or municipality  $i$  during 2000-2011,  $I_{i,2011}$  represents

$$R_i = \frac{I_{i,2011} - I_{i,2000}}{11}$$

the urbanization rate of the province or municipality  $i$  in 2011, and  $I_{i,2000}$  represents the urbanization rate in 2000. In combination with the reality of China’s social and economic development, the zones exhibiting high speed, rapid, constant speed and slow urbanization are shown in *Table 1*.



Speed of urbanization	Province or municipality	Speed of urbanization	Proportion of the total number of provinces and municipalities	Speed of urbanization	Province or municipality	Speed of urbanization	Proportion of the total number of provinces and municipalities
High speed > 1.5 a year	Guangdong	1.91	19.35%	Constant speed 0.4-0.8 a year	Ningxia	0.79	22.58%
	Jiangsu	1.85			Sichuan	0.78	
	Hebei	1.77			Qinghai	0.57	
	Jiangxi	1.64			Shanxi	0.53	
	Henan	1.58			Inner Mongolia	0.5	
	Chongqing	1.54			Heilongjiang	0.41	
Rapid speed 0.8-1.5 a year	Fujian	1.46	38.71%	Slow speed < 0.4 a year	Jilin	0.41	19.35%
	Hunan	1.4			Tibet	0.31	
	Shanghai	1.34			Anhui	0.3	
	Shandong	1.3			Tianjin	0.29	
	Gansu	1.19			Guangxi	0.17	
	Shaanxi	1.16			Liaoning	0.13	
	Hainan	1.11		Yunnan	0.1		
	Hubei	1.03					
	Guizhou	1.01					
	Beijing	0.97					
	Xinjiang	0.89					
	Zhejiang	0.85					

**Table 1: Division of the zones by different level of urbanization (%)**

The results show that during the 11 year period, the zones of high speed urbanization include the areas like Guangdong and Jiangsu and Chongqing, a municipality directly under the Central Government, as well as Hebei and Jiangxi, accounting for 19.35% of the national provinces and municipalities. The zones of rapid urbanization account for the highest proportion among the four levels of urbanization, including central cities such as Beijing and Shanghai and developed coastal provinces like Zhejiang and Fujian. The zones exhibiting a constant speed of urbanization are mainly north-eastern provinces like Heilongjiang and Jilin, and seven western provinces including Sichuan and Qinghai, accounting for 22.58% of the total number of provinces. The zones experiencing slower speeds of urbanization cover six provinces and municipalities,



including western provinces or autonomous regions – Tibet, Anhui, Guangxi, Liaoning, Yunnan, and the Municipality of Tianjin – accounting for 19.35% of the national total. Notably, the slow zones fall into two categories. The first is remote areas with weak economic driving forces. The second are areas that had a head start in urban industrial production, such as Tianjin and Liaoning. They have high existing levels of urbanization but have begun experiencing slower development during this period. The spatial distribution is shown as follows.



## The Influence of the Speed of Urbanization on the Demand for Distance Education Resources

### *Selection of Leading Industries in Zones With Different Urbanization Speeds*

Yifu (2003) cites Rostow as initiating the use of rates of industrialization to assess urbanization (LinYifu, 2003). Following Rostow, the earliest research incorporating this as a factor appeared China in the mid-1980s (GuanAiping, Wand Yu, 2002). At present Chinese scholars interpret the concept of a “leading industry” as an economic sphere that plays a leading role in overall economic development. The output value of a particular sector has a specific weight and serves to drive the development of other industries and the regional economy arising from factors such as advanced technology, high growth rate and strong industrial correlation (Wang Zhanxiang, Feng Taiwe and He Zhe, 2009). The term ‘correlation’ is used to indicate an industry that, for example, stimulates sectors within higher education, promotes the development for example, of transportation infrastructure and employs a highly diversified workforce. In this paper we wish to explore how such changes in industries affect the provision of vocational training opportunities.

Level of urbanization	Zones according to leading industry	Provinces and municipalities	Leading industry
Zones of high speed urbanization (G)	G1	Guangdong, Jiangsu	R、V、F、X、F、N
	G2	Hebei, Jiangxi, Henan, Chongqing	A、D、O、P、Q
Zones of rapid urbanization (K)	K1	Fujian, Shanghai, Beijing, Zhejiang	J、I、K、S、M、T、U、V、X
	K2	Shandong, Hunan, Hubei	A、S、P、H、E、D
	K3	Guizhou, Gansu, Shaanxi, Hainan, Xinjiang	A、D、C、J、K、L、P
Zones of constant speed urbanization (C)	C1	Shanxi, Sichuan, Heilongjiang, Jilin	A、B、C、J、L、K
	C2	Inner Mongolia, Ningxia, Qinghai	B、E、G、J、K、O、K
Zones of slow urbanization (H)	H1	Liaoning, Anhui, Tianjin	V、U、S、P、O、K
	H2	Guangxi, Yunnan, Tibet	A、D、B、K、P、Q

**Table 2: Spatial division of leading industries**

The results show that the provinces in the G1 zone, Guangdong and Jiangsu, are representative of provinces with early, highly active economic development. Their leading industries are dominated by metal products, electronic machinery and equipment manufacturing, measuring instruments and office machinery, textiles and garments, and plastic products. Provinces in the G2 zone, Hebei, Jiangxi, Henan and Chongqing, have



leading industries dominated by agricultural processing, tobacco manufacturing, non-metallic mineral products manufacturing, and metal smelting and rolling.

Beijing, Shanghai, Zhejiang and Fujian all fall into the K1 type of rapid urbanization zones. Among their leading industries are high level technology and communications equipment, manufacture of computer and electronic equipment, instruments and meters, chemical raw materials and chemical products manufacturing, cultural, education and sports equipment manufacturing, a classic profile for a developed economic region. Provinces within the K2 type such as Shandong feature primary industries such as agricultural processing, general equipment manufacturing, smelting and processing of ferrous metals, paper and paper products manufacturing, textiles, and tobacco products manufacturing. However this profile in a major province such as Shandong is complemented by an extensive cultural and tourist sector. K3 type provinces are also categorized as rapid urbanization zones, but due to their regional characteristics their leading industries can differ from those of K1 and K2, including beverage manufacturing, petroleum processing, coking, nuclear fuel processing, manufacture of chemical raw materials and chemical products, pharmaceutical manufacturing, and agricultural processing. An example of this is the extensive rural province of Inner Mongolia which specializes in Beef production.

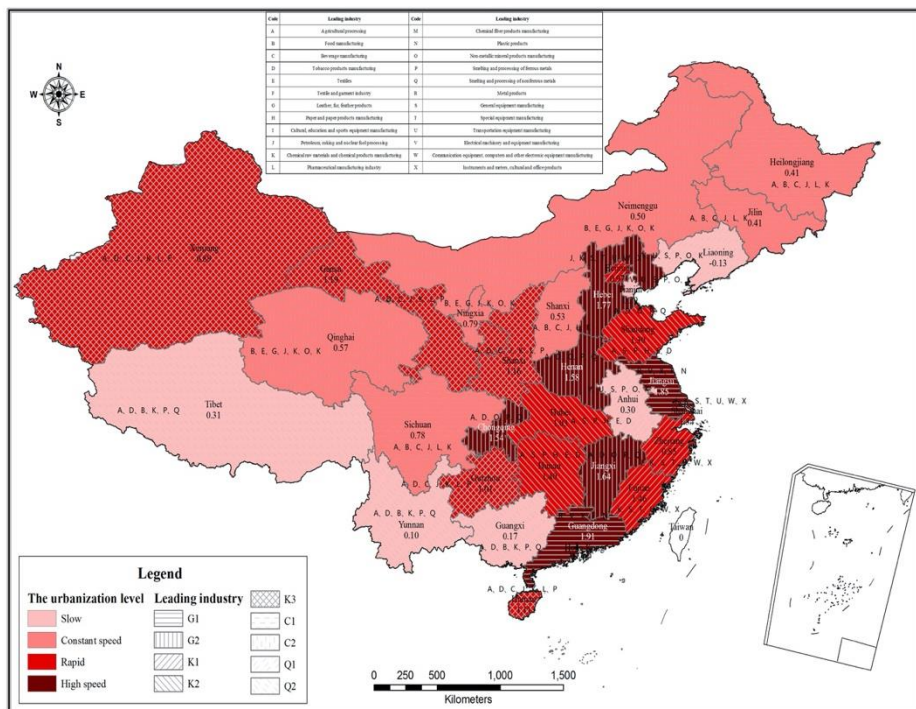
The C1 category in which there is a constant speed of urbanization zones includes Shanxi, Sichuan and the two north-eastern provinces of Heilongjiang and Jilin. Their leading industries include agricultural processing, food and beverage manufacturing, petroleum manufacturing, coking, nuclear fuel processing, pharmaceutical manufacturing, and chemical raw materials and chemical products manufacture. The C2 category includes the northern province of Inner Mongolia and the western provinces of Ningxia and Qinghai. Their leading industries include textiles, food manufacturing, leather, fur, and feather products manufacturing, and non-metallic mineral products manufacturing.

The H1 category of initial urbanization zones includes the municipality of Tianjin and the two provinces of Liaoning and Anhui. Their leading industries are electrical machinery and equipment manufacturing, transportation equipment manufacturing, general equipment manufacturing, smelting and processing of ferrous metals, and chemical raw materials and chemical products manufacturing. The H2 category includes Guangxi, Yunnan and Tibet; their leading industries are agricultural processing, tobacco products manufacturing, food manufacturing, chemical raw materials and chemical products manufacturing, and metal smelting and rolling.



Code	Leading industry	Code	Leading industry
A	Agricultural processing	M	Chemical fiber products manufacturing
B	Food manufacturing	N	Plastic products
C	Beverage manufacturing	O	Non-metallic mineral products manufacturing
D	Tobacco products manufacturing	P	Smelting and processing of ferrous metals
E	Textiles	Q	Smelting and processing of nonferrous metals
F	Textile and garment industry	R	Metal products
G	Leather, fur, feather products	S	General equipment manufacturing
H	Paper and paper products manufacturing	T	Special equipment manufacturing
I	Cultural, education and sports equipment manufacturing	U	Transportation equipment manufacturing
J	Petroleum, coking and nuclear fuel process	V	Electrical machinery and equipment manufacturing
K	Chemical raw materials and chemical products manufacturing	W	Electronic and communication equipment, computers manufacturing
L	Pharmaceutical manufacturing industry	X	Instruments and meters, cultural and office products

**Table 3: Leading industries and corresponding**



**Figure 2: Spatial distribution of the nine categories of**

*The Spatial Differentiation of the Demand for Distance Education Resources During the Urbanization Process*

Distance education in China provides practitioners in all fields with degree education but also non-degree education. In order to focus on the needs for knowledge and skills during the development of leading industries in zones experiencing different speeds of urbanization, this research is based on College and University Undergraduate Major Catalogue and Guidance Major Catalogue for Advanced Vocational Schools issued by the Ministry of Education in 2012. The demand for distance education resources in each of the nine leading industry zones is shown in *Table 4*.

Leading industry zone	Undergraduate major	Advanced vocational major	Leading industry zone	Undergraduate major	Advanced vocational major
G1	Mechanics	Chemical technology	K3	Chemicals and pharmaceuticals	Agricultural technology
	Materials	Materials		Mining	Animal husbandry and veterinary medicine
	Electrics	Electronics technology		Nuclear engineering	Chemical technology
	Textiles	Mechanical design and manufacturing		Plant production	Pharmaceutical technology
	Light industry	Mechanical and electrical equipment		Pharmacy	Food
		Light chemical engineering		Chemicals and pharmaceuticals	Agricultural technology
G2	Materials	Agricultural technology	C1		Animal husbandry and veterinary medicine
	Mining	Animal husbandry and veterinary medicine		Nuclear engineering	Chemical technology
	Food science and engineering	Materials		Food science and engineering	Pharmaceutical technology
	Plant production	Food		Plant production	Food
	Animal production			Animal production	
K1	Finance	Light chemical engineering	C2	Mining	Agricultural technology
	Economics and trade	Materials		Textiles	Animal husbandry and veterinary medicine
	Instruments	Mechanical design and manufacturing		Food science and engineering	Chemical technology
	Electronics and computers	Computers		plant production	food
			Animal production		

	information		H1		
	Computers	Electronics and informat		Mechanics	Mechanical design an manufacturing
	Chemicals and pharmaceuticals	Communication		Electronics and information	Road transportation
	Electronic busines	Light chemical engineeri		Chemicals and pharmaceuticals	Railway transportatio
		Packaging and printing		Mining	City rail transportatio
K2	Materials	Agricultural technology	H2	Transportation	Water transportatio
	Electronics and information	Animal husbandry and veterinary medicine			Civil aviation transportation
	Textiles	Automation			Port transportation
	Light industry	Communication			Chemical technology
	Food science and engineering	Light chemical engineeri			Mechanical and electrical equipment
	Plant production	Textiles and clothing		Food science and engineering	Agricultural technolo
	Animal productio	Food		Plant production	Animal husbandry an veterinary medicine
		Animal productio	Chemical technology		
		Chemical and pharmaceutical	Food		
		Mining			

**Table 4: Evaluation of the demands for distance education resources in the nine leading industry zones**

Note: Under“undergraduate major”, the figures represent the code of the corresponding specialty in theCollege and University Undergraduate Major Catalogue.Under“advanced vocational major”, the figures stand for the code of the corresponding specialty in theGuidance Major Cataloguefor Advanced Vocational Schools.

The results show each of the nine leading industrial zones exhibit specific socio-economic characteristics due to the speed of urbanization and factors such as natural resource endowment and their development history. In theory, the leading industries in each zone indicate college-based major subject areas in which practitioners could have opportunities to improve their knowledge and professional skills. This paper provides examples of the key major subject areas for zones Z and B (B represents an undergraduate major subject and Z represents an advanced vocational major). Key majors for Zone G1 are mechanical design and manufacturing and automation (B), metal materials engineering (B), CNC equipment application and maintenance (Z), and knitting technology and clothing (Z). Key majors for Zone G2 include oil-gas storage and transportation (B), food quality and safety (B), processing of agricultural and livestock products (Z), and





tobacco cultivation techniques (Z). Key majors for Zone K1 include electronics and information engineering (B), chemical engineering and technology (B), precision machinery technology (Z), and polymer processing engineering (Z). Key majors for Zone K2 include food science and engineering (B), communication engineering (B), tobacco cultivation techniques (Z), and modern textile technology (Z). Key majors for Zone K3 include chemical engineering and industrial biotechnology (B), mineral processing engineering (B), agricultural facility technology (Z), and chemical and pharmaceutical technology (Z). Key majors for Zone C1 include agricultural facility science and engineering (B), mineral resource engineering (B), biochemical pharmaceutical technology (Z), and processing of agricultural and livestock products (Z). Key majors for Zone C2 include food science and engineering (B), textile engineering (B), food biotechnology (Z), and oil refinery technology (Z). Key majors for Zone H1 include mechanical design, manufacturing and automation (B), transportation equipment and control engineering (B), mechanical design and manufacturing (Z), and chemical technology application (Z). Key majors for Zone H2 include food science and engineering (B), tobacco (B), tobacco cultivation techniques (Z), and food processing technology (Z).

## Conclusion and Discussion

The main actors in the process of urbanization in China are people living in rural areas whose families have entitlements to communal land within their villages, who will transform through migration into urban inhabitants. These rural migrants may lack certain types of knowledge and skills, making it difficult for them to strike a balance between work and study, especially as many become trapped in undertaking more than one job and find themselves working very long hours. Distance education based on modern information technology provides one option for people in such a situation to develop their knowledge and skills. Through an assessment of the leading industries in different zones at varying stages of urbanization, this research concludes that the curriculum in undergraduate and junior college courses should better reflect employment opportunities within leading industries. In many educational settings there is a lack of direct connection between what is taught and learned and the realities that exist for future employment and future developmental needs.

The first aspect that needs to be discussed is choice of leading industry. The leading industries indicated in this research according to speed of urbanization are mainly concentrated on primary and secondary industries such as farming, forestry, animal husbandry and fishery, mining, manufacturing and construction. Some tertiary industries such as transportation, warehousing, information transmission, and information technology are also present. However, many types of tertiary industry, such as wholesale and retail, accommodation and catering services, software, real estate and business services, education, and health and social work, are not listed as leading industries due to their extensive professional skills and low regional correlation. However, these social/economic sectors may also absorb new employees during the process of

urbanization and as such should not be discounted during future research. An example might be the expanding schools system requiring increased numbers of non-teaching employees – often women workers from rural areas.

The success of Open University vocational training courses opens up the idea that it is possible to develop worthwhile and economically valuable courses that are vocationally based rather than being based upon traditional academic subject which continue to dominate the curriculum within schools. It may be that this positive experience will encourage reviews of what is being taught to young people so that many of them do not leave school at 16 or 18 years old with very little ability to adapt to a changing world of work. Attitudes of employers also need to change so that those possessing vocational rather than academic qualifications are seen to be of equal value.

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## Evaluating the Impact of Augmenting the Material of the “Guide to Blended Learning”, Commonwealth of Learning via the ARTutor Platform

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### Abstract

Augmented Reality (AR) provides new opportunities to enhance learning through technology in diverse learning spaces. The term carries many definitions and is most known in education for enhancing engagement and increasing access by adding images, audio, video, and/or links for additional, dynamic material to current, perhaps rapidly dated physical learning contents. As a theoretical notion, AR provides known experiences from everyday life through constructed media that require replicated actions and activities normally carried out in everyday, real experiences. This everyday experience may be reconstructed through technological affordances that replicate space, roles, and/or activities. This clarifies that AR uses technology but has an added requirement of making the AR space familiar and in line with existing user realities and competences. ARTutor (Augmented Reality Tutor) is a novel Augmented Reality Educational Platform (UNESCO Greece Nominated & Golden Price Educational Leaders awards 2019) available free of cost to all educators and students around the globe. This tool facilitates the development of technology-enhanced educational material and the improvement of educational performance and experience. ARTutor embraces the UNESCO initiative “Education for All” by trying to remove socioeconomic or cultural barriers which prohibit the access to high-end educational technologies and technology-enhanced learning in general. The ARTutor platform consists of two parts: (a) the authoring tool, which is a web-based application used to upload learning material and assorted learning objects; and (b) the mobile application. Via the mobile application the user is able to download the augmented book and display, and interact with augmentations using haptic and voice interactions. Furthermore, the user, via the mobile application can activate the ARTutor Intelligent Agent which is able reply to user’s natural language questions in relation to the content of the augmented book. Its focus is to create AR learning experiences in combination with existing learning materials, whether those materials are technologically delivered or not. This is achieved by adding digital content to traditional educational books and other texts, with the aim of assisting the students’ independent study and ultimately improving the understanding of the material. This paper will discuss examples of

this tool, with particular reference to the recent Guide to Blended Learning created by the Commonwealth of Learning. ARTutor provides opportunities to shape current content for use in diverse environments by creating customized additions to the current content without huge cost or time-consuming changes. Limitations and challenges to the use of ARTutor will also be reviewed in reference to solutions and benefits shown in recent examples under the SECTION evaluation framework.

## Introduction

Augmented reality is an emerging technology that has, in recent years, received a great deal of attention within the field of education related to formal or informal training activities and in commercial solutions such as product promotion or fashion design (Dunleavy, 2014; Frydenberg & Andone, 2018; Kamarainen, Reilly, Metcalf, Grotzer, & Dede, 2018; Menezes, 2017). AR technology superimposes digital information with physical environments (Dunleavy, 2014; Fernandez, 2017; Kamarainen et al., 2018; Radu, 2014); within an educational setting, it allows students to use mobile, context-aware devices such as smartphones and tablets to enrich their learning experience (Dunleavy, 2014; Frydenberg & Andone, 2018). AR as part of the everyday educational classroom activities (either in Secondary or Post Secondary Education or even at the University Level) is not widely used yet, even though it has been demonstrated to support learning and engagement (Dede, 2009; Kamarainen et al., 2018; Lytridis, Tsinakos, & Kazanidis, 2018; Radu, 2014)

ARTutor is an Augmented Reality Educational Platform available free of cost to educators and students around the globe, in order to help them to develop technology enhanced educational material and improve educational performances and experiences (Lytridis, Tsinakos and Kazanidis 2018). Its focus is on adding digital content on traditional educational books and other texts, with the aim of assisting the students' independent study and ultimately improving the understanding of the material. The main impact of ARTutor in the field of education can be summarized to the following objectives:

- i. Maximize students' engagement to the educational material (text books).
- ii. Enable teachers with limited IT skills to develop augmented reality books and create highly engaging and immersive educational activities and experiences in the class.
- iii. The implementation of a single mobile application to enable students to access all the augmented reality books in order to enhance their study and to promote independent, self paced distance learning
- iv. Easy interaction with the enhanced digital content of any book using haptic or voice commands (in order to assist even students with movement disabilities)
- v. Voice-based interaction with a virtual tutor for information retrieval with the integration of Artificial Intelligence services.



The platform consists of a mobile application and a web-based authoring tool. It allows educators to augment existing book in a simple way (they don't need any specific knowledge) on the web-based authoring tool. Books created on the authoring tools are based on PDF files which are uploaded to the server environment during book creation. Once the pdf is uploaded the user can select the appropriate areas-pages of the book, without the use of any QR codes, or even altering at any manner the physical layout of the book in order to create the trigger areas where the augmentations will appear. In addition, the PDF files are processed after upload, and the text they contain is extracted using the PdfToText library, which enable the ARTutor agent to search the content of the book in order to retrieve adequate answer in case the user asks for a specific question related to the content of the book.

ARTutor mobile application has been developed for both the iOS and the Android platforms using native developing tools. It has been designed to operate in the Greek and English language, depending on the device's language setting (the default is English).

In more detail, the web-based authoring tool is used by the teacher to upload the educational material, namely a book and its corresponding augmentations. The teacher can upload a book in PDF format and attach to it a title, a description and a category. When the book is uploaded, the teacher can select areas in the various pages of the book that and associate them with augmentations (Figure 1 & 2). Various types of augmentations are supported, such as images, videos, 3D models and sounds. Each augmentation is also accompanied by user-defined commands that are used to interact with the augmentation e.g. to start or stop a video augmentation.

On the other hand, the mobile application serves as the gateway for the students (or the end user) to access the augmented books created in the authoring tool. Initially the student has to select the book who wishes to study via the ARTutor library which contains a list of augmented books. Once the selection is made, the student can start to scan the printed copy of the book and explore the various augmentations. The student can interact with the augmentations via the ARTutor figure which appears in the down right side of the screen of the mobile device. Furthermore the student can interact with the augmentation using voice commands or using the speech recognition capabilities to ask questions, and receive visual and audio answers based on the text content of the book. ARTutor, embraces the UNESCO initiative "Education for All", trying to remove socioeconomic or cultural barriers which prohibit the access to high end educational technologies and to the technology enhanced learning in general.



ARTutor

Home Books ARTutor Contact About Profile Logout

Edit book

Title: Guide to BLENDED LEARNING

Description: Martha Cleveland-Innes with Dan Wilton Athabasca University, Canada

Category: Books

Language: English

Upload new file

SAVE BOOK DELETE BOOK ADD ASSET

Figure 1: Book creation

ARTutor

Home Books ARTutor

Edit asset

Title: Chapter 3: Successful Blended Learning

Trigger image: Open book to select

Price (€): 0.00

Augmentation: Augmentation selection

Title: How to Apply the SAMR Model with Ruben Puentedura

Trigger image: Open book to select

Price (€): 0.00

Augmentation: Augmentation selection

SAVE ASSET DELETE ASSET

Figure 2: Augmentation creation

The current paper evaluates the impact of augmenting the educational material of the “Guide to Blended Learning”, Commonwealth of Learning by adding augmented activated content, via the SUS and SECTION evaluation model.



## Method and Pilot Study

The book resource of the current pilot was the “Guide to Blended Learning” by Commonwealth of Learning, authored by Martha Cleveland Innes and Dan Wilton (2018). As it is referred in the book description “*The Guide to Blended Learning is an introduction using technology and distance education teaching strategies with traditional, face-to-face classroom activities. This Guide has been designed to assist teachers adopt blended learning strategies through a step-by-step approach taking constructivist and design-based approach and reflecting on decisions taken to provide authentic learning experience in their own contexts. It provides a general discussion of types of blended learning in reference to the level of education, the needs of the students, and the subject being taught.*”

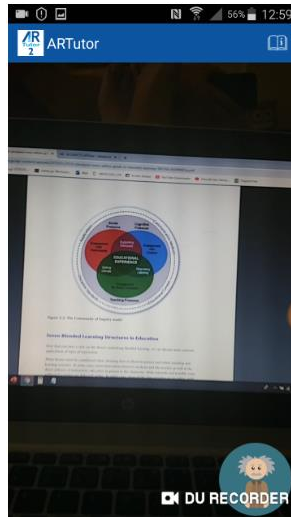
The main objective of the current pilot was to evaluate the impact of the addition of augmented material as part of the original pdf (and hard copy) version of the book towards the specific evaluation areas defined by the SUS and SECTION model which are below described in detail

A number of additional materials was added as augmentations to the original content of the book (Figure 4 & Figure 5). It is worth mentioned that all the additions were made with the consensus of the authors and were valid only for the purposes of the particular pilot. Addition include all type of augmentation media supported by ARTutor, such as video, audio narrations, images, and 3D objects.

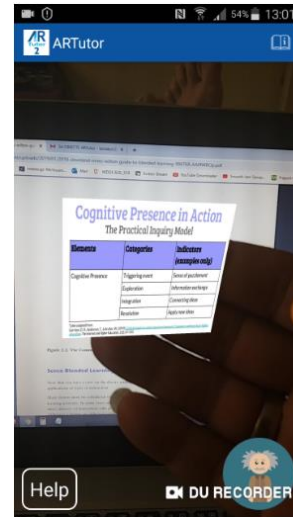
Assets

Title	Type	Price	Page		
Chapter 1: Blended Learning	■	\$0.00	11		
Chapter 2: Theories Supporting Blended Learning	■	\$0.00	19		
Chapter 3: Successful Blended Learning	■	\$0.00	30		
Chapter 4: Design for Blended Learning	■	\$0.00	38		
Chapter 5: Technologies for Blended Learning	■	\$0.00	47		
Chapter 6: Development of Blended Learning	■	\$0.00	47		
Chapter 7: Synchronous and Asynchronous Activities in Blended Learning	■	\$0.00	62		
Chapter 8: Evaluation of Successful Blended Learning	■	\$0.00	70		
How to Apply the SAMR Model with Ruben Puentedura	■	\$0.00	28		
Introduction to The Commonwealth of Learning (COL)	■	\$0.00	1		

**Figure 3: List of Additional Material**



(a) Image augmentation



(b) Image augmentation

**Figure 4: Scanning and recognizing the digital version of the book**

A number of fifty four (54) volunteer undergraduate students of the Eastern Macedonia and Thrace Institute of Technology in Greece were asked to access, download and make use of the augmentations available via the ARTutor platform for a period of four weeks. Although there was no initial gender distribution, as the sample has been randomly selected, the gender distribution participated in the current pilot was comprised by 43% male and 57% female volunteers. Volunteers were supposed to evaluate the use of the ARTutor application (Figure 6) using Brooke's (1996) System Usability Scale (SUS) which is considered as one of the most widely used tools for assessing the perceived usability of a system or product" (Tullis & Albert, 2013, p. 137).

SUS consists of 10 standard questions, has been extensively analyzed and demonstrated to be both reliable and valid (Brooke, 2013). In addition, it has been shown to be reliable even with small sample sizes (Tullis & Albert, 2013). The only change to the original set of questions was the replacement of the word "system" with "app," a change that had not affect the tool's validity.

Participants were asked to rate their tech skills overall (as "poor," "fair," "good," "excellent," or "other") and identify the type of mobile device they used. They were also asked to rate their experience of AR, including increases in engagement, comprehension, motivation, and enjoyment, which we evaluated using a five-point Likert scale.



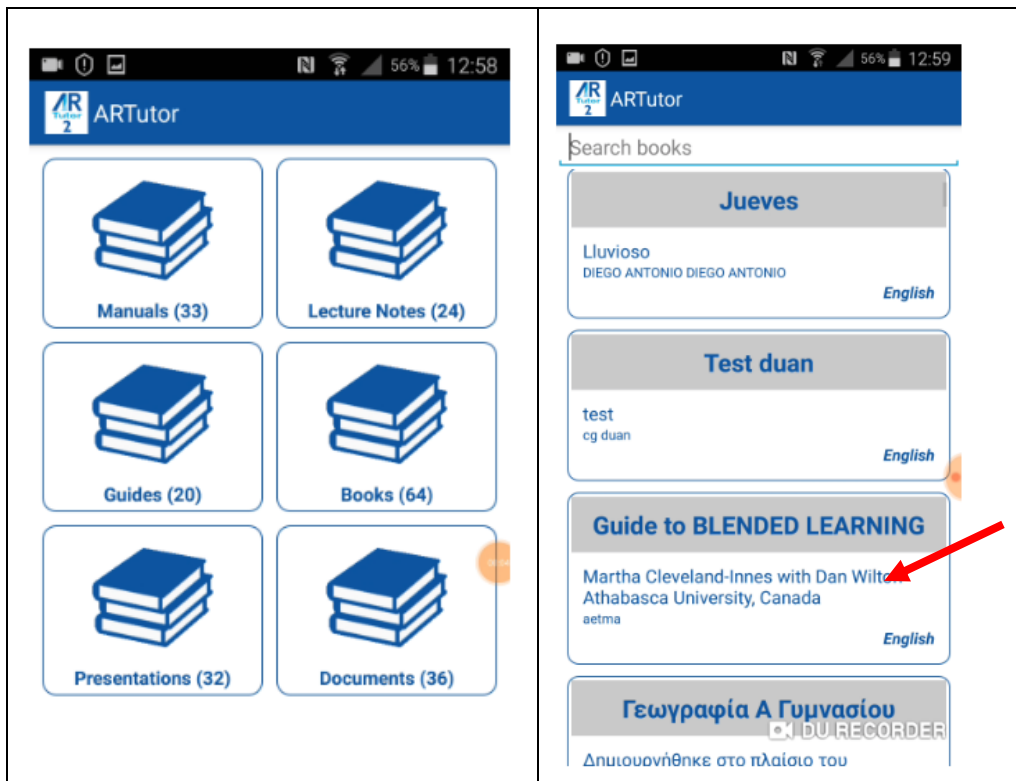


Figure 5: ARTutor App accessing Guide to Blended Learning

Based on the finding of this pilot, the authoring team of the current paper was supposed to evaluate the whole education activity via the SECTION evaluation framework

### Results of Mobile App & SECTION Evaluation

SUS scores were calculated manually, utilizing the automated SUS score calculator used for confirmation. The participants' mean SUS score was 87,35 . With scores of <50 considered unacceptable, scores of 50–70 considered marginal, and scores of >70 considered acceptable in usability terms, this score falls well above the threshold of acceptable usability (Tullis & Albert, 2013). Furthermore, as it falls within the range of 80–90, the score can be characterized as indicating excellent usability (Bangor, Kortum, & Miller, 2009). It is also worth to notice that individuals who rate a system or product with a SUS score of 82 or higher are likely to recommend it to a friend or colleague (Brooke, 2013); all participants' individual SUS scores fell above this threshold. Median responses to Likert questions regarding increases in engagement, comprehension, motivation, and enjoyment were calculated converted to a 100-point scale varying from 100 "strongly agree" and 0 representing "strongly disagree", median responses were 89.3 for increased engagement, 73,8 for increased comprehension, 96 for increased motivation, and 81,2 for increased enjoyment when reading the Guide to Blended Learning. Findings suggest that participants to this pilot had a very positive experience by



using the augmented enhanced version of the book affecting positively areas such as engagement and motivation, followed by enjoyment.

### *SECTIONS Analysis*

The process of summative evaluation of ARTutor platform for enmeshing the material of the Guide to Blended Learning was made using the SECTIONS criteria (Bates 2015). While this evaluation framework was originally proposed by Bates & Poole (2003), the revised framework incorporates new elements such as networking and security that are particularly pertinent when evaluating computer-based technologies. The SECTIONS model was selected as evaluation framework because it “is based on research, has stood the test of time, and has been found to be practical” (Bates, 2015, p. 308). An acronym, the SECTIONS framework consists of eight basic elements: students, ease of use, cost, teaching functions (including pedagogical affordances of media), interaction, organizational issues, networking, and security and privacy (Bates, 2015). Each is discussed below.

#### *Students*

This dimension includes three separate components: student demographics, access, and learning differences (Bates, 2015). Of these, access is particularly critical. After all, “no matter how powerful in educational terms a particular medium or technology may be, if students cannot access it in a convenient and affordable manner they cannot learn from it” (Bates, 2015, p. 312). From this access perspective, ARTutor is an excellent choice within Canadian online education. The only equipment required is a mobile device such as a smartphone or tablet; in Canada, 76% of the general population owned a smartphone as of 2016, with ownership rates rising to 94% of those aged 15 to 34 (Statistics Canada, 2017). As Bates (2005) has argued, once 70% of a target group can access a particular technology, “it is unreasonable to deny the majority the advantage of a superior technology” (p. 212).

Regarding student demographics, the ARTutor platform is suitable for students (readers in this particular case) enrolled either in a traditional, blended or a fully online program. Bates (2015) emphasizes the importance of “flexibility” (p. 312) to such students; because it adds a mobile element to the learning environment, ARTutor enhances the flexibility of online learning.

ARTutor is also ideally suited to accommodate the “wide range of differences in prior knowledge, skills, and preferred study styles” (Bates, 2015, p. 312) found within any group of learners. As Bates (2015) notes, “the intelligent use of media and technology can help accommodate these differences” (p. 312). Because ARTutor has the capacity to incorporate an array of digital media, it is a simple but powerful means for accommodating such differences. Under the light of this statement, “Guide to Blended Learning” by



Commonwealth of Learning is freely accessible by any student, researcher, or reader. Therefore, it is an excellent resource for the ARTutor platform.

### *Ease of Use*

Ease of use is a “critical factor in the successful use of technology for teaching” (Bates, 2015, p. 323). Bates (2015) argues that “it is important that students and teachers do not have to spend a great deal of time on learning how to use educational technologies, or on making the technologies work.” (p. 319). Despite the technical challenges encountered, especially with the use of 3D models, AR content was successfully created in less than thirty minutes (30) of beginning exploration of the ARTutor platform. This investment of time was minimal, particularly in comparison to other educational technologies, available in the literature. However, as previously noted, unsuccessful in using complicated color textures in 3D models, these elements may be considered an exception to the overall simplicity of the platform’s use from the teacher’s (author’s) perspective.

Bates (2015) also suggests that “a useful standard or criterion for the selection of course media or software is that ‘novice’ students (students who have never used the software before) should be studying within 20 minutes of logging on” (p. 320). We are confident that this was the case for the participants in our pilot. Additionally, the very high mean SUS score of 87.35 from our pilot participants suggests that from the perspective of the learner, ARTutor is exceptionally easy to use. Based on this evidence one of the major benefits of using ARTutor for augmenting the content of the “Guide to Blended Learning”, is the additional content that each reader can add to the book in order to create a personalized enhanced version of it. On the other hand the book’s authors are able to update the book content at any time easily without any additional complex procedure or even additional cost.

### *Cost*

Both the authoring platform and the mobile app are free for ARTutor users. The delivery cost is therefore nil; however, design and development would be a fixed cost (Bates, 2015). With the proliferation of open educational resources available online at no cost, the primary driver of design and development costs would be the teacher/instructional designer’s time to locate, select, and potentially alter existing learning objects; our experience suggests this would take about 30 to 60 minutes per augmentation. In addition, in order to take full advantage of the benefits of this technology, there could be some costs associated with instructional redesign of the course (Bates, 2015). It should be noted, however, that the ease of use of ARTutor’s authoring platform is a cost benefit, as minimal time would be needed to navigate the authoring platform and upload augmentations.



### *Teaching Functions*

As Bates (2015) notes, “design decisions are critical in influencing the effectiveness of a particular technology” (p. 335). Because ARTutor has the capacity to incorporate multiple types of media (images, audio, video, and 3D models), it offers the flexibility to ensure the “complex challenge” (Bates, 2015, p. 333) of appropriate media selection is met.

Simply by virtue of its capacity to include multimedia, however, augmented reality in general (and the ARTutor platform in particular) has the potential to improve student learning. For example, Mayer’s (2001) first principle of multimedia learning states that “students learn better from words and pictures than from words alone” (p. 184); for Mayer, the term “pictures” refers to “any form of static or dynamic graphic, including photos, graphics, charts, illustrations, video, and animation” (p. 64). Inclusion of videos and other images into an augmented document should therefore result in superior learning over a document such as the original version of Guide to Blended Learning. Access to the additional (augmented) content does not redirect the readers to a third party platform ( as it is the case of using QRcodes) but immerse the reader to the book content and therefore maximize both the teaching impact and the learners’ concertation towards the reading material.

In addition, participants in our pilot project reported increased motivation, engagement, comprehension, and enjoyment as a result of the augmentations, as previously noted. These data are consistent with previous research (e.g., Dede, 2009) that suggests these may be pedagogical advantages of the AR learner experience.

### *Interaction*

Three primary types of interaction can occur when learners are studying: interaction with learning materials, interaction with the teacher, and interaction with other learners (Bates, 2015). The ARTutor platform is particularly strong in the area of interaction with learning materials. The mobile app allows learners to interact with the augmentations via voice commands, gestures, and questions (Lytridis et al., 2018). In addition, the augmentations themselves “can be explicitly designed to encourage interaction” (Bates, 2015, p. 341). For example, embedded video clips “can be designed to encourage interpretation, by presenting situations or cases that have to be analysed or classified” (Bates, 2005, p. 102).

The ARTutor platform could also be used to support interaction between geographically distributed learners in a new and powerful way to create and present augmented reality experiences to their peers, a transformative learning opportunity (Frydenberg & Andone, 2018). The simplicity of the ARTutor authoring platform suggests it could be used for similar projects in a distance education context, supporting not only student interaction but a variety of potential learning objectives.



Interaction with the teacher is also supported via the ARTutor platform. The inclusion of video and audio clips in to the Guide to Blended Learning, provides the opportunity for asynchronous, one-way interaction with the teacher (who could record him- or herself in a variety of ways, such as in a short screencast or podcast); two-way interaction could be supported through careful design of embedded learning activities. In that way the process of reading a book can turn to an inclusive educational experience with positive benefits to the content comprehension and reader/learner engagement.

### *Organizational Issues*

In general, organizational support is needed for successful technology implementation (Bates, 2015). This can take various forms. Some institutions “provide funding for innovative teaching projects” (Bates, 2015, p. 347); implementation of augmented reality, as an emerging technology, has the potential to qualify for such funding. In addition, as Bates (2015) notes, most educational organizations provide access to instructional designers and educational technologists. These experts could be helpful in assisting with design, creation, and selection of augmentations, as well as with AR’s integration into the course as a whole.

### *Networking*

The ability of an educational technology to support networking beyond the confines of a course is a question of increasing importance (Bates, 2015). While Bates’s (2015) discussion is focused on social media, the ARTutor platform has the capacity to support student creation of resources to help other students (as described in the “Interaction” section above), one of Bates’s five key networking elements. Another of these five key elements supported by the platform is creation of instructor-led open educational resources. Individual digital augmentations created by an instructor for use within the platform, as well as the augmented document as a whole, would fall into this category. Overall, then, the ARTutor platform provides innovative opportunities for networking.

### *Security and Privacy*

Online security and privacy have become key issues for learning institutions, and creation of a “strictly controlled environment enables institutions to manage security and privacy more effectively” (Bates, 2015, p. 354). While the ARTutor mobile app is fully accessible to anyone, access to augmented documents can be controlled by housing the documents themselves in a secure environment such as a password-protected learning management system (Bates, 2015). Another significant threat to security, however, is possible malware embedded within a media file and downloaded to a student’s device. This risk can be mitigated by using standard network security procedures (e.g., firewalls, regular malware and virus scanning, etc.) to prevent such a security breach.

## Conclusions

In conclusion the present study can contribute to the instructional design education by providing evidence that AR applications are positively affecting the support of teaching and learning. ARTutor as a platform and as a mobile application can be a useful tool both for teachers and students. The results may offer new insights to researchers and provide educators with effective advice and suggestions on how to incorporate this instructional model into their teaching. The preliminary observations show that this application can be a useful, easy and helpful tool for familiarizing with concepts related to Blended Learning as that was the topic of the current study. Moreover it could be a very useful tool for a blended learning approach since it allows students to collaborate, cooperate and have access to educational content without time or spatial constraints, with tasks being able to be completed both in the classroom and at home. Future driven studies should explore in detail the relationship between students' motivational characteristics and its impact in students' performance

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## Care and Rigor in Online Courses: An Analysis of Faculty & Student Perspectives

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### Abstract

Balancing care and rigor in the online environment can be a challenge for faculty in higher education. A cross-disciplinary group of online scholar practitioners at a regional public mid-sized American university brought together faculty from the disciplines of education, nursing, history, and psychology who inquire into and explore online teaching practices. A descriptive study using online survey methodology was conducted to identify faculty and student perceptions of care and rigor in online courses. Preliminary quantitative results reveal faculty and students agreed on the top characteristics of care and rigor in the online classroom. Both faculty and students agreed that several examples of instructor-learner interactions in the online classroom are a combination of both care and rigor. The results also indicate that care may exist independently of rigor, but that elements of care are embedded within expressions of rigor. The findings and implications about balancing care and rigor may be useful for online faculty, administrators, and instructional designers.

**Keywords:** Online Teaching, Care, Rigor, Self-Study, Instructor-Learner Interaction

### Introduction

Effective online teaching requires a balance between exhibiting care and academic rigor. This paper measured the faculty and student perceptions of instructor actions in the online classroom. The results suggest that faculty and students agree on the instructor actions that embody both care and rigor. The results further suggest that care and rigor exist together and are inseparable for many instructor actions in the online classroom.





## Conceptual and Theoretical Framework

### *Institutional Context*

In 2016, the Higher Learning Commission charged the university with establishing distance learning criteria and expectations for teaching, including evaluation of online courses, ensuring consistency of online course rigor, and maintaining consistency between online and on campus sections of the same course. Recognizing the need to support effective online instruction, the university's Global Campus created a new faculty scholar position to help plan and coordinate online teaching institutional initiatives. Relevant to this study, the scholar invited faculty to participate in an online self-study inquiry group (Loughran & Northfield, 1998; Freidas, Sgouros, & Wiles-Kettenmann, 2005). Five faculty from three disciplines participated during the first semester and a sixth member joined the second semester. The faculty disciplines included Education, Nursing, Psychology, and History. The six faculty researchers systematically studied their online teaching practices for an academic year. During this time, the group spent nearly a year examining their own practices and repeatedly circled around questions of perceptions of care and rigor in their own courses. The questions of care stemmed from conversations about the nursing ethic of care. The questions of rigor aligned with the institution's priorities to address accreditation.

### *Why Care and Rigor?*

Care and rigor are important topics because they speak to the quality of the online educational experience. Online courses and programs have increased with widespread internet availability. In our Midwestern, primarily rural region, the university has pioneered an educational access network (EAN) and established LTE towers to provide educational internet access. The university simultaneously initiated their Global Campus programs to recruit students beyond commuting distance or who otherwise may not be able to or prefer not to attend the campus (Board of Trustees, Northern Michigan University, 2018). Like other universities initiating online programs, there is concern about the inconsistent quality of course design and course implementation. This aligns with Meyer's (2002) argument that a widespread perception exists that the quality of online courses does not live up to the quality of on campus courses, even when accompanied by a thriving online program. The perception of lack of quality persists even after countless empirical studies that substantiated findings that there is no significant difference in the learning outcomes between online and face to face courses (Russell, 1999). Meyer (2002) also recognized the need for a comprehensive and unified definition of quality to guide the development and instruction of online courses. The Quality Matters rubric has since remedied this problem. The university implemented several professional development opportunities that embody the Quality Matters best practices to help prepare faculty to effectively teach online.



## Previous Research

### *Interactions*

How faculty and students perceive care and rigor may be understood in terms of course design and course implementation. The Quality Matters Course rubric outlines best practices for online course design. In terms of course implementation, instructional interaction is well-documented in the literature as a key factor for effective online learning. Effective interaction is defined as promoting the learners' thinking in profound and new ways (York & Richardson, 2012). The Community of Inquiry Framework proposed an instructional design model, which suggested that social, cognitive and teaching presences overlap to inform the educational experience. Interactions are inherent in this model.

There are many ways to examine interaction in the online classroom. Moore's (1989) three types of interaction laid the groundwork for classifying interactions into categories of student-student, student-instructor, and student-content. The kinds of interaction may vary by context and preferences. For example, Anderson's (2003) equivalency theorem suggested that "deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level" (p. 4). Nuances have since been added to include other typologies such as learner-self (Hirumi, 2002) and learner-interface (Hillman, Willis & Gunawardena, 1994). Dennen, Darabi, and Smith (2007) looked at the importance of instructor actions from both the student and faculty perspective. These authors found that while faculty feel taking actions to share the course content is most important, students perceive the most important instructor actions to be those that focus on interpersonal communication and meeting individual student needs.

### *Care*

The literature on the ethics of care informed this study. The ethics of care require an examination of stories and relationships in their context because doing so intensifies relationships thus resulting in potential new solutions to obstacles that might not have otherwise existed (Gilligan, 1982). In the context of nursing, caring can be defined as "a universal phenomenon influencing ways in which people think, feel, and behave in relation to one another" (Potter, Perry, Stockert, & Hall, 2017, p. 80). Within the discipline of nursing, caring is considered an important moral obligation and ethical pledge that nurses have with the public. The care dialogue approach requires that ethical issues be handled as a complex, inductive, and social process (Schuchter and Heller, 2018). Considering the importance of caring in the education setting is also important. Deacon argued that "creating a context of care in a classroom creates a robust environment for student learning; it facilitates better dialogue between students and teachers and allows teachers to draw out individual students and help them achieve their potential" (2012, p.6).



### *Rigor*

A single shared scholarly definition of ‘rigor’ appears to be lacking in the literature. Rigor may be based on academic demands (Wyatt, 2005), time and energy expended (Winston et al, 1994), cognitive expectations (Braxton, 1993), or the amount of critical thinking required (Taylor and Rendon, 1991). Graham and Essex (2001) found that the same methods faculty used to ensure academic rigor in on campus courses applied to online courses, with the caveat that clearer expectations and directions were required for the online course. Wyse and Soneral (2018) noted differences in student perceptions of rigor based on their academic classification: introductory students defined rigor based on workload, whereas upperclass students defined rigor based on cognitive demand.

The existing literature also suggests that faculty and students have different perceptions of rigor in university courses. Wyatt (2005) quantitatively found that students perceived online courses to be more academically demanding than traditional courses. In follow up interviews, Wyatt (2005) noticed that students suggested their online courses were intentionally requiring more work in order to defray criticism that online courses are not as rigorous as traditional courses. While not specific to online courses, Draeger et al. (2013) identified the various ways that faculty and students identified elements of rigor. Faculty defined rigor as being characterized by higher order thinking, appropriate expectations, active learning, and meaningful content (Draeger et al., 2013). In contrast, students defined rigor as being characterized by level of difficulty, grading standards, workload, perceived relevance to future goals, and level of interest.

### **Research Methods**

The aim of this study was to examine specific instructor actions often utilized in online courses and to determine whether faculty and students perceive those actions as demonstrating Care, Rigor, or Both Care and Rigor. Faculty and student perceptions were gathered through online survey methodology using Qualtrics. A descriptive approach was used to analyze quantitative data. Institutional Review Board approval was obtained from the mid-western United States public university where the study took place. The survey requested demographic information about the respondents, their experience teaching or taking online courses, and questions related to 16 instructor actions that were identified by Dennen, Varabi & Smith (2007) as relevant to online courses and that the current research used to explore how care and rigor are perceived in an online learning environment.

This study involved two groups. Faculty met inclusion criteria if they taught at least one online course during the past three years at the university where the study took place. Students met inclusion criteria if they had taken at least one online course during the past three years and were currently a student at the university where the study took place. With assistance from the business intelligence department at the university,



emails inviting participation in the study were sent to all faculty and students who met inclusion criteria. Through the email, potential participants were provided with a brief introduction to the study and asked to follow the survey link if they consented to participation. Data collection was conducted in March and April of 2019. Faculty and student groups completed a similar survey. Each survey asked participants to identify whether 16 instructor actions related to Care, Rigor, or Both Care and Rigor. The items were adapted from the work of Dennen, et al (2007.)

## Results of the Research

### *Sample*

The sample consisted of two main groups, faculty (n = 69) and students (n= 404). Faculty were presented with survey items that prompted them to further explain their roles and experiences teaching online courses. Fourteen (20.2%) of faculty identified as graduate faculty while 39 (56.5%) described themselves as undergraduate faculty. The remaining 16 (23.1%) faculty taught both graduate and undergraduate courses. Faculty participants reported having experienced varying levels of training in the role as online educators.

The student participant group was also asked to answer further survey items regarding their student status. Traditional students made up 58.6% (n = 237) of the sample. Non-traditional students were 41.3% (n = 167) of the sample. The traditional student group included students who entered college directly from high school. The non-traditional student group included returning students, adult learners, graduate students, and global campus students.

Preliminary examination of the data (using z-tests with Bonferroni adjustment) indicated that only minor differences existed in perceptions of key aspects of care and rigor among traditional students, non-traditional students, and faculty. Therefore, in order to explore the concepts of care and rigor in a way that reflects commonality and shared perception, and ultimately will inform a scholarly definition of rigor, these data were examined as a whole and combined faculty and student perceptions.

### *Actions that Demonstrate "Care"*

Of the 16 instructor actions, the top three items categorized as Care were 'respond to emotional tones,' (75%) 'accommodate individual differences,' (62.8%), and 'respond' to student inquiries.' (57.8%). Taken together these top responses for Care reflect individual attention to students and their unique needs. The next tier of interactions that demonstrate Care involve communication and responsiveness of faculty; 'check email' (52%) and 'prompt interaction' (48.1%). A complete display of the rankings can be seen below in *Table 1*.

Item	Care (%)	N
Respond to emotional tones	75	472
Accommodate individual differences	62.8	470
Respond to student inquiries	57.8	474
Check email to assess learner needs	52	473
Prompt interaction	48.1	472
Check on learner access to course materials	41.7	468
Ensure availability of technical assistance	38.2	471
Provide timely feedback	34.9	473
Address nonproductive behavior	31.9	470
Provide examples	27.1	472
Provide extensive feedback	26.9	472
Model communication protocols	24.2	472
Establish synchronous meeting times	23	469
Post to discussion board	20.9	474
Communicate rules / expectations	17.3	473
Review appropriateness of course materials / activities	12.9	473

**Table 1: Overall sample rankings of instructor actions as they contribute to Care**

#### *Actions that Demonstrate “Rigor”*

The top three items that demonstrated Rigor were related to establishing a course that is appropriate and communicating with students in a meaningful way. Specifically, ‘review the appropriateness of course materials and activities’ (36.6%), ‘post to discussion board’ (34.8%), and ‘communicate rules/expectations’ (32.8%) were the top three interactions identified as demonstrating Rigor. Of particular note is that the proportions of respondents identifying items as Rigor were much lower overall than those of the top ranked Care items. A complete display of the rankings as they relate to rigor can be seen below in *Table 2*.

Item	Rigor (%)	N
Review appropriateness of course materials / activities	36.6	473
Post to discussion board	34.8	474
Communicate rules / expectations	32.8	473
Model communication protocols	26.9	472
Establish synchronous meeting times	23.7	469
Provide examples	22.7	472
Address nonproductive behavior	21.7	470
Ensure availability of technical assistance	15.5	471
Provide extensive feedback	15	472
Check on learner access to course materials	12.8	468
Prompt interaction	11.7	472
Provide timely feedback	8.9	473
Respond to student inquiries	3.8	474
Check email to assess learner needs	3.8	473
Accommodate individual differences	3.4	470
Respond to emotional tones	2.5	472

**Table 2: Overall sample rankings of instructor actions as they contribute to Rigor**

*Actions that Demonstrate “Both Care and Rigor”*

The top two interactions identified by respondents as demonstrating Both Care and Rigor were related to feedback; ‘provide *extensive* feedback’ (53.8%) and ‘provide *timely* feedback’ (53.5%). The items rated with the next highest proportions relate to providing structure and setting expectations: ‘provide examples’ (47.2%), ‘communicate rules/expectations’ (46.5%), and review appropriateness of course materials / activities (45.5%). A complete display of the rankings as they relate to Both Care and Rigor can be seen below in *Table 3*.

Item	Both Care and Rigor (%)	N
Provide extensive feedback	53.8	472
Provide timely feedback	53.5	473
Provide examples	47.2	472
Communicate rules / expectations	46.5	473
Review appropriateness of course materials / activities	45.5	473
Check email to assess learner needs	41.9	473
Model communication protocols	40.9	472
Check on learner access to course materials	38	468
Address nonproductive behavior	37	470
Respond to student inquiries	36.7	474
Prompt interaction	35.6	472
Post to discussion board	34.8	474
Ensure availability of technical assistance	34.6	471
Establish synchronous meeting times	30.7	469
Accommodate individual differences	28.5	470
Respond to emotional tones	14	472

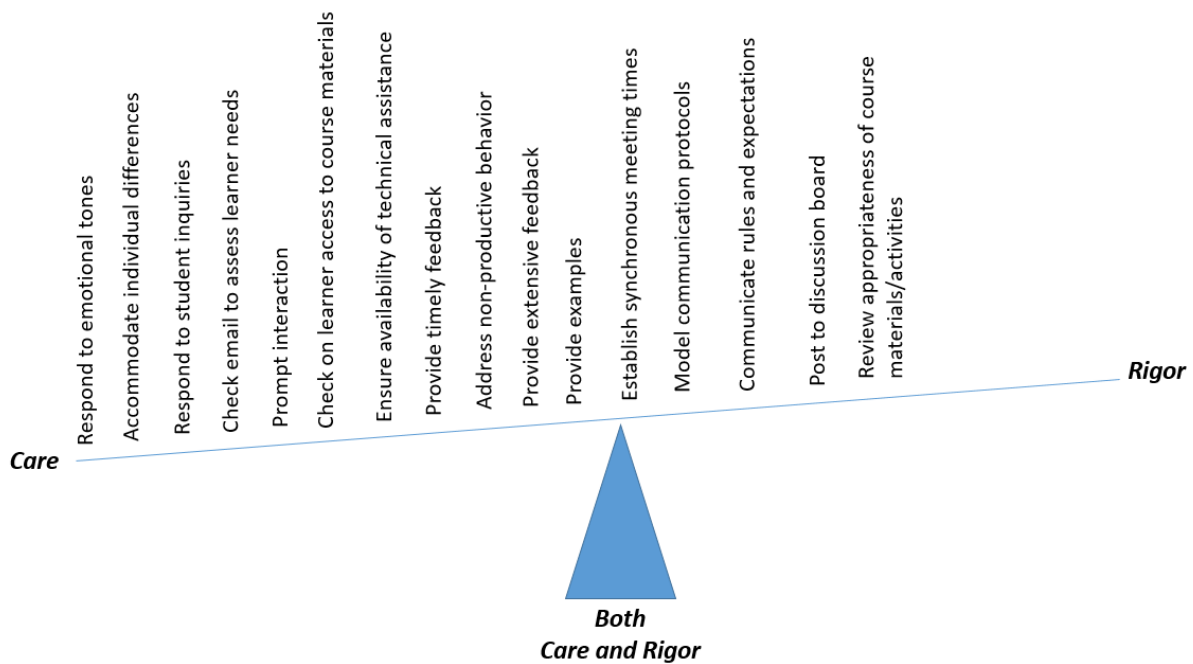
**Table 3: Overall sample rankings of instructor actions as they contribute to Both Care and Rigor**

### Overall Analysis of Items

All 16 items were ordered based on whether each item received the largest proportion of Care, Rigor, or Both Care and Rigor choices. Those items that were identified as 'Both Care and Rigor' were examined further to explore whether Care or Rigor was more dominant in that designation, or if that item was a balanced combination of both of those attributes. If an item received the highest proportion of respondents indicating that it demonstrated Both Care and Rigor, the attribute that received the next highest proportion of responses became the secondary designation. For example, if an item was most often chosen as demonstrating Both Care and Rigor and the next highest proportion of responses indicated it demonstrated Care, it was designated as 'Both (Care).' If an item was first designated as 'Both' and then was identified by the next largest proportion of respondents as 'Rigor' then it was designated as 'Both (Rigor).'



If the secondary 'Care' and 'Rigor' proportions were within 5 percentage points of each other, that item was designated as 'Both (Balanced)' because it did not lean more towards Care or Rigor (see *Figure 1* for a visual depiction of these results).



**Figure 1: The balance of care and rigor within instructor actions**

Of the 16 items used in the study, over half were identified as primarily or secondarily demonstrating Care. Three items were identified as balancing Care and Rigor ('provide examples,' 'model communication protocols,' and 'establish synchronous meeting times'). The three items that could be identified as Both but predominantly Rigor are 'post to discussion board,' 'communicate rules/expectations,' 'review appropriateness of course materials/activities.' Of particular note, although many of the instructor actions explored in this study were perceived as demonstrating Care, or Both Care and Rigor, no items were perceived *exclusively* as Rigor. See *Table 5* below for a presentation of these results.



Item		N
Respond to emotional tones	Care	472
Accommodate individual differences	Care	470
Respond to student inquiries	Care	474
Check email to assess learner needs	Care	473
Prompt interaction	Care	472
Check on learner access to course materials	Care	468
Ensure availability of technical assistance	Care	471
Provide timely feedback	Both (Care)	473
Address nonproductive behavior	Both (Care)	470
Provide extensive feedback	Both (Care)	472
Provide examples	Both (Balanced)	472
Model communication protocols	Both (Balanced)	472
Establish synchronous meeting times	Both (Balanced)	469
Post to discussion board	Both (Rigor)	474
Communicate rules / expectations	Both (Rigor)	473
Review appropriateness of course materials / activities	Both (Rigor)	473

**Table 5: Overall sample rankings of instructor actions as they contribute to both Care and Rigor**

## Discussion

The instructor actions identified by Dennen et al. (2007) as important to learner satisfaction and success were found to more often demonstrate care than rigor in this current study. Further, even the interactions that were perceived as primarily rigorous also had strong components of care within them (i.e., posting to discussion board, providing timely feedback). These findings add to the understanding of the role of care in the classroom in both theoretical and practical ways. First, it supports the work by Deacon (2012) that student learning is related to care in the classroom. Second, the current study identifies concrete instructor actions that can be used in the online classroom to demonstrate care, an aspect of research that has been overlooked in the literature (Rose and Adams, 2014). Specifically, care in the online classroom is demonstrated most clearly through personal attention to students: responding to emotional tones, accommodating individual



differences, responding to student inquiries, checking and responding to emails, and promptly interacting with students. Because care has been found to facilitate student learning (Deacon, 2012), educators can include these interactions to foster care, and ultimately facilitate student success, in their online classrooms. Interestingly, there was a greater proportion of respondents who identified items in this survey as 'Care' or 'Both Care and Rigor' than there was for 'Rigor' alone. In searching existing published literature, a clear definition of rigor in the online environment is not evident. The research team was hopeful that analyzing data collected in this study would provide some clarity. However, none of the instructor actions included in this survey were clearly identified by the participants as rigor. This brings about more questions about the concept of rigor: Do students and faculty have trouble recognizing and defining rigor? Did the faculty actions included in the survey lack certain items that contribute to rigor?

Although no instructor actions were identified as rigor exclusively, rigor was noted within the majority of instructor actions. This suggests that while faculty demonstrate care within their courses, they also contribute to the rigor of the course. The results of this study suggest that care and rigor are not mutually exclusive; a specific instructor action may contribute to both care and rigor simultaneously. Of note, two items ('accommodate individual differences' and 'respond to emotional tones') were clearly identified as exclusively demonstrating care. This suggests that care can exist without rigor. However, this study does not provide evidence to suggest that rigor can exist without care. The current study found that faculty and students have similar perceptions of care in contrast to literature that found faculty and students have different perceptions of rigor in university courses (Wyatt, 2005), suggesting that rigor is a more complicated, multidimensional, and situational construct in teaching and learning than is care. In order to create an accurate and robust definition of rigor as a concept in online learning, more research is needed. A qualitative study seeking perceptions of rigor in online learning from both students and faculty would add valuable information to understand the concept of rigor.

## Conclusion

This study was not without limitations. This study was conducted by gathering perceptions of students and faculty. This study used a sample of students and faculty from one institution, which limits generalizability of the results. The survey did not request age or gender from participants. Future research should gather this information to analyze whether students of differing ages and genders have different perceptions of online learning. It was brought to the research team's attention that the concept of rigor may include how much time a student is required to spend in a given course. An item related to time was not part of the survey and could also be added for any future research. Future research could also explore care and rigor as they relate to student outcomes such as retention, success, and satisfaction in online coursework. In conclusion, the results of this study provide faculty teaching online with an understanding of how to demonstrate care

through their interactions. Rigor in the online learning environment has been questioned in the past. The research presented in this paper was undertaken partially because the research team, in the context of self-study, expressed concerns about balancing care and rigor in their online courses. These concerns can be somewhat alleviated since the results of this study indicate that care and rigor are not mutually exclusive and are commonly intertwined.

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## Student Access and Success through Hybrid Learning: A South African University's Business and Delivery Model

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### Abstract

Participation and success rates at Higher Education institutions in Sub-Saharan Africa remain low in comparison with the rest of the world. According to UNESCO's Global Education monitoring report 2017/2018, the global gross enrolment ratio has risen from 17% to 46% since 2000 in upper middle income countries (UNESCO, 2017). Since 2010, South Africa's higher education participation rate has steadily increased to 18,6% (Department for Higher Education and Training, 2017) and the national dropout rate after the first year decreased from 30% to 14% in 2015 (Green, 2018). A recent analysis of South African high school finishers indicates that only 4% of Grade 12's eventually obtained a university degree (Spaull, 2016). Stellenbosch University (SU) is one of the most successful Universities in South Africa with a 85% graduation throughput rate for 3 and 4 year programmes (Green, 2018), and annually receives many more applications than it can accommodate in its full-time on-campus degree programmes. Expanding access by fully online academic offerings is not an attractive option for SU, because of the poor success rates of those students in South Africa. SU is therefore embarking on a hybrid learning model, i.e. a combination of block contact sessions and online (synchronous and asynchronous) learning opportunities, for current and new student markets. This paper outlines how SU is expanding student access while ensuring student success with a hybrid learning model that:

1. Targets untapped markets with short courses, modules and complete academic programmes;
2. Maintains the high throughput rate of the on-campus students for hybrid mode students;
3. Uses an ecosystem of role-players and ICT that facilitates effective learning; and
4. Ensures sustainability using a full-cost financial business model.

By focusing on these key issues, SU shall make a significant contribution to the goal of South African National Development Plan for 2030, which calls for an increase in university enrolment from 950,000 in 2010 to 1,62 million by 2030 (National Planning Commission, 2011).

**Keywords:** Blended Learning, Business Model, Student Access, Hybrid Learning, Student Success, ICT, Flexible Learning



## Introduction

Participation and success rates at Higher Education institutions in Sub-Saharan Africa remain low in comparison with the rest of the world. Stellenbosch University (SU) is one of the most successful Universities in the South African Higher Education system and is committed to access with success. SU is a largely residential University and annually gets far more applications than it can admit to the degree programmes in its ten faculties. The only way to increase access is by providing some academic offerings via hybrid learning, i.e. a combination of block contact sessions and online (synchronous and asynchronous) learning opportunities. This paper outlines how SU plans to expand access to and flexibility of its academic offering with success through hybrid learning opportunities by focusing on:

- The South African and SU context
- Outlining niche target markets for short courses, modules and undergraduate and postgraduate programmes;
- An ecosystem of role-players with responsibilities to ensure student success; and
- A financial business model that will ensure sustainability of the hybrid learning initiatives.

By focusing on these key issues, SU will be able to via its hybrid offering make a significant contribution to the transformation of lives and societies both within and outside the borders of South Africa.

## South African Context

According to UNESCO's Global Education monitoring report 2017/2018, "[i]n 2015, 213 million students were enrolled in tertiary education. Since 2000, the gross enrolment ratio has risen by 29 percentage points in upper middle income countries, from 17% to 46%. [...] By contrast, enrolment growth in Caucasus and Central Asia and in sub-Saharan Africa has almost stagnated, remaining close to 2000 levels" (UNESCO, 2017, p. 150). South Africa's higher education participation rate has since 2010 steadily increased to 18.6% (Department for Higher Education and Training, 2017) and the success rate of students is also increasing with the national dropout rate after the first year decreasing from 30% to 14% in 2015 and the percentage of students graduating after 8 years for 3 and 6 year undergraduate qualifications increasing to 57.9% (66.4% for contact programmes and 23.2% for distance programmes) (Green, 2018). What however remains worrying is that only about 4% of the 2008 Grade 12 cohort who enrolled in Grade 1 completed a degree within 6 years after matric (Spall, 2016).

The recently released draft South African National Policy on Post-Secondary Education and Training (Lewin, 2016) contains the five goals of the White Paper on Higher Education (2013) as threads throughout the plan: Social justice; a single coordinated system, access, quality and diversity, and improved links between



education and work. Due to limitations in the South African fiscal budget, it is unlikely that the model of “bricks-and-mortar” universities for full time residential attendance by students, will be able to meet the growing demand for higher education. However, lecture rooms and laboratories at SA universities are underutilised during academic recess times, offering opportunities to serve students with a hybrid learning mode.

Top rated international higher education providers are entering the South African student market with fully online offerings. Yet, local South African universities have the advantage of face-to-face (F2F) short term contact for students in (South) Africa, combined with online learning. The throughput rate of students who have had F2F interaction is significantly better than for exclusively online students (DHET, 2019).

### **Stellenbosch University**

Stellenbosch University (SU) is one of the top residential, research-intensive institutions in South Africa and within the top 1% on international rankings. It effectively uses face-to-face, hybrid and blended learning to provide student access with success. Student success and a Student-centered institutions were identified by Educause as two of the top 10 IT issues in 2019 (Grajek, 2019). SU has a very high success rate in comparison with the rest of sub-Saharan Africa with an 85% throughput rate for students in 3 and 4 year programmes and only 8% dropout rate of first-year students (Green, 2018).

SU holds a nuanced view of student success, broader than only throughput and dropout rates. In its newly adopted Teaching and Learning Policy, student success is viewed holistically and includes a focus on the SU graduate attributes (an enquiring mind, an engaged citizen, a dynamic professional and a well-rounded individual), through a substantial co-curricular offering (Mochichane, 2019).

### **The SU Hybrid Delivery Model**

In its Strategic Framework 2019-2024 SU decided to further expand its academic offering in a hybrid mode, i.e. a combination of face-to-face and fully online learning opportunities. It shall not only extend the reach of SU’s programmes, but also the increase the richness, i.e. enhancing learning and the student experience by how the curriculum is offered and the greater diversity of students partaking. Academic transformation, identified by Educause as the most important key issue in teaching and learning for 2018 (Educause, 2018), is also a key priority for SU. This includes, as indicated by the EDUCAUSE Learning Initiative (ELI) survey, “breakthrough teaching and learning models, innovative partnerships and alliances, and strategic transformation of the campus mission” (Educause, 2018).

Richard De Millo, the executive director of the Georgia Institute of Technology's Centre for 21<sup>st</sup> Century Universities predicts that some traditional campuses might also start fusing the best of the physical and digital experiences to dissolve the traditional physical-digital dichotomy (Selingo, n.d.-a). SU's hybrid learning strategy also aims to have its students experience the best of both worlds.

The priority areas where SU explores new knowledge markets using hybrid learning opportunities, are:

- Non-credit bearing short courses;
- SU's credit bearing postgraduate programme offering; and
- Credit bearing undergraduate modules, module chains in a subject field and complete undergraduate programmes.

The overarching principles that will govern SU's hybrid learning projects include:

1. *Embed hybrid delivery in existing systems* focusing on maximum synergy between face-to-face and hybrid mode delivery. This shall leverage what SU already has in place and make hybrid learning accessible to current residential students as well.
2. *Maintaining high quality is non-negotiable.* The educational merits, quality of the offering and achievement of SU graduate attributes should drive the initiative.
3. SU needs to understand and serve the market for higher education, but this should *not lead to the marketisation and/or commodification of education.*
4. As with the SU residential students, SU needs to *provide effective support to the "whole" hybrid learning student*, albeit meeting differentiated needs of the latter. Where possible, the co-curricular experience should be integrated as well.
5. The *digital literacy and connectivity of students should be taken into account* in the design of hybrid learning programmes. Students need regular and convenient interaction with academic and support staff, as well as with peers, as hybrid learning students will mostly not be physically present on campus.
6. The *Design of flexible and accessible learning opportunities*, including the modularisation of academic programmes, to provide a "menu selection" approach to students, linked to the current knowledge acquisition preferences of society.
7. *Human Resources processes and procedures need to be flexible enough* to appoint of part-time teaching assistants and staff to support students, and with flexible working hours to support students after hours.
8. *Hybrid learning* implies new products and *will require additional resources.* A transparent budget model must ensure that the income flows to where the resources are required (faculty and support staff and operations).
9. The *hybrid offerings must all have positive financial balances.* One of the aims of the hybrid learning extension is to help sustain the overall teaching offering at SU, which is currently strained by ceilings placed on student fee increases and state subsidies that do not compensate for the higher education cost inflation.



10. *Up-front payment by students should be considered on a per-module basis* to enhance retention of hybrid learning students whose switching costs to other modules and programmes are lower than for residential students, and to mitigate economic risks for the university when hybrid programmes attract many students.
11. A *research-led approach to hybrid learning and teaching* should be followed to establish effective pedagogies, as is being done for residential students.
12. Hybrid learning offerings should *focus on student groups who can afford the study fees, but for whom the opportunity costs of full time residence on an SU campus is too high*. Hybrid learning students will be cost sensitive and critical about the return on their investment.

### **Niche Target Markets**

The University will focus on the new target groups of students whose higher education needs cannot be fulfilled with the current full-time residential offering of SU's programmes, or the offerings from other universities. These include:

- *School-leavers* who a) need bridging courses to gain access to higher education, b) did not get access to SU because of limited programme places or c) cannot afford full-time studies.
- *Learn-and-earn students* who want to a) obtain a first-time qualification, b) further their existing qualifications and skills or c) do continuous professional development (CPD) courses but cannot interrupt their careers to study full-time residential. This type of lifelong learning in short spurts when they need the knowledge rather than over lengthy periods, is often referred to as the "third wave in education and training." This third wave according to economists "is likely to be marked by continual training throughout a person's lifetime—to keep current in a career, to learn how to complement rising levels of automation, and to gain skills for new work" (Selingo, n.d.-b).
- *International students*, in particular from the rest of Africa, who for instance wish to partake in SU's programme or short course offering will be able to gain access to SU's hybrid academic offering.

### **Ecosystem of Role-Players to Deliver on Hybrid Learning Opportunities**

Every new academic offering shall be developed as a team project with a learning designer, instructional designers, videographers and editors working in close collaboration with the relevant faculty's academic staff members and blended learning coordinator. Various other role-players ranging from academic administration (time tabling, exams, etc) to Information Technology staff who manage the learning technology systems will also be involved. Lastly a marketing and recruitment team shall assist the faculties with feasibility studies and assist with the recruitment of students.

As alluded to before, it is of paramount importance that hybrid learning students have the same quality experience as the current residential students at SU. Sufficient technical and academic support shall be



provided beyond normal office hours. The scalability challenge of providing enough academic, administrative and management staff will have to be dealt with proactively. In this regard, SU shall partner with online learning platform providers to supplement SU's core capacity to scale up student numbers, to do marketing and administration, for the redesign of learning material and providing online forums for peer-group learning amongst students. However, SU shall maintain the core capacity to manage and offer hybrid programmes.

### **Business Model**

One of SU's larger hybrid learning offerings is the Honours Bachelor degree of Public Administration (HBPA) with 2034 enrolments in 2018. It is offered by the School of Public Leadership in the Faculty of Economic and Management Sciences. The HBPA programme was selected as an appropriate entity for analysis, for the following reasons:

- 1) The HBPA is a well-established programme, with which SU has more than 10 years of experience;
- 2) The programme is well-tuned in to the needs of earn-and-learn students in the work place;
- 3) Relatively high student enrolment numbers that afford economies of scale;
- 4) Excellent data on actual income and full costs of offering this programme;
- 5) It is at the next academic level after a first Bachelors degree, which is the most likely growth area for expansion of SU hybrid learning offerings. Typical programmes at this level are Post Graduate Diplomas and Honours degrees, which have large teaching components; and
- 6) The state subsidy at this level is midway between other potential SU hybrid learning programme offerings at taught Masters and Bachelors programme levels.

All the income streams and expenses for this Honours Bachelor degree of Public Administration (HBPA) programme were analysed by a work group comprising the Director of the School for Public Leadership (SPL), the Faculty Manager of Economic and Management Sciences, and colleagues from the SU Finance Division and the institutional Information Governance Centre. A generalised model for break-even analysis was subsequently developed, to provide a best estimate of profit or loss for similar hybrid learning programmes, using the number of FTEs (full time equivalent students) enrolled as the independent variable.

The following components were taken into account in the model:

#### *Income Sources*

- 1) Student fee income
- 2) Additional programme levies (paid by students or their employers)
- 3) State subsidies (input, output and institutional factor subsidies)



The above incomes were then divided by the actual FTEs enrolled, to arrive at a per unit income for each income stream.

### *Expenses of the HL Offering*

#### Fixed costs (based on 150 FTEs in the programme):

- 1) Faculty staff (teaching, administrative and management)
- 2) Office equipment and furniture
- 3) Digitalisation of learning material (initial major digitalisation)
- 4) Marketing campaign (initial major campaign for a new HL programme)
- 5) Contracting and approval costs
- 6) SU teaching and office facilities overhead costs
- 7) SU IT costs (services, licenses, telematic delivery)
- 8) Off-campus venue rental costs (for block contact sessions and assessments)

#### Variable Costs (with FTEs as independent variable):

- 1) Teaching staff and teaching assistants (academic)
- 2) Administrative and technical support staff
- 3) General service assistants
- 4) Office equipment and computers for the above staff
- 5) Recurrent staff training costs
- 6) Learning material for students (e.g. e-text books)
- 7) Computers & IT equipment for students
- 8) Continuous (annual) renewal of digitalised learning material
- 9) SU Overhead IT costs (computer user areas, services, licenses, telematic delivery)
- 10) Central SU overhead costs for Human Resources management
- 11) Central SU overhead costs for Financial management
- 12) The programme's proportion of the annual membership fee for an international online platform

The above total expenses for each item were then divided by the actual FTEs enrolled, to arrive at a per unit expense for each cost item. Income and expenses above were then entered in the formula below, to arrive at a profit or loss diagramme as depicted in Figure 1 below. For the sake of this paper, all South African Rand amounts were converted to US Dollars, applying an exchange rate of 15 Rands to the Dollar.

$$\text{Profit/loss} = (\text{per unit income items}) * \text{FTEs} - \text{Fixed costs} - (\text{per unit expense items}) * \text{FTEs}$$



Note that the Honours Bachelor degree of Public Administration (HBPA) programme was offered to 152 FTE students, which is the current financial break-even point. For enrolments above that number, the offering academic environment may be able to accommodate the additional students without more fixed costs. However, at some point larger student numbers will step-wise increase the fixed cost costs, e.g. for venue rentals, teaching staff, management overhead costs, etc. For the purposes of the rest of this report, we shall assume that financial model, with the fixed costs that were determined for approximately 150 FTEs, will remain valid for a range of 50 to 250 FTE students.

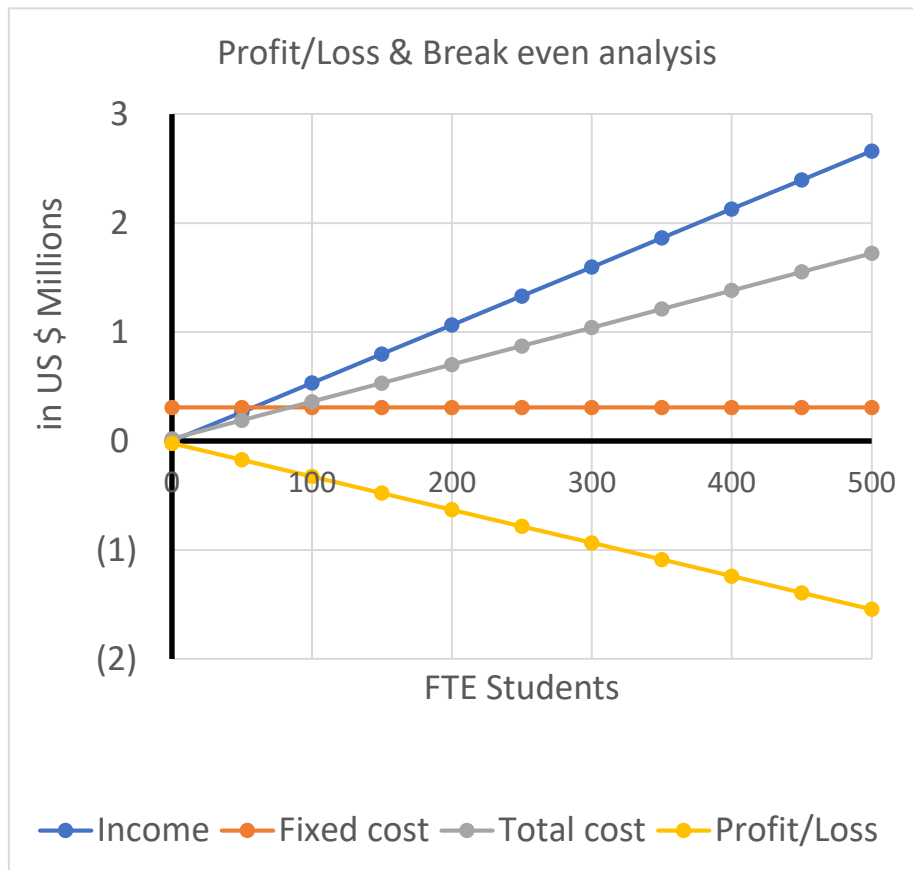


Figure 1: Profit & Loss graph for the Hons-Bachelor of Public Administration programme

In 2018 SU had 11% of its FTEs enrolled in hybrid learning modules. The strategic goal behind SU hybrid learning business plan is to grow this to 25% over the six year period 2020-2025. This implies that 21 hybrid learning academic programmes of at least 250 FTEs each need to be established, each comprising one academic year with 8 course modules per year, involving 150 hours of student work per module. The financial module then indicates a total profit potential of US \$3.6 million per annum when all 21 programmes are



operational and running at full capacity. The investment required to make this expanded hybrid learning offering by SU is as follows:

Overall hybrid learning project management and administration	US \$91 000 per year
Online support staff for hybrid learning students	US \$154 000 per year
Hybrid learning material design staff	US \$201 000 per year
IT support staff	US \$155 000 per year
Online service platform provider (membership spread over 6 years)	US \$37 000 per year
Learning material design (for 8 modules per one year programme)	US \$28 500 per programme
Buy-out of academic staff's time for online learning design	US \$31 600 per programme
Learning material design & delivery technology investment at SU	US \$182 000 (once-off)
Physical infrastructure investment at SU	US \$365 300 (once-off)

A cash flow model for the SU hybrid Learning business model, using the above income and expense data, indicates that SU's investment can be recovered within 8-10 years.

### Conclusion

SU has the opportunity to, through a hybrid offering, make a significant contribution to student access with success by offering hybrid learning in a variety of formats ranging from short courses, to modules to full academic programmes to a variety of target markets. This model will not only have advantages for the hybrid learning students but also for the existing residential students at SU because they will also be able to access the material created for the online environment as well as switch from residential to hybrid and back if required. Investments in learning technology and IT infrastructure over the past decade position SU well to expand its academic offering to new student markets by means of hybrid learning. Accurate financial data on one existing successful hybrid learning programme is available and was used to build a financial model for expansion into other programmes for which gaps in the market exist. The medium term projection shows that offering more hybrid learning programmes at SU is not only financially viable, but should generate extra profits to mitigate pressures on some of the existing programme offerings to full-time residential students.

### Acknowledgements

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## The Community of Inquiry Framework: Future Directions - Shared Metacognition

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### Abstract

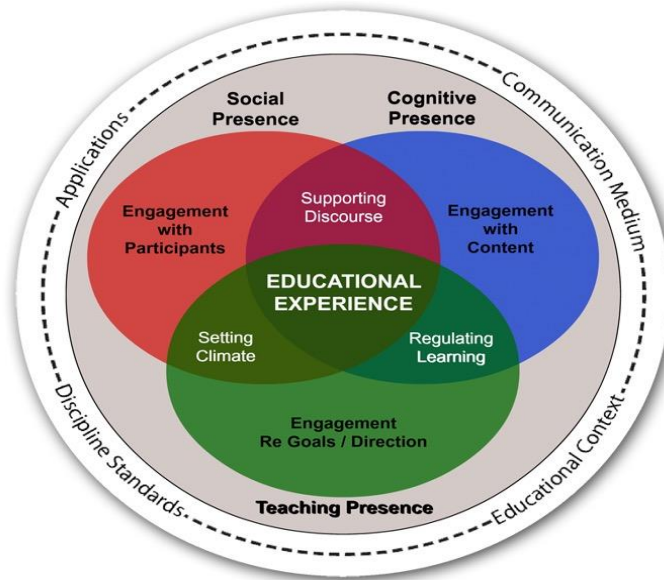
Metacognition is a required cognitive ability to achieve deep and meaningful learning that must be viewed from both an individual and social perspective. Recently, the transition from the earliest individualistic models to an acknowledgement of metacognition as socially situated and socially constructed has precipitated the study of metacognition in collaborative learning environments. This metacognitive construct was developed using the Community of Inquiry framework as a theoretical guide and tested applying qualitative research techniques and has been tested in this research by way of developing a metacognition questionnaire. The results indicate that in order to better understand the structure and dynamics of metacognition in emerging collaborative online and blended learning environments, we must go beyond individual approaches to learning and consider metacognition in terms of complementary self and co-regulation that integrates individual and shared regulation.

**Keywords:** Metacognition, Self-Regulation, Co-Regulation, Community of Inquiry, Teaching Presence

### Introduction

Metacognition is key to learning how to learn. Metacognitive approaches to learning starts with designing and planning the learning experience. Metacognition means increasing awareness of the learning process and taking responsibility to control the learning process. In the context of a community of inquiry (CoI) this is a shared experience of inquiry that considers the transactional environment (Figure 1).

To help us understand this approach we will begin by providing a brief overview of the Shared Metacognition construct developed in the context of the CoI framework. The CoI theoretical framework provided the “context to conceptually and operationally define and operationalize metacognition in a socially shared environment” (Garrison, 2017, p. 62) as well as rigorously testing the construct for its structural and transactional integrity.



**Figure 1: Community of Inquiry Framework**

Shared metacognition (MC) exists at the intersection of the cognitive and teaching presence constructs and goes to the heart of a deep and meaningful educational learning experience (Figure 2). As such we must understand shared MC and its role in a community of inquiry.

ELEMENTS	CATEGORIES	INDICATORS (examples only)
<b>Social Presence</b>	Open Communication Group Cohesion Affective Expression	Risk-free expression Encourage collaboration Emoticons
<b>Cognitive Presence</b>	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
<b>Teaching Presence</b>	Design & Organization Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

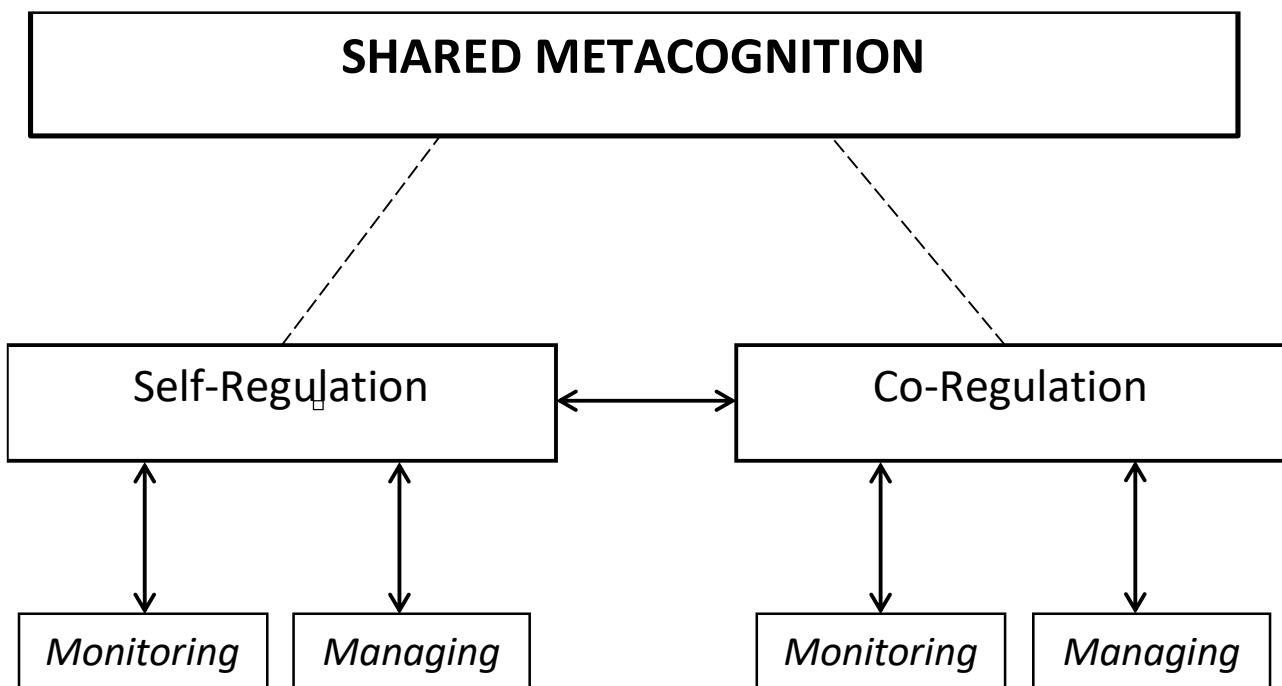
**Figure 2: Community of inquiry elements, categories and indicators**

The premise here is that developing metacognitive awareness and ability is core to becoming an effective inquirer. Metacognition has been generally accepted as consisting of two components – awareness of the inquiry process and implementation strategies (regulation). Awareness allows the learner to monitor and actively manage/regulate the inquiry process. In short, metacognition awareness and implementation





abilities provide the knowledge and strategies to monitor and manage effective inquiry. Most importantly, in a collaborative online and blended learning environment, awareness and implementation strategies are developed through critical discourse and the requirement of participants to explain and justify one's thinking to self and others. The approach to developing a viable metacognition construct for collaborative learning environments is to subsume self and shared regulatory functions within a single construct. The Shared Metacognition construct (Garrison, 2017; Garrison & Akyol, 2015a, 2015b) reflects the dynamic dimensions of self and co-regulation each exhibiting a monitoring (awareness) and a managing (strategic action) function (Figure 3).



**Figure 3: Shared Metacognition Construct**

To explore the practical implications of shared MC we must focus on the intersection of Cognitive Presence (CP) and Teaching Presence (TP). That begins with a consideration of TP categories (planning & organization; facilitation; and direction) as they overlap with CP operationalized through the phases of Practical Inquiry (problem defining, exploration, integration and resolution). While we have made progress in defining and measuring the construct of Shared MC, we are in the infancy of determining effective implementation and support for this process. However, with the conceptual construct of Shared MC and the Col framework as a foundation we begin with the practical implications of research found in a recent article exploring teacher support of metacognition (Zepeda et al., 2018).



## Design and Organization

With regard to metacognitive support and conceptual growth, Zepeda et al. (2018) provides us with some clues as to where we might begin focusing our implementation efforts. They concluded that “teachers from high-conceptual growth classrooms engaged in more cognitive talk than teachers in low-conceptual growth classrooms” (p. 13). The idea is that cognitive talk (discourse) gets students to think about their understanding and become open to sharing their thinking. This, of course, resonates very much with the essence of a community of inquiry. More specifically, the study suggests that questioning more easily supports metacognition. Of particular interest here is that planning is considered to be a key metacognitive skill. From our perspective, we would argue that to be introduced to and understand the process of Practical Inquiry (ie, awareness) is an essential predicate to implementing and supporting shared MC. Furthermore, we would state that planning should be done collaboratively that requires an awareness and appreciation of the phases of inquiry. This understanding of inquiry will encourage and support assuming responsibility for the inquiry process.

The focus on planning brings to the fore the importance of design and organization that relate to the following seven principles (Garrison, 2017, p. 112):

1. Plan for the creation of open communication and trust
2. Plan for critical reflection and discourse
3. Establish community and cohesion
4. Establish inquiry dynamics (purposeful inquiry)
5. Sustain respect and responsibility
6. Sustain inquiry that moves to resolution
7. Ensure assessment is congruent with intended processes and outcomes

The second, fourth and sixth principles reflect the need to plan for collaborative inquiry. Parenthetically, the first, third and fifth principles reflect social presence issues, and notwithstanding their importance, we will focus on teaching presence as it relates to cognitive presence (i.e., the primary focus of the Shared MC construct). With regard to planning for critical reflection and discourse, it is extremely important to provide a metacognitive map of the inquiry process (CP) so participants are aware of and understand the dynamic of purposeful inquiry (fourth principle). This will create an important awareness of their role in the progression of their activities and tasks as well as provide greater assurance of efficiency and effectiveness in managing and achieving intended learning outcomes. It has been shown that awareness of the type of contribution encourages students to reflect on their thinking, explore metacognitive regulation, and encourage productive activities (Garrison, 2017). The practical advantage of shared MC awareness is to facilitate management of the inquiry process and enhance timely progression through the inquiry phases without stalling on any one of the phases.



The primary research question beyond confirming the construct should be to study how to develop awareness and management of shared MC; and how this awareness can be used to achieve deep learning outcomes. Any number of practical research questions evolve from an awareness of shared MC. For example, from a teaching presence perspective we could explore the effect of shared metacognitive awareness on cognitive and social presence; or does shared MC awareness expedite the inquiry process (cognitive presence construct) compared to a control group? Similarly, with regard to social presence, does shared MC awareness enhance open communication through an understanding of the integral role of reflection and discourse? There are any number of specific examples of research questions that link shared MC awareness to practical inquiry, learner characteristics and disciplinary demands. All of these questions can be studied quantitatively using the Shared MC and Col questionnaires (Appendix 1 & 2).

The following cognitive presence issues (see Garrison, 2017) associated with design and organization are also a source of worthwhile shared MC research questions awareness and management of a community of inquiry.

- expectations of assessment of cognitive development,
- organization and limitation of curriculum,
- selection of appropriate learning activities,
- provision of time for reflection,
- integration of small discussion groups and sessions,
- provision of opportunities to model and reflect upon the inquiry process,
- design of higher-order learning assessment rubrics.

## Facilitation

The next logical area for exploration relates specifically to the TP responsibilities of implementation and support of shared MC. Here again we return to the Zepeda et al. (2018) article. They observe “that the high-conceptual growth classrooms had more metacognitive supports for personal knowledge, monitoring, evaluating, directive manners, and domain-general frames than the low-conceptual growth classrooms (p. 13). More specifically, they state that “Teachers in classrooms with high-growth scores on a conceptual learning assessment used more metacognitive talk than teachers in classrooms with low-growth scores” (p. 1). This finding supports the argument that metacognitive talk concerning the inquiry process and task goals could have enormous value from a pragmatic perspective in understanding and promoting shared MC in a collaborative learning environment. As such, communities of inquiry have enormous potential to support shared MC through critical reflection and discourse that includes questioning, feedback and direction.

Shared MC research questions that arise specifically from issues of facilitation begin with relevant, puzzling and challenging questions and discussion that precipitate reflection about and management of the inquiry process. Research questions might explore any number of questions associated with the effectiveness of teacher facilitation that encourages shared MC awareness and management. Students taking control of the inquiry process also need to be studied in terms of the effectiveness of the learning process and outcomes.



More specifically, what is the effect of student moderated discussions on shared MC (self and co-regulation). One interesting approach here would be to assess the effectiveness of participants regularly identifying the nature of their contributions from the perspective of the phases of inquiry and moving discourse forward. More complex questions relate to assessing the balance of self and co-regulation of learning with regard progression of inquiry and quality of learning outcomes. Research questions exploring self and co-regulation of learning go to the essence of shared MC and the potential of a community of inquiry.

### **Direct Instruction**

Direct instruction is the third category of teaching presence that needs to be explored from the perspective of shared MC. Direct instruction from a metacognitive perspective should be approached with the intent of improving inquiry competence through the awareness and management of the collaborative inquiry process that leads to higher-levels of academic achievement. Direct instruction is productive when it stimulates reflection about the ideas as well as the learning process. Deep and meaningful learning depends on diagnosing misconceptions and formative evaluation where participants collaboratively shape the inquiry dynamic. This often means intervention on the part of the instructor of record by presenting relevant content and regulatory arguments that can guide an efficient inquiry dynamic. At times this may require an intervention to provide a needed metacognitive perspective. Direct instruction is an important teaching presence responsibility to support the development of shared MC. At the same time research has shown that too much direct instruction will seriously limit metacognitive reflection and discourse. The point is that students must have the responsibility and control to individually and collaboratively monitor and manage the inquiry process that best facilitates deep and meaningful learning. This requires a delicate balance where the situation may call for learner control, while at other times the discussion may need direction or be brought to a close with awareness of constraints that restrict developmental progress. Direct instruction must encourage participants to not only collaboratively look deeper into a topic but understand metacognitive self and co-regulation of the inquiry process (i.e., shared MC monitoring and management).

Shared MC research questions associated with direct instruction relates to when and how to effectively and efficiently enhance metacognitive awareness management responsibilities. Research needs to explore the positive and negative influences of direct instruction on metacognitive awareness and management of inquiry and approaches to learning. For example, what kind of direct interventions stimulate discourse that will enhance MC awareness and move the inquiry process forward; and conversely, when does interventions restrict development of inquiry? When responding to specific questions we need to understand how to use this as an opportunity to encourage further reflection before providing answers that risks curtailing reflection and discourse. Also, an important research question is when is it advantageous to step back to get the big picture of the inquiry process and assess if a new tactic is warranted.

### **Assessment**

A final area associated with shared MC implementation and support is associated with assessment that should facilitate focus and sustainability of collaborative inquiry. It is well known that assessment can have a



significant impact on how students approach learning, especially with regard to encouraging personal and shared responsibility and control of the inquiry process (self and co-regulation). Sustained, formative evaluation is required to address the complexity of the development and delivery of an online and blended community of inquiry. At the end of a course it is often appropriate to extract key concepts, assess the inquiry process and direct students to further learning challenges. This is important from both a cognitive and social presence perspective. Summative assessment can create a sense of accomplishment, offer direction for further study, and provide a record of achievement. Socially it is an opportunity to have some closure and a sense of accomplishment. Finally, it is only through rigorous and systematic assessment and evaluation research that educators and administrators will be able to develop an understanding of the complex issues associated with judging the worth of the educational experience.

Shared MC research questions associated with assessment will focus on formative learning feedback that informs individuals and the group how they could improve their approach to learning and intended outcomes. The goal is to create an environment for thinking and learning collaboratively based on authentic and constructive feedback.

## Conclusion

In a modern connected society learners must be cognizant of the process of thinking and learning collaboratively. A major part of this is an awareness and understanding of shared metacognition as constituting a fusion of self and co-regulation responsibilities. Students should be provided opportunities to manage and monitor their learning activities if they are to judge the success of these strategies and tactics. That is, students need to be aware of their thinking and that of others to effectively regulate thinking and learning critically. This awareness will go a long way to move discourse beyond the early exploratory phase and move the discourse on to the integration and application of new ideas and concepts. Shared metacognitive awareness and regulation is developed through activities that are not overly scripted and shared MC is developed through distributed teaching presence.

Finally, two invaluable tools in the research into the implementation of shared MC in a community of inquiry are the Shared MC Questionnaire combined with the CoI Questionnaire. Both instruments have been validated and are attached (see Garrison, 2017 for further description).

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### **Appendix One: Shared Metacognition Questionnaire**

*When I am engaged in the learning process as an individual: SELF-REGULATION*

- I1: I am aware of my effort
- I2: I am aware of my thinking
- I3: I know my level of motivation
- I4: I question my thoughts
- I5: I make judgments about the difficulty of a problem
- I6: I am aware of my existing knowledge
- I7: I assess my understanding
- I8: I change my strategy when I need to
- I9: I am aware of my level of learning
- I10: I search for new strategies when needed
- I11: I apply strategies
- I12: I assess how I approach the problem
- I13: I assess my strategies

*When I am engaged in the learning process as a member of a group: CO-REGULATION*

- G1: I pay attention to the ideas of others
- G2: I listen to the comments of others
- G3: I consider the feedback of others
- G4: I reflect upon the comments of others
- G5: I observe the strategies of others
- G6: I observe how others are doing
- G7: I look for confirmation of my understanding from others
- G8: I request information from others
- G9: I respond to the contributions that others make
- G10: I challenge the strategies of others
- G11: I challenge the perspectives of others
- G12: I help the learning of others
- G13: I monitor the learning of others

*5 point Likert-type scale*

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

## Appendix Two: Community of Inquiry Survey Instrument

### Teaching Presence

#### *Design & Organization*

1. The instructor clearly communicated important course topics.
2. The instructor clearly communicated important course goals.
3. The instructor provided clear instructions on how to participate in course learning activities.
4. The instructor clearly communicated important due dates/time frames for learning activities.

#### *Facilitation*

5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.
6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
7. The instructor helped to keep course participants engaged and participating in productive dialogue.
8. The instructor helped keep the course participants on task in a way that helped me to learn.
9. The instructor encouraged course participants to explore new concepts in this course.
10. Instructor actions reinforced the development of a sense of community among course participants.

#### *Direct Instruction*

11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.
12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.
13. The instructor provided feedback in a timely fashion.

### Social Presence

#### *Affective expression*

14. Getting to know other course participants gave me a sense of belonging in the course.
15. I was able to form distinct impressions of some course participants.
16. Online or web-based communication is an excellent medium for social interaction.

#### *Open communication*

17. I felt comfortable conversing through the online medium.
18. I felt comfortable participating in the course discussions.
19. I felt comfortable interacting with other course participants.

#### *Group cohesion*

20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
21. I felt that my point of view was acknowledged by other course participants.
22. Online discussions help me to develop a sense of collaboration.

## **Cognitive Presence**

### *Triggering event*

23. Problems posed increased my interest in course issues.
24. Course activities piqued my curiosity.
25. I felt motivated to explore content related questions.

### *Exploration*

26. I utilized a variety of information sources to explore problems posed in this course.
27. Brainstorming and finding relevant information helped me resolve content related questions.
28. *Online discussions were valuable in helping me appreciate different perspectives.*

### *Integration*

29. Combining new information helped me answer questions raised in course activities.
30. *Learning activities helped me construct explanations/solutions.*
31. *Reflection on course content and discussions helped me understand fundamental concepts in this class.*

### *Resolution*

32. I can describe ways to test and apply the knowledge created in this course.
33. I have developed solutions to course problems that can be applied in practice.
34. I can apply the knowledge created in this course to my work or other non-class related activities.

### *5 point Likert-type scale*

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree





## Degrees of (un)ease: Emerging Relationships between Online Programme Management Companies and University Stakeholders in an Unbundling Landscape

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### Abstract

Many higher education institutions are moving to provide degrees and qualifications in online modes. This has been motivated variously by reasons including to increase access and flexibility for diverse student groups, an imperative to innovate, and the lure of increased numbers of students and concomitant revenue. While many universities started with Massive Open Online Courses (MOOCs) as a way of experimentation with online education, increasing numbers of traditionally residential universities are now offering credit bearing online qualifications. This paper draws on data and findings from a 26 month research project “The Unbundled University: Researching Emerging Models in an Unequal Landscape”; part of which explores the emergence and nature of business relationships between universities and private companies to provision online education in South Africa and England. This paper discusses how these relationships are perceived and experienced by key university stakeholders and executives of private companies in both countries. Offering fully online qualifications involves significant capacity building and investment, and universities are engaging with the increasing numbers of private companies that offer services to manage their online programs. These companies are often known as ‘edu-businesses’, ‘enabler companies’ or most commonly Online Programme Management companies (OPMs). Unbundling offers opportunities for multiple stakeholders to be drawn into educational provision. To date, these have largely been private companies; while public universities have always used suppliers and dealt with vendors, new types of relationships and models of engagements, including joint ventures, have emerged in recent years as OPMs have come into existence. In some respects both are still feeling their way. Drawing on interviews with senior leaders in universities and senior executives in private companies, this paper considers alignments, contradictions and tensions in the way these two groups perceive and discuss unbundled educational provision.

**Keywords:** Higher Education, Online Education, MOOCs, OPM, Unbundling



## Introduction

Many universities are expanding their capacity for offering online programmes at both undergraduate and postgraduate levels. While this sometimes builds on experiments and implementations of technology enhanced delivery of education over a number of decades, moving to offering fully online courses and programmes represents a significant shift in emphasis. For most traditional universities, and arguably for many distance education institutions, this requires a new way of doing things as well as new types of capacity and substantial investment. Capacity development can happen largely through in house growth where the expansion of existing inhouse resources may include the employment and deployment of new staff, systems and tools while at the same time buying in quite specialist services, specifically those which are not considered core business. The alternative is engaging a private company which specialises in servicing universities to develop, market and manage particular types of online programmes, often within a formal partnership arrangement. Whichever way the expansion of online education is provisioned, universities are forced to think through, engage with and assess the implications of new business models.

In educational provision, unbundling has manifested in different ways in different education contexts. In some contexts unbundling is primarily perceived as credit accumulation, credit transfer, and, more recently, micro credentials such as nanodegrees or micromasters while in others it is currently viewed as the disaggregation of learning into smaller parts which offers, in theory at least, opportunities for Higher Education institutions to separate traditionally integrated components and reimagine new flexible offerings. Drawing on data and findings from a 26 month research project “The Unbundled University: Researching Emerging Models in an Unequal Landscape” (Swinerton et al., 2018), this paper explores the emergence and nature of business relationships between universities and private companies to provision online education in South Africa and England. The focus is on how these relationships are perceived and experienced by key university stakeholders and by executives of private companies.

This paper addresses the questions:

1. What are the rationales that senior university leaders and OPM executives provide for online courses/programmes and concomitant business arrangements?
2. What are the alignments and contradictions regarding the `rationales` of these key stakeholders?

## Literature

While the concept of unbundling has recently emerged as a topic in higher education research (Gehrke and Kezar 2015; McCowan, 2017), particularly in relation to institutional management and policy (Robertson and Komljenovic 2016; Komljenovic and Robertson 2016), much of the literature on unbundled educational provision is conceptual. Critical perspectives relate for example to the predicted demise of the holistic services offered by a university (McCowan, 2017) or to the austerity environment which purportedly gives rise to unbundling (Newfield, 2019). Robertson and Komljenovic (2016) conceptualise partnerships between public universities and private companies as “market making”, while a recent paper by Komljenovic (2018) investigates strategies of private companies selling services to universities who are acting as buyers. Lawton et al. (2013, p. 23) consider unbundling as ‘... the de-linking of teaching provision from qualifications gained’ while Gehrke and Kezar refer to it as ‘pertaining to the differentiation of university and faculty tasks’ (2015, p.93). MacFarlane applies unbundling to academic roles (2010, p.464) whereby ‘... academic work is being subdivided into specialist functions’. Our interest is to look more closely at the unbundling of educational provision mediated by digital technologies and examine relationships between universities and private companies for new forms of educational provision, particularly in the form of online courses and programmes looking at both the who (is doing the unbundling) and why (reason and rationales).

The focus on the role of private companies takes place against a backdrop where the nature of teaching and learning provision is being reshaped by forces including marketisation, digitisation, and austerity climates. These developments are reported in “grey literature” from industry, education consultants or specialist higher education media interested in tracking this new phenomenon (Czerniewicz & Walji, 2019). In particular, the emergence and activities of Online Programme Management companies (OPMs) has garnered particular interest, while the convergence of MOOC providers and OPMs provides a link between a particular type of market-led education provision (Hill, 2018). Given that many universities can and do unbundle their provision through partnerships with OPMs, offering MOOCs or credit-bearing courses or programs, empirical research is needed to understand the nature of these developments.

## Methodology

This paper draws on interviews with two sets of stakeholders: Eight senior leaders in English and South African public universities (four and three respectively) and six senior executives of OPMs servicing both countries. All the university leaders cited in this paper had been approached by an OPM or was currently in an OPM relationship. Both sets of stakeholders were asked questions that followed broadly similar lines, although the semi-structured nature of the interviews meant that respondents also pursued conversations



that spoke to their context. The interviews were analysed for emergent themes. Selected quotations have been chosen to be broadly reflective of common views and differences across stakeholders. Analysis of the interviews focussed on looking at alignments and contradictions between the reasons the two parties gave as rationales for unbundled arrangements and relationships.

## Findings

The interviews sought to understand reasons and rationales for the emergence of unbundled relationships between universities and OPMs. Five key reasons emerged through analysis of interviews with senior leaders and with OPM CEOs and which in response to the research questions surfaced reasons and rationales as well as alignments and contradictions. These have been analytically structured under two main themes: i) Reasons for developing online education provision and ii) Reasons for relationships.

### Reasons for Developing Online Provision

#### *Meeting and Championing Students' Needs*

One strong reason articulated by both parties expressed for developing online education was that it was a way of meeting particular students' needs and requirements. As one senior leader in a South African university remarked: "once you've got something good online you can extend it to the population of students that you don't have on campus because the campus is full" (University leader A). This reason suggesting that online provision is a way of extending the campus was expounded upon by another university leader, who was more specific about how online modes could accommodate students' life circumstances, saying: "Others who learn and earn, ... or work and earn, they want a different type of experience – so we're differentiating between two; a totally online experience..." (University leader E).

In a similar vein, a senior executive in an OPM referred to meeting students' needs through digital technology: "There are ways and means to bring technology to them [students], so that they can be successful at what they do and every student ... will have a very high level of engagement" (OPM 3). Interestingly, OPM executives were effusive about the services that they provided to students and in some cases saw themselves as needing to push university academics to think of the students' needs:

We're doing lots of fantastic stuff with the students and we're trying to expose them to real world technologies, that they would use out in the real world. So ...that's what we're getting our faculty to think of when they are writing the courses, is – is keeping it real and – and that's ... speaks to one of my kind of passions around authentic assessment for students. Just because we're delivering it online, keeping it real for the students. (OPM 4)



Another OPM executive centred student needs as a major impetus: “So our decisions all revolve on the student, and we know what we do for our students, we help them build competence and confidence ... the competence is recognised” (OPM 5).

Tellingly these last two quotes indicate a sense of ownership over students and academics; the Senior Executive of OPM 5 refers to ‘our student’, while Senior Executive of OPM 4 goes further to refer to ‘our faculty’. There were a number of instances where OPM executives considered the universities as being out of touch with what students really needed: “as we move into a world where there is far more choice and far more kind of competition,...that is forcing universities to re-evaluate what they represent and how they do ultimately demonstrate a return to the learner” (OPM 2). While the discourses regarding using online provision to meet student needs from both senior leaders and OPM executives showed some alignment, it was striking that OPM executives further claimed that they were particularly adept at understanding and serving students, and insinuating that public universities were out of touch with the changing times.

#### *Increased Income Opportunities*

That online learning was a potential source of increased income and a business opportunity was an area of alignment for senior university leaders and OPM executives. Senior university leaders did not shy away from talking about the potential for increased income as a reason for expanding online learning:

I can't see any reason not to use what resources we have to generate as much money as we can ... as long as it's going to promote the ... mission of the university. I would strongly encourage online learning ...if we can make a profit. (University leader A).

Another was also clear about differential pricing for these online students:

“you can run it at a profit, ...because you're speaking at a ... different student cohort... willing to pay” (University leader F).

Unsurprisingly, OPM Executives' rationale for income generation was tied to decisions around which universities to work with:

you need to have university partners where you have a brand that can sustain a relatively high price in order to make the business model work. So if you've got a brand that can't sustain a good price and then you're taking the revenue share split between both parties and, you know, you're then putting in all the cost that we invest (OPM K).



One OPM executive went further in ascribing profit-making imperatives to both parties:

“I almost think that kind of the public/private thing can – is almost blurred and how do you define what is a public institution and what’s a private institution? At the end of the day, they’re all out to make money. Universities obviously have to have a profit somewhere, so that they can make – put buildings up and that’s the same for us at [name of company]. We – we need to do the same. We’re in the private sector, we’re a business, we’re obviously there to make money, but universities are the same now” (OPM 4).

While income generation via online modes was a clear aim for both senior leaders and OPM executives, there was discomfort expressed by university leaders for whom this arrangement might be a necessary evil. A senior leader reflecting on why their university had decided against an OPM offer said that “for them [the company] it was .. a profit driving process. Our strategy is ... not necessarily to make profit because this university is not a profit-making institution” (University leader E)”. Another senior leader saw the profit-making imperative as antithetical to access issues:

Listen, this online stuff is about money. It’s not about reaching more people. The party line is we want to expand access and reach more people but no, that’s not what’s going on. It’s third stream income because all South African universities are in crisis (University leader G).

### *Meeting Industry Needs*

There was a difference of opinion regarding the need to meet industry needs through online provision, with this rationale prominent in the interviews with OPM executives. Indeed, they considered themselves as speaking on behalf of industry by pointing out current problems with what universities were producing. One OPM executive questioned the value of university provision in general remarking: “we still produce more graduates in the human sciences, in the humanities ... disproportionate to the needs of society, or industry” (OPM 6), while another remarked “the demands are there from the employer base to, say, train people in a different way. Are your degrees still actually fit for purpose?” (OPM 3). An OPM executive went as far as to say “We’re definitely [going to] see more business involvement in the programmes, and that’s, you know, a very, very necessary thing, I think (OPM 1).

However the OPM’s role in brokering university-industry partners was sometimes disputed. One English university leader stated that current practice already meant that “The curriculum, whenever curriculum is reviewed or rebuilt it is required that academics consult with industry” (Senior University leader H), while another senior leader in an English university acknowledged that while “employers will have more of a say in



curriculum in the future, but I wouldn't expect [OPM] partners to, to be doing that. I'm not sure what they could add to a curriculum really" (University leader C), suggesting misalignment with OPM led assertions about the relevance of the university curriculum.

Of the three main reasons for why universities might consider expanding online provision, the desire to reach and serve students was expressed by both groupings, although OPM executives felt that they better understood the needs. While the potential for income generation was important to both parties, its dominance as a factor differed. There was least agreement that online provision should serve the needs of industry better, with OPMs considering that current university offerings were deficient in some way. In all these cases OPM executives expressed more confidence when discussing and articulating these reasons.

### **Reasons for Relationships**

Another set of themes emerged around reasons and rationales for OPM and university relationships for the provision of online education. Two main rationales: university capacity constraints and the need to be entrepreneurial emerged as dominant.

#### *Expertise*

Senior university leaders also spoke of areas of specialist expertise that OPMs could provide remarking: "there are some things that we as a public university are not good at and that they as a private company are very good at" (University leader A). Expertise was (unsurprisingly) echoed in the views from OPM executives when reflecting on what particular skills they brought. In relation to student enrolment strategies, one senior executive remarked: "the relationship, by the way, between recruitment and marketing is beautiful. That's one of the things that you can do in this sort of company that you can't necessarily do in a university" (OPM 1), and they further considered the company extending the university's abilities: "you can potentially do more in the acquisition and the preparation of students, and then you can potentially do more upon graduation ... So you become an even greater extension of the university than you already at the moment" (OPM 1).

When describing the allocation of expertise, the language of partnership was deployed by a Senior Executive to indicate the bringing together the particular strengths of both parties: "through partnership, we can move together by combining respective strengths. We can move faster, we can be more agile ...we can play to respective strengths and... build something that's stronger than the sum of the individual parts" (OPM 2).

Another OPM executive went further to suggest that OPMs act as catalysts for universities to consider innovations such as new modes:

I think it takes someone like a private provider to say you can do as well as you do in your classroom if you are in a different modality? Going online does not mean lower quality. It doesn't mean less engagement. In fact, the opposite is true. You have an opportunity to actually be better and to engage more because technology allows with that, for that engagement (OPM 3).

While there was little disagreement in the general sentiment about OPM partnerships strengthening universities' ability to offer online education at this point in time, one South African university partner did suggest that the capacity building achieved would give choice to a university to offer in-house provision in the future: "we don't have the capacities or the infrastructure to do this alone, but that clause is inserted there ..., so that in three (-) five years, we have the capacity to go completely in-house ...if we desire." (University leader F). This suggests an underlying unease about long term dependency on a private company. Actual experiences also moderated some enthusiasm about working with an OPM with one senior leader reflecting on a recent experience railed against an interaction, recounting "they have a preconceived notion of [what] they want to impose .. on the university .. you've got to fit with them. No, I don't like that" (University leader E). An English university leader in a mature partnership with an OPM, while deeming it generally successful, saw a different future as the field evolves, "I think different types of partnerships will be formed and not just OPM-style partnerships. I think there'll be more technology partnerships, more partnerships with employers and government organisations" (University leader C).

University leaders, while acknowledging expertise brought by OPMs, often had different visions of where the future might lie; while OPMs saw a future whereby they became an extension of the university (and therefore presumably indispensable), university leaders often spoke of choices in the future including growing expertise in house as well as exploring new forms of (non OPM) relationship.

### *Entrepreneurship and Risk Taking*

Another theme that emerged around unbundled arrangements for online provision was the notion of shared risk and entrepreneurship. University leaders commented on the nature of risk and the desirability of it being shared: "they [private companies] must be willing to make investments, and for those investments they will get a return, but then you must also be able to get a return" (University leader F). Another leader spoke about a particular business model with an OPM: "it is the right company to partner with because it enables us to enter the market without having to go through all the pitfalls" (University leader B). A university leader described the implications of the entrepreneurial endeavour on enrolment patterns "when you're in a revenue share arrangement with a partner, you can't have [just] .. thirty students a year and expect that the programme is [going to] be successful for both parties" (University leader C). However, arrangements were also liable to change with one university leader in a mature OPM partnership having renegotiated the





arrangements so that: “It’s a much more equal share of the risk and the revenue. So we are putting up – we are investing more in developing programmes and what have you” (University leader D).

In relation to risk, OPM executives tended to give detailed explanations into the rationale for the particular business models stressing their high level of risk:

We would never expect any partnership to even reach break-even until year – about three to four years into a partnership. So we’re investing, investing, investing, all the way through, without the security of a return because it ultimately comes down to how successful the partnership is. ... we kind of succeed together and we fail together (OPM 2).

This exposure to risk also allowed OPM executives to make strong arguments for assuming control over key decisions:

We cover everything from picking the programmes to the price, to the marketing strategy and the campaigns and the student support and the curriculum structure and the course design and..., the recruitment process and all that kind of stuff. ... we are interested in the reputation of our... sector and... if our university partner suffers ... a weakening in their reputation, then that's [going to] affect the sector (OPM 1).

While both parties spoke about shared risks, university leaders spoke of the partnerships as mitigating risks, while OPMs seem to suggest that they were taking considerable risks through investing in a university’s programmes or brand. This subtle difference in emphasis of risk reflects the relative positions of power with OPMs claiming a metaphorical upper hand in relation to providing the expertise and investments. It also provided OPMs with a reason for justifying high profit shares and long-term multi-year contracts.

## Conclusion

This paper gives insights into a particular type of university unbundling and allied business model - where a university’s expansion into online learning is unbundled and then rebundled, so a university and an OPM together provide various services to design and deliver an online course or programme to a market for profit. In this sense the unbundling enables a particular type of online provision. Here, the rhetoric of unbundling is not so much about a no-frills version of an educational experience to give students more choice or reduce end user costs (McCowan 2017) nor is the rationale for this form of unbundling to enable students to pick and choose courses to construct their own pathways or programmes. Rather this form of unbundling points to new forms of business models for provision of online education via a university-OPM arrangement that aims to attract those students globally who can afford offerings in a fully online format.



OPM executives were more confident in their abilities to lead and guide universities and were surer of the market for online education. This language and these assertions were common across OPMs indicative of the global nature of these businesses with the interviews revealing the types of business practices designed to establish trust and foster relationships through networking and exercise of social capital as identified in other studies (Komljenovic, 2018). They also showed considerable confidence when speaking of ‘our students’ and ‘our faculty’, which gives an interesting insight into self-perceptions of their roles notwithstanding that they relied on the university’s brand for the success of the programmes or courses. In these relationships they saw themselves as a central player amongst the various parties.

Given that universities however seemed to be more unwilling profit-seekers, there were manifestations of misalignments and contradictions where senior leaders sometimes expressed reservations about some OPM practices as being rigid or where there was some discomfort about types of functions that OPMs were fulfilling. OPM discourses about serving students should also be seen in the light of serving a particular type of student who has the ability to pay and therefore represented a market opportunity.

This paper mainly draws on interviews with senior university leaders who were in OPM partnerships or contemplating doing so and is therefore representative of a subset of universities who are desirable enough to have been targeted by OPMs. This paper provides a window of insight into two particular groups at a moment before such arrangements have stood the test of time. The views of senior leaders who have not considered such relationships, as well as those of academics themselves also need to be understood.

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## Shifting Paradigms: Innovating Learner-Empowered Emergent Technology Integration for Learning on Demand

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### Abstract

The dynamic, exponential growth in emerging technologies requires learners to adopt a mindset that enables them to perpetually and seamlessly integrate appropriate technologies for learning on demand throughout life. *Emergent technologies* (defined as “tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes”; Veletsianos, 2010, p. 33) are rapidly changing the global landscape of learning. These technologies are expediting the transformation of the millennial-old institution of education, enabling: (1) a local State-controlled economy of information scarcity to be replaced by one of worldwide information abundance; (2) the social structure of a teacher-directed knowledge transmission model to become a learner-determined knowledge innovation, curation, evaluation, and sharing model; and (3) the rigidly-defined time/space parameters of formal institutional schooling to become the increasingly mobile learners’ seamless, dynamic, real and virtual world learning contexts. Such profound changes to the socio-political and economic structures in the institution of education, prompted by the increasingly ubiquitous use of emergent technologies, are precipitating a shift in educational paradigms. This paper offers findings from a doctoral dissertation undertaken to determine what educational paradigm best facilitated learners’ perpetual and intentional integration of emergent technologies for learning on demand. A Paradigm Shift Framework was employed to track the relationship between online graduate students’ integration of 16 emergent technologies and their perceptions of what key factors, approach to learning, and paradigm most enabled them to perpetually integrate these technologies for learning. When the study began, all respondents indicated that, on average, they were at the early practice level with the 16 emergent technologies. End-of-study results indicated that there was a significant increase in mastery with these technologies by learners who preferred a perceptual, learner-determined paradigm. Conversely, learners aligning with the traditional behavioural paradigm experienced a slight decrease in their practice level with these technologies by the end of the study.



It was determined that such findings had profound implications for designing innovative learning experiences that maximized student success, not only within the context of formal learning, but also for life-wide and lifelong learning. Another key finding offering a significant contribution to educational stakeholders was the usefulness of the Paradigm Shift Framework for capturing and analyzing existing educational contexts, as well as for choosing or designing future learning contexts that could not only meet the increasingly online and mobile learners' needs, but would also be theoretically and practically cohesive in nature.

**Keywords:** Behavioural Paradigm, Emergent Technologies, Learner-Determined Learning, Online Learning, Paradigm Shift Framework, Perceptual Paradigm

## Introduction

Gros (2016) asserts that *emergent technologies* (or “[t]ools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes”; Velentsiano, 2010, p. 33) are most often adopted from other fields, so integration typically warrants the co-evolution of such technologies with educational practices (Gros, 2016). Veletsianos (2010) concurs, stating that the employment of emergent technologies for learning “may necessitate the development of different theories, pedagogies, and approaches to teaching, learning, assessment, and organization (p. 18).” This creates a conundrum for educators in determining how best to support learners’ capacity to perpetually and reflexively integrate appropriate emergent technologies in this world of dynamically-fluxing technologies and educative practices (Brynjolfsson & McAfee, 2014; Kurzweil, 2005; Moore, 1965/1998, 1975; Wark, 2018).

To assist educational stakeholders in addressing this conundrum, a doctoral dissertation was undertaken. This dissertation explored what *educational paradigm* (defined as “the shared beliefs, theories, and practices, including research practices, associated with a particular educational group or school of thought”; Wark, 2018, pg. 26) most helped online and mobile learners in the study to integrate 16 currently emerging technologies for learning *on demand* (supplied when and where needed or desired by the learner; Wark, 2018). (These technologies included: 3D printing, augmented reality, cloud computing, conversational interfaces, educational game technologies, flipped classrooms, interactive whiteboards, learner analytics, mobile learning, MOOCs, online learning management systems, online social networking, open content, QR codes, tablet computing, and wearable smart technologies.) A critical pragmatic research paradigm, transformative mixed methods methodology, and a Paradigm Shift Framework (Wark, 2018) were employed for conducting this research. Quantitative questionnaires and qualitative interviews derived from this



framework were used to collect data from 12 volunteer students enrolled in two Master of Education in Distance Education (MEd DE) courses during one 2017 semester at an online North American institution.

### *Research Questions*

The primary question used to explore this critical issue was, “What educational paradigm most empowers online graduate level learners to acquire higher levels of emergent technology integration for learning on demand?” More specifically:

1. What are the key institutional, curricular, instructional, and other contextual factors that empower the learners in this study to integrate emergent technologies for learning on demand? Will these perceptions change as they progress through the course?
2. Is there a difference in technology integration levels between the learners in the study who identify a preference for a traditional teacher-directed learning paradigm or a learner-determined one, or who appear to be in the midst of a paradigm shift? If so, what key learner-identified factors are most likely associated with the reported differences?
3. Is there a difference in the amount of scaffolding and learning curve reported by the learners in the study who identify a preference for a traditional teacher-directed learning paradigm or a learner-determined one, or who appear to be in the midst of a paradigm shift? If so, what key learner-identified factors are most likely associated with the reported differences?

### **Theoretical Framework**

A critical pragmatic research paradigm underpins the theoretical, conceptual, substantive, and practical elements of this dissertation. *Critical pragmatism* is “a theory of science that emphasizes the need to apply knowledge to everyday problems based on radical interpretations of liberal and progressive values” (Deegan, 1988, p. 26). It is a marriage of critical theory, pragmatism, and reflective research traditions (Ulrich, 2007b) and is employed in normative research to analyze and alter contexts, outcomes, rationality, power, and ethics (Zack, 2008) to promote equality. This research paradigm was chosen to reflect and amplify students’ perspectives on what key factors, and ultimately, what educational paradigm most empowers learners to *thoughtfully, purposely, and perpetually* integrate appropriate emergent technologies for learning on demand. The study hypothesized that educational stakeholders, including students, are in the midst of a paradigm shift between the traditional behavioural educational paradigm and a perceptual, learner-determined one (Emery, 1981; Hase & Kenyon, 2001, 2013). After examining numerous emergent technology integration frameworks, models, and taxonomies, it was determined that none adequately reflected the integration of emergent technologies for learning on demand from the learner’s perspective (Wark, 2018; Wark & Ally, 2019). Thus, a new Paradigm Shift Framework was developed for this project.

## Introducing the Paradigm Shift Framework

The Paradigm Shift Framework merges the newly-designed Paradigm Shift Model and Omni-tech Taxonomy. The Paradigm Shift Model is introduced first.

### *Paradigm Shift Model*

The Paradigm Shift Model reflects paradigmatic states between a behavioural paradigm/teacher-directed and a perceptual paradigm/ learner-determined approach to learning (Figure 1). The use of a Venn diagram is intended to reflect scholarly claims in some literature (e.g., Garnett & O’Beirne, 2013; Hase & Kenyon, 2013), and substantiated by the dissertation, that learning is an individual, non-linear, messy, and dynamic process (Wark, 2018). P indicates a primarily behaviouristic/pedagogical approach that encourages learner reflection, A indicates a shifting paradigm/andragogical (Knowles, 1970, 1984) approach that aims to promote critical reflection, and H indicates a perceptual/heutagogical (Hase & Kenyon, 2001, 2013) approach that engages reflexivity. Reflection promotes the efficiency and effectiveness of performance (Finlay, 2008; Schön, 1983, 1987); critical reflection requires the individual to analyze existing socio-political powers in relation to new knowledge or experience (Rose, 2013; Smyth, 1992); and reflexivity involves the introspection of self, praxis, and human nature (Freire, 1970/1993; Ryan, n.d., Smyth, 1992). The learner maintains control over their own learning journey when the heutagogical state of self-determined learning is reached. Nevertheless, the learner may opt to learn in P or A environments if the learning outcomes merge with the learner’s perceived learning needs (Wark, 2018).

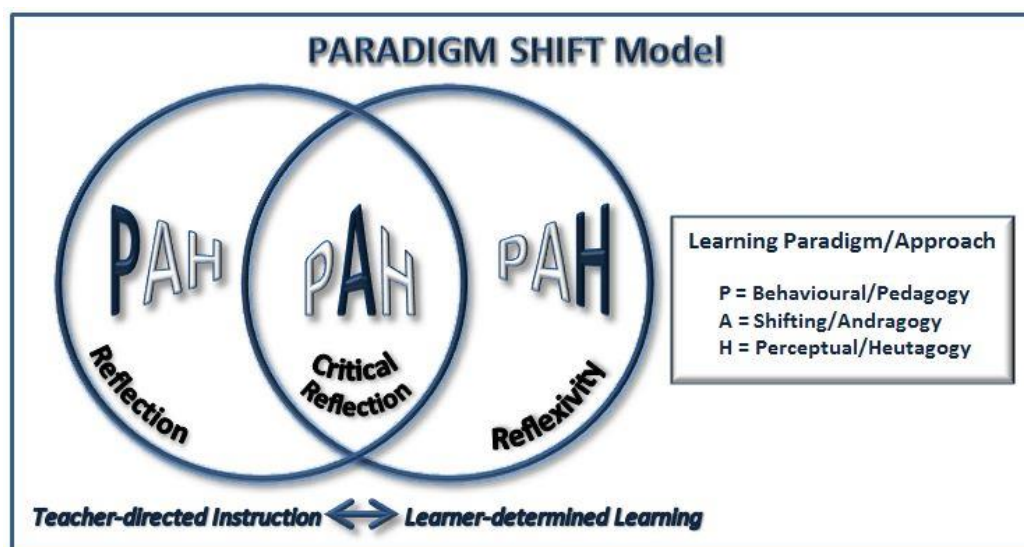


Figure 1. Paradigm Shift Model



### Omni-tech Taxonomy

In Figure 2, the Omni-tech Taxonomy image on the left indicates varying levels of technology integration anticipated in relation to, in the left column, behavioural/pedagogical (P), in the middle column shifting/andragogical (A), and in the right column, perceptual/heutagogical (H) learning environments. In the P environment, technology integration foci are on the acquisition and practice of knowledge, skills, and attitudes. Practice leads to competency in the A environment. In the H environment, the learner develops the transformative capacity to perpetually learn about and adopt a leadership role in technological integration as they deem necessary. While they may participate in P and A learning environments, they retain the power and choice over their own learning (Wark, 2018).

The right portion of Figure 2 offers a more detailed graphic of the transformative learning and leading section of the Omni-tech Taxonomy. Emergent technology is integrated naturally when the H state of learning is realized. As illustrated, the learner’s emergent technology integration experiences and perceptions dynamically influence each other through reflexivity and innate drives to find purpose, gain mastery, achieve autonomy, and innovate within the learner’s holistic, natural, omni-learning personal learning environment (PLE). This learning process dynamically employs instrumental reasoning, rational thought, and creative intuition, thus helping the learner to reflexively interpret experiences and transform perceptions, while simultaneously satiating intrinsic drives for purpose, mastery, autonomy, and innovation.

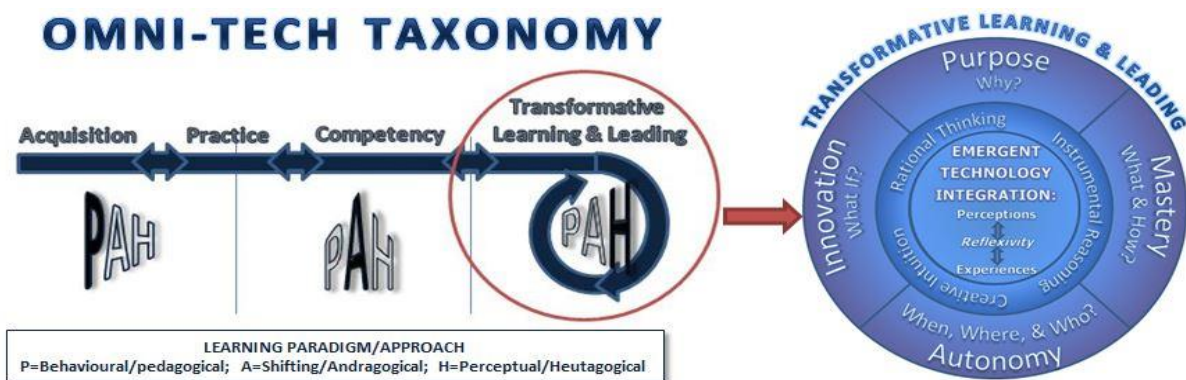
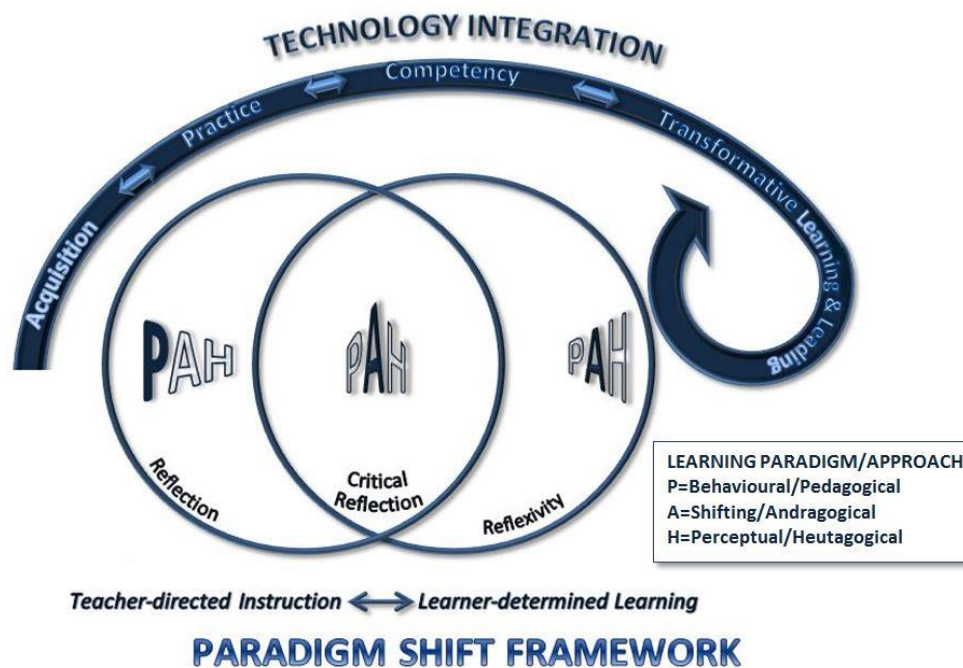


Figure 2. Omni-tech Taxonomy, Illustrating Transformative Learning and Leading Details



### Paradigm Shift Framework

The Paradigm Shift Framework combines the Paradigm Shift Model and Omni-tech Taxonomy to capture the learner’s levels of emergent technology integration within the P, A, and H environments (Figure 3). Briefly stated, the teacher determines what and how technology knowledge, skills, and attitudes are acquired and practiced by the learner in a P environment; assessment reflects efficiency and effectiveness of the learner’s progress. The learner engages with other learners, the instructor, and possibly other experts to facilitate the learner’s growing competency with emergent technology integration for learning in the A environment. Learning how to use these technologies is no longer a major learning outcome; technologies are simply means for facilitating discourse, critical reflection, and other higher-order thinking skills within the learner’s growing learning community (Garrison, Anderson, & Archer, 2001).



**Figure 3. Paradigm Shift Framework, Merging Paradigm Shift Model and Omni-Tech Taxonomy**

In the H environment, the integration of technologies for learning is a perpetual, dynamic, reflexive process in which the learner determines: (1) what is learned, (2) how it is learned, (3) why it is being learned, (4) when and where the learning occurs, (5) who is involved in the learning, (6) how the learning can be adapted for use in novel situations, and (7) what learning outcomes and consequences this technology integration may have on the learner, the environment, and collective humanity. Through this process the learner hones their capacity for transformative learning and leading. It is this framework that binds the theoretical, conceptual, and substantive elements of the dissertation, including the research process and development of the data collection instruments used with study participants.



## Research Methods

A transformative mixed methods methodology was selected for its ability to: (1) translate theory into practice, (2) challenge habituated thoughts, political and social beliefs, and stereotypes, (3) prompt change or reform that inspires emancipation and social justice, and (4) improve practice through research (Creswell, 2012; Finley, 2008; Greene, 2007, 2008; Mertens, 2007, 2009, 2012, 2015). This methodology seemed uniquely suited to capture what key factors, and ultimately, what learning paradigm most enabled learners to perpetually and thoughtfully integrate emergent technologies for learning on demand from the perspective of learners in this study.

Twelve students from two Master of Distance Education (MEd DE) courses voluntarily participated in this study during one four-month semester at an online university in North America. The courses were purposively selected; one merged the theory and practice of online and distance learning with the use of emergent technologies, while the other dwelt upon mobile learning. (The study was precipitated by a pilot study at the same institution with a similar group of respondents. The main goals of the pilot study were to test the instruments, and refine recruitment, data collection, and data analyses processes.)

The theoretical, conceptual, and methodological frameworks, as well as the research questions poised in this exploratory study, guided the development of all research instruments. Seven instruments were used. All 12 student respondents completed the online quantitative pre- and post-term questionnaires, as well as the mid- and post-term interviews. Course instructors completed post-term interviews. Further data about the courses was drawn from the university public course description web pages. The final instrument was the researcher's journal.

NVivo Pro 11 and SPSS v. 23 software programs were used to analyse the data. A second coder was also employed. One quarter of the student interviews were co-coded. Seventeen percent were initially coded in isolation, yielding inter-coder reliability of 92.4% agreement and a Kappa Coefficient of 0.956; as well as an intra-coder reliability of 93.6% and 0.985 Kappa Coefficient. The coders also separately coded the final qualitative scores for each participant, yielding a 93.3% level of agreement.

## Results

This section begins with an overview of student respondent demographics. It then moves on to each sub-question before providing results for the overarching question asked in this study.



## *Demographics*

The study included 35.3% of all students who completed both courses and reflected the gender ratios found in both class settings – 75% of respondents were female, 17% were male, and 8% did not select a gender designation. Forty-two percent lived in large urban centers (population >500,000), and 75% had completed over half of the MEd DE program before participating in the study. Most respondents indicated that the current course was the first one that they had taken during the program on the use of emergent technologies for learning.

## *Question 1*

The first question asked, “What key factors empower the respondents and other learners to integrate emergent technologies for learning on demand? Would these perceptions change as these respondents progressed through the course?”

The top ten encouraging factors list represented 27% of all empowerment units, and over a third of all encouraging units identified by learners in this study. Over half of these top ten empowering units were divided between the instructional use of emergent technologies, being responsible for one’s own learning, and the instructional use of assignments.

The top ten lack of empowering factors list contained eight percent of all empowerment units and 42% of all disempowering units in the study. Over half of the top ten disempowering factors were split between the instructional use of technology, the formal school environment, and the MEd DE program.

Although two-thirds of encouraging mid-term factors were also on the post-term list, the number of units and order of priority of these factors changed. The number of encouraging factors also increased by the end of the term.

## *Question 2*

The second question asked if there was a difference in technology integration levels between the learners who consistently identified a preference for one learning paradigm, or who appeared to be in the midst of a paradigm shift. If so, what key learner-identified factors were most likely associated with the reported differences?



At the beginning of the term, behavioural, perceptual, and shifting paradigm groups indicated that they were at the early practice level with the 16 emergent technologies included in the study. By the end of the term, the behavioural paradigm respondents' level had slightly decreased, the shifting paradigm group's practice level had slightly to moderately increased, and the perceptual paradigm group's level had significantly increased to the early competency level. In examining what key factors were most likely associated with the changes in technology integration levels, it was discovered that the top five factors identified by the behavioral paradigm group had little in common with the other groups. Four of the five factors in the behavioural group list were disempowering; the disempowerment of government changes and instructional use of technologies topped this list.

All of the factors on the perceptual and shifting paradigms' top five lists were empowering. Three factors were the same on both lists. These were the instructional use of technologies and assignments, and being responsible for their own learning. One difference between these latter two groups' lists was the number of units assigned to each factor.

Four of the perceptual paradigm group's factors shared a nearly equal number of units, while there was a significant spread in the number of units between the shifting paradigm group's factors. The other noticeable difference was the inclusion of two meso-level factors (that is, factors controlled by the institution or employer) on the shifting paradigms list. These differences suggest that the shifting paradigms group might have been struggling with taking control over their own learning.

### *Question 3*

The third question asked if there was a difference in the amount of scaffolding and learning curve reported by the learners who identified a consistent preference for one paradigm, or who appear to be in the midst of a paradigm shift. (The second half of this question was addressed in Question 2.)

Those belonging to the behavioural and perceptual paradigm groups strongly disagreed that they required more scaffolding than their classmates, while responses from the shifting paradigms group varied between strongly disagreeing and agreeing with this statement.

Behavioural paradigm group members strongly disagreed, perceptual paradigm group members disagreed, and shifting paradigm group members wavered between disagreeing and agreeing with experiencing a significant learning curve during the term.



### *Main Research Question*

The final, overarching question was, “What educational paradigm most empowers online graduate level learners to acquire higher levels of emergent technology integration for learning on demand?”

The paradigm that most empowered learners in this study to acquire higher levels of emergent technology integration was the perceptual paradigm, as evidenced by the significant increase in the emergent technology integration level by the end of the term among those identifying with this paradigm. These self-determined learners set and achieved personal technology integration goals by employing key empowering factors in their PLEs, thus acquiring an early competency level by the end of the term. For instance, here is what two respondents who adhered to the perceptual paradigm said:

The goal is my own. It was to be able to create something that I am going to be able to use in the workplace. So I guess that I was focused right at the beginning. [Respondent 1]

My goal at the beginning of this course was to be more at ease with mobile technology. I wanted to be using my tablet and cell phone more effectively for learning. I recently bought a tablet about one year ago in preparation for this course. I wanted to learn more about mobile technology and be more efficient with the tool. I wanted to learn more about mobile applications, like creating apps. [Respondent 2]

Conversely, those identifying with the behavioural paradigm felt so disempowered that they could not imagine setting any personal learning goals without the direction of meso- and *macro-level* (that is government level) authorities. To illustrate, when respondents were asked if they set a personal emergent technology integration goal for the term, one respondent who preferred the behavioural paradigm said, “No [I didn’t set a goal because] this isn’t a technology course.” Another respondent gave this reply:

I did not with this course and I was actually a little perplexed by that question just because it’s an online teaching and learning course about online teaching and learning, but it is not really a course specifically about technology. So, it wouldn’t be a course where I would set that type of goal because I am not going to learn about new technologies in it.

### **Conclusion**

This dissertation concluded that the most empowering educational paradigm for learners is the perceptual paradigm. Furthermore, as hypothesized in the dissertation, most respondents appeared to be in the midst



of a paradigm shift. By following each respondent throughout the term, the study was able to confirm what scholars such as Garnett and O'Beirne (2013), and Hase and Kenyon (2013) propose – learning is a dynamic, non-linear, individual process.

The paradigm shift framework:

- Captures the theory, nature, and power of learning;
- Illustrates the dynamic, non-linear nature of learning;
- Identifies the relationship between learning paradigms, learning approaches, and the integration of emergent technologies at individual learner, small group, and large group levels;
- Offers a framework for identifying and enhancing learner-determined integration of emergent technologies in current and desired PLEs;
- Provides a learner-determined emergent technology integration taxonomy, merging innate drives, rational thought, and creative intuition, as well as experiences and perceptions of the natural learner; and
- It may be adaptable to other areas of learning as well.

Limitations and delimitations include government, institution, and faculty controls that prevented study interventions designed to challenge learners' perceptions on learner empowerment and emergent technology integration. The sample size made it difficult to identify outliers or generalize findings beyond similar groups of learners, although critical pragmatists argue that there are no universal truths. Therefore, it is recognized that the framework, findings, and recommendations coming from this study will evolve as new learners and perspectives on learning emerge. Another double-edged sword was the reliance upon respondent self-perceptions. While the study found that some respondents' perceptions did not match other perceptions, this only underscored the need to acknowledge the individualistic nature of learning. Furthermore, according to scholars such as Freire (1970/1993), only those who perceive themselves to be enslaved can emancipate themselves. Thus, it was critical to examine the learners' perspectives on empowerment in this study *in order to understand their realities*. There were also a few instrument shortcomings. For example, there was a limited number of operationalizing statements for the concepts of purpose, innovation, and reflective thought. As well, the emergent technology integration mastery level list was limited and time-stamped, so would need to be reviewed before being used in the future.

There are two main areas of recommendations coming from this study. The first concerns learner-empowered technology integration. Such recommendations include: (1) access to emergent technologies for all educational stakeholders, (2) augment or replace old with current resources and technologies, (3) initiate perpetual stakeholder currency and professional development, (4) make learning relevant; theory, research,



and practice should be blended in all courses, and (5) educational stakeholders should assist learners in setting, reflecting on, and revising personal goals.

In terms of future research, suggestions include: minor changes to some research instruments; recruitment of a statistically-significant number of respondents for another round of study; interventions to challenge perceptions on learner-empowered emergent technology integration, and then measurement of long-term transformative effects; design and research a course based upon literature and findings from this study; and finally, test the viability of the framework for other areas of learning.

This dissertation makes a number of significant contributions to the academic community. It is an inaugural study that merges a critical pragmatic paradigm and transformative mixed methods to amplify the learners' perspective on this critical issue. This work documents the relationship between paradigms, learner empowerment, and emergent technology integration. It offers a Paradigm Shift Framework and recommendations for improving learner empowerment and emergent technology integration. Furthermore, the dissertation provides evidence that learning is an individual, dynamic process. Most of all, this work challenges stakeholder beliefs about learner empowerment & emergent technology integration. In doing so, this dissertation promotes the widespread adoption of a perceptual paradigm that can revolutionize learning, society, and our world.

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## **A Paradigm Shift in ODL: From Disengaged Students to Transformative Learners and Leaders**

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### **Abstract**

A paradigmatic shift in education is being precipitated by dynamic, exponentially-emerging technologies. Eons of information scarcity is rapidly evolving into a new era of information abundance. State-controlled, teacher-directed knowledge transmission is transforming into learner-determined knowledge creation, curation, and sharing. Time- and space-defined formal schooling is being supplanted with the mobile learner's increasingly seamless, dynamic, real and virtual world contexts. The dilemma that educational stakeholders face is in selecting the theoretical framework that can best facilitate the perpetual integration of emergent technologies for learning now and in the future, given the current state of flux that the world of education is in. In keeping with the conference sub-theme, "transformative online pedagogies," this paper employs the Paradigm Shift Model in the theoretical and practical analysis of the: (1) Framework for the Rational Analysis of Mobile Education (FRAME); (2) Bring Your Own Device (BYOD) framework; (3) Pedagogy Wheel; (4) Substitution, Amplification, Modification, and Redefinition (SAMR) taxonomy; (5) Replacement, Amplification, and Transformation (RAT) framework; and (6) Replacement, Amplification, Transformation, and Leadership (RATL) model. The goal of this analysis is to determine what framework, model, or taxonomy can best support the individual online learner's perpetual emergent technology integration needs in the most theoretically- and practically-cohesive, dynamic, relevant, and transformative manner. The analysis concludes that none of the reviewed frameworks, models, or taxonomies reflects the transformative learner-determined paradigm required to help learners flourish in this fluxing world or the nebulous future beyond. The presentation concludes by offering the innovative Omni-tech Taxonomy, which enables educational stakeholders to design and participate in theoretically founded online and distance learning contexts that empower learners to transition from their dependence upon teacher-directed emergent technology integration instruction to becoming self-determined transformative emergent technology integration learners and leaders.

The Omni-tech Taxonomy and the Paradigm Shift Framework make significant contributions to the academic community because they enable stakeholders to adjust traditional focus from the “what” and “how” to the “what, how, when, where, why, and who” of emergent technology integration learning and, in doing so, replace formal learning competency measures with transformative, lifelong and life-wide “capabilities” (defined as “deeper cognitive processes...using competencies in new contexts and challenging situations”; Hase & Kenyon, 2013, p. 25).

**Keywords:** Emergent Technology Integration, Learner-Determined Paradigm, Lifelong and Life Wide Learning, On-Demand Learning, Paradigm Shift Framework, Transformative Learning and Leading

## Introduction

As humans advance technology, technology alters humanity (Wark, 2018). Epochs in human history are precipitated by technological advances that subsequently change the socio-economic structures of societies (Brynjolfsson & McAfee, 2014). In the mid-1960s, Moore identified an exponential growth in the emergence of new technologies; Moore’s Law (1965/1998, 1975) remains true to this day (Brynjolfsson & McAfee, 2014). The age of *singularity* (when humans and machines become one in a perpetual repair and improvement process) is near. Kurzweil (2005) predicts that by 2045, we will be “spiritual machines.” While other experts, like Louis Rosenberg (computer scientist), Patrick Watson (MIT artificial intelligence expert), Jürgen Schmidhuber (artificial intelligence expert), and 373 other artificial intelligence (AI) experts suggest that singularity will occur between 2030 and 2060 (AIMultiple, 2019; Creighton, 2018), there is no doubt that humanity is entering the era of the fourth industrial revolution (4IR; Ally & Wark, 2019a, 2019b).

Butler-Adams (2018) predicts that as humankind enters the *4IR* (defined as “technological developments that blur the lines between the physical, digital and biological spheres,” Morgan, 2017, p. 1), we will not only need the skills to integrate and work with *emergent technologies* (or “[t]ools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes”; Velentsiano, 2010, p. 33) and each other, but must also possess the ability to be flexible, adaptable, problem-solvers who make timely ethical and moral decisions about these technologies. Others, like Brown and Keep (2018), Habanik, Grencokova, and Krajco (2019), Jules and Sundberg (2018), and Morgan (2017) concur, pointing out the growing necessity for learners to hone creative and innovative abilities. While Hakanik et al. (2019) see education as the driving force of innovation in the 4IR era, they also argue that the 4IR “is so challenging that it will mean the end of the traditional education system (p. 48).” Hakanik et al. (2019) foresee



that not only will digital and information communication technology (ITC) skills be essential, but that that AI and other emergent technologies will drastically alter the content and form of education.

The question is - what kind of mindset are learners going to need in order to thoughtfully and purposely integrate emergent technologies *on demand* (supplied when and where needed or desired by the learner; Wark, 2018), given this fluxing world of dynamically evolving technologies and educative practices? In response to this question, the following paper critically examines a number of emergent technology integration frameworks, models, and taxonomies for their ability to assist educational stakeholders in preparing learners for not only surviving, but flourishing in the 4IR.

### **Theoretical Background**

There are two prevalent *educational paradigms* (or “the shared beliefs, theories, and practices, including research practices, associated with a particular educational group or school of thought”; Wark, 2018, pg. 26), based upon disparate epistemologies about human knowledge. Behaviourism subscribes to the notion that the source of knowledge is external and sense-based, whereas the perceptual position argues that the source of knowledge is innate human perception (Atkisson, 2010; Emery, 1981; Hammond, Austin, Orcutt, & Rosso, 2001; Hase & Kenyon, 2001; Hauser, n.d., Keller, 2008; Murphy, 1996; Palaiologos, 2011). These paradigmatic stances are manifested to varying degrees in the learning theories and approaches that have evolved from these notions. The learning approach, pedagogy, most closely reflects the behavioural paradigm, whereas heutagogy (or learner-determined learning; Hase & Kenyon, 2001, 2013) emulates the perceptual paradigm. Andragogy, a learning approach most often associated with adult learners (Knowles, 1970, 1984), marks a shift between these two paradigms. In practice, the most prevalent difference between these theoretical positions and their related approaches to learning is on what educational stakeholder retains the greatest control over learning in a given environment.

The traditional behavioural paradigm is manifested in the factory-based mass education model of the Third Industrial Revolution. The shortage of educational resources and need for a proletariat conditioned for assembly-line work was conducive to a knowledge transmission model. This form of education fostered instrumental reasoning (that is, the “what” and “how” of learning) and reflective practices that focused upon the efficiency and effectiveness of learning (Emery, 1981; Hammond, Austin, Orcutt, & Rosso, 2001; Hase & Kenyon, 2001; Wark, 2018).

Thanks to the advent of emerging technologies, the age of information scarcity is now rapidly being replaced with information abundance. Rather than being passive recipients of elite-sanctioned knowledge, learners are now able to actively create, curate, and share knowledge, as well as consume it. This shift in control over



learning suggests a transition towards the perceptual paradigm, wherein the learner assumes control and responsibility for their own learning in any environment throughout life. Perceptual learning marries instrumental reasoning with transformational learning. (Transformative learning is a dynamic blend of rational thought, involving logic and affective thinking (Adorno, 1951/1985; Kant, 1781/2013; 1784/1997; Vygotsky, 1986), and creative intuition (Peat, 2000), leading to change in perception; Cranton, 1994, 2002; Dirkx, 1998; Mezirow, 1981; Robertson, 1997.) In the perceptual paradigm, the what, how, when, where, what if, who with, and why of learning are addressed (Emery, 1981; Hase & Kenyon, 2013; Wark, 2018).

Aforementioned literature on the skills that learners must possess in the 4IR suggests a need to transition from a behavioural to perceptual paradigm. This conclusion was confirmed by a dissertation study (Wark, 2018) that examined online graduate-level students' perspectives on, and experiences with integrating emergent technologies. Learners in the study who adopted a perceptual, learner-determined paradigm were best able to integrate emergent technologies for learning on demand. Furthermore, during the period under study, three-quarters of the respondents reported being in the midst of a shift between the behavioural and perceptual paradigms (Wark, 2018).

### **Emergent Technology Integration Frameworks, Models, and Taxonomies**

The critical analysis of various emergent technology integration frameworks, models, and taxonomies is facilitated by the use of the Paradigm Shift Model that was designed and tested in the dissertation study. This model is introduced first to facilitate the assessment of the: Framework for the Rational Analysis of Mobile Education (FRAME; Koole, 2009) model, Bring Your Own Device (BYOD; Stead, 2012) framework, Padagagy Wheel (Carrington, 2016), Substitution, Amplification, Modification, and Redefinition (SAMR; Puenterdura, 2006, 2013) taxonomy, Replacement, Amplification, and Transformation (RAT; Hughes, Thomas, & Scharber, 2006) taxonomy, and Replacement, Amplification, Transformation and Leadership (RATL; Hesselbein, 2014) taxonomy.

#### *Paradigm Shift Model*

The Paradigm Shift Model is designed to capture various aspects of learning environments that reflect the behavioural and perceptual paradigms as well as the *paradigm shift* (defined as a change or movement between worldviews; Kuhn, 1962, which is often precipitated by the widespread adoption of new technologies; Brynjolfsson & McAfee, 2014) between these two disparate perspectives (Figure 1). A Venn diagram is used to express the idea that learning is a dynamic, messy, and individual process (Garnett & O'Beirne, 2013; Hase & Kenyon, 2001, 2013), a claim that was substantiated by evidence gathered during Wark's (2018) dissertation.



In this figure, P represents learning environments that primarily adopt a behaviouristic/pedagogical approach to learning. Such environments promote knowledge transmission of a generic, linear curriculum, passive learning, and instrumental reasoning. Reflective thoughts focus upon performance efficiency and effectiveness. The government, institution, and teacher control instructional time, pace, place, content, resources, delivery, and evaluation. Learning officially occurs in the formal schooling context, typically during the learner's younger years.

H indicates learning environments that generally reflect a perceptual/learner-determined or heutagogical approach (Hase & Kenyon, 2001) to learning. Such environments emulate principles of autonomy, diversity, openness, interactivity (Downes, 2010), and responsibility (Freire, 1970/1993). The curriculum is holistic, individualistic, and based upon a learner-determined individual education plan (IEP). Learning merges instrumental reasoning, rational thought, and creative intuition. The learner controls their learning throughout life within their unique personal learning environments (PLEs) with the support of their personal learning networks (PLNs). However, since the learner controls their own learning, they may choose to learn in P or A environments if the learner perceives that the learning outcomes in such environments will meet their needs. H environments foster learner reflexivity: the introspection of self, praxis, and human nature (Freire, 1970/1993; Ryan, n.d., Smyth, 1992), which may lead to learner transformation.

A represents a shift from the P to the H learning environments and characteristics of an andragogical approach (Knowles, 1970, 1984) to learning. In such environments, varying degrees of control between government, institution, teacher, and learner are found in relation to such aspects as program curricula, as well as course settings, timelines and due dates, learning activities, assignments, and grading. In such environments, learners begin to develop higher order thinking skills, as well as to expand their social and professional resource networks (Garrison, Anderson, & Archer, 2001). Learners engage in critical reflection as they analyze their new knowledge and experiences in relation to existing socio-political powers (Rose, 2013; Smyth, 1992).

No learning environment is strictly P, A, or H in nature. The Venn diagram uses varying heights among these letters in each environment to express this notion. The tallest letter represents the most prevalent paradigm and approach to learning in a given environment. The mid-sized letter indicates that a moderate level of a particular worldview and related approach to learning in this same environment. The smallest letter indicates that very little of this worldview or approach to learning would be found in this particular environment. To illustrate, in the left circle of the Venn diagram, there is a tall P, mid-sized A, and small H. Therefore, in this environment the most predominate paradigm and approach are behaviourism and pedagogy. Some A aspects may be present. However, very few, if any H aspects would be found in this environment.



This model is used to help analyze the appropriateness of the following emergent technology integration frameworks, models, and taxonomies for their ability to help learners thoughtfully, intentionally, and perpetually integrate emergent technologies for learning on demand as they enter the 4IR era.

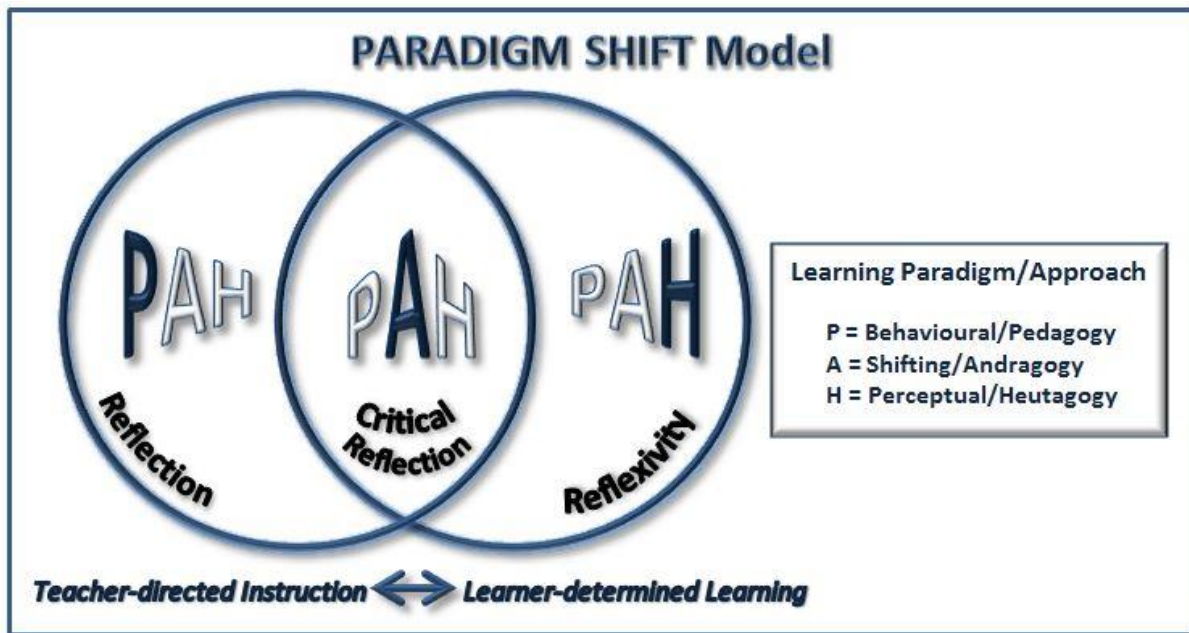


Figure 1. Paradigm Shift Model

#### FRAME Model

Koole describes her (2009) Framework for the Rational Analysis of Mobile Education (FRAME) model as, “as a heuristic... a tool, like a lens, that allows someone to critically examine a given [technological] phenomena” (Koole, 2015). The FRAME model is represented graphically as a Venn diagram with three aspects: Device (D), Learner (L), and Social (S), and four intersects between the aspects: Device Usability (DL), Social Technology (DS), Interaction Learning (LS), and Mobile Learning (DLS). The FRAME is intended to capture and explore the holistic, contextually dynamic nature of mobile learning and work environments (Koole, 2009).

According to a systematic review by Koole, Buck, Anderson, and Laj (2018), the FRAME model was used in 55 research projects since being introduced in 2009. According to these authors, the model was not typically selected for its theoretical value by researchers. Main critiques of the model in the literature that Koole et al. (2018) reviewed included: (1) focus on higher education, (2) limited perspectives on learning contexts, (3) lack of defined mobile learning stages, (4) no guidelines for implementation in formal learning, (5) lack of recognition of macro-level social and cultural barriers, (6) missing criteria, (7) lack of learning approach design for collaborative learning, and (8) a conceptual, rather than practical focus of the model.



When applying the FRAME model to a research study examining online graduate students' use of mobile devices for learning, work, and pleasure, operationalizing the FRAME model uncovered overlaps, missing elements, inconsistencies, and ambiguities in the model (Wark, 2018.) Problems included: “(1) apparent lack of theoretical cohesion between conceptual and descriptive elements, (2) vague, missing, or contradictory definitions, and (3) confusing use of nomenclature” (Wark, 2018, p. 89).

Using the Paradigm Shift Model to analyze the FRAME model, it is concluded that the FRAME model emulates a quasi-learner-centric paradigm, reflecting some learner autonomy within formal, informal, and lifelong learning contexts. Although there is recognition of social, environmental, motivational, and affective factors, the main focus is upon individual cognitive development. It is concluded that the FRAME would be applicable in P and A environments, but not H environments.

#### *BOYD Model*

Stead's (2012) Bring Your Own Device (BOYD) model adapts the FRAME model for the mobile workplace. The intention of the BOYD model is to increase mobile technology integration efficiency and effectiveness while decreasing costs in industrial and corporate settings. The BOYD model reorganizes and clarifies some FRAME model descriptors, while maintaining the overall structure and characteristics of the FRAME model. No known research publications have used the BOYD model (Stead personal communication, March, 2015; Google Scholar search results, June 16, 2019).

Given that the BOYD model focuses primarily upon cognitive development, as well as reflection on the efficiency and effectiveness of performance, this model would be most conducive to P environments and moderately applicable within A environments.

#### *Padagogy Wheel V5*

The Padagogy Wheel V5 (Carrington, 2016) offers a mobile learner-centered approach to learning that merges Pink's (2009) conception of motivation, Bloom's (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) cognitive domain, the Substitution, Amplification, Modification, and Redefinition (SAMR; Puenterdura, 2006, 2013; detailed below) taxonomy, and mobile apps for learning. Expressed visually as a poster, the Padagogy Wheel V5 aims to motivate and transform students, enhance their technology integration skills, and thus promote their ability to achieve 21st century graduate outcomes.

The popularity of the Padagogy Wheel is rapidly increasing among educational practitioners and has been translated into 19 languages (Carrington, 2016). However, no known research studies using the Wheel have been done to date.





Review of the Padagogy Wheel V5 poster and blog postings (Carrington, 2016) does not clarify how mobile apps, learner motivation, cognition, 21st century attributes, and technology integration inter-relate. Furthermore, the breadth of applicability is questionable. The Wheel appears to only facilitate the integration of mobile apps, not other emergent technologies. Nor does it define the contexts or learner groups that the Wheel is intended to support.

Evaluating what environment the Padagogy Wheel V5 might best reflect according to the Paradigm Shift Model is difficult. Confusion over the level of learner control arises when examining the innermost circles of the Wheel, as it appears that Pink's motivators are driven by externally-imposed societal and institutional sanctions. Although the Wheel claims to develop learner *capabilities* (or "deeper cognitive processes...using competencies in new contexts and challenging situations"; Hase & Kenyon, 2013, p. 25) and to transform learners, the poster and related blog do not detail how learners develop capabilities or transform their learning. Lastly, all literature generated in relation to the Padagogy Wheel (Carrington, 2016) is aimed at educators, not learners. The lack of apparent theoretical cohesion between learner capabilities, transformation, and empowerment coupled with no guidance on how to foster such skills on one hand, and the reliance upon teacher, institution, and societal control, as well as a technology integration model that is teacher-directed (as discussed below), suggests that the Wheel is perhaps best suited to P or A environments.

The FRAME model, BYOD model, and Padagogy Wheel merge technological, individual, and social aspects of mobile learning from a broad theoretical and practical perspective, whereas the following taxonomies focus more upon the integration of generic technologies for specific tasks or situational contexts.

#### *SAMR Taxonomy*

Puenterdura's (2006, 2013) Substitution, Amplification, Modification, and Redefinition (SAMR) taxonomy is a hierarchal representation of technology adoption. The lowest level, Substitution, represents contexts in which one technology is used in place of another; the functions remain constant (e.g., using a computer as a typewriter). Augmentation is the second level. At this level some function is enhanced (e.g., computer cut-and-paste options, changing of font styles). Transition between the first and second level is known as Enhancement. The third level is Modification, wherein some technical change allows the redesigning of previous tasks (e.g., adding image and video clips to a Word document). The highest level, Redefinition, includes technologies that introduce tasks that were previously not possible (e.g., using learning management systems for online instruction). Change from the third to the fourth level constitutes Transformation (Puenterdura, 2006).



The SAMR model has become increasingly well-known among corporate and educational entities since its inception in 2000. Yet critics such as Hesselbein (2014), Linderoth (2013), Love (2015), and O’Hagan (2015) question the validity of this taxonomy; no research or academic, peer-reviewed publications or presentations by any scholars, including Puenterdura, are known to exist.

Although Puenterdura (2013) provides a graphic illustrating 21st Century learning encompassing foundational, meta, and humanistic knowledge attributes, he fails to detail the relationship between his taxonomy and 21st Century learning. Nor does he provide explanation of the epistemic or theoretical foundations of the taxonomy (Puenterdura, 2006, 2013). The taxonomy focuses upon technologies and tasks. Thus, “Transformation” in this taxonomy is understood as transformation of tasks, not learners. The taxonomy and related literature suggest a linear progression, which is a curricular characteristic of the P environment. Finally, Puenterdura’s presentations are teacher-centric in nature. Critiquing the SAMR taxonomy within the framework of the Paradigm Shift Model leads to the conclusion that the taxonomy is best suited for use in P environment, as based upon the limited number of publically-accessible resources generated by Puenterdura to date.

#### *RAT and RAT(L) Taxonomies*

The SAMR taxonomy is conceptually similar to the Replacement, Amplification, and Transformation (RAT; Hughes, Thomas, & Scharber, 2006) taxonomy, although scholars such as Hesselbein (2014) and McHugh (2014) claim that the RAT is “less complex, easier to interpret, and thus more practical to use” (Wark, 2018, p. 91). The bottom RAT level is Replacement, wherein one technology is substituted with another to complete the same task. The second level is Amplification; the new technology increases functional efficiency, without significantly changing a task or situation. The highest level, Transformation, enables teaching and learning activities that were not previously possible (Hughes et al., 2006). Hesselbein (2014) renamed the taxonomy, RAT(L), when he added one higher level, Leadership, which exemplifies teachers who help others use technologies in transformative manners.

When examining the RAT and RAT(L) taxonomies in relation to the Paradigm Shift Model, it is noted that both taxonomies are teacher-centric. They also subscribe to a hierarchal, linear notion of learning (Hesselbein, 2014; Hughes et al., 2006). Thus, the RAT and RAT(L) are theoretically and conceptually most conducive to a P environment.

#### *Omni-tech Taxonomy*

The Omni-tech Taxonomy (Figure 2) is theoretically, conceptually, and practically designed to be employed with the Paradigm Shift Model. The left of this graphic reflects the P environment. In this environment, the curriculum and instructional delivery primarily focus upon development of instrumental reasoning skills; the



acquisition and practice of integrating emergent technologies for school activities and tasks. The center of the graphic represents the A environment, wherein technological competence is achieved through practice with emergent technologies as the learner interacts with peers and an increasing range of experts in learning and work environments. Although reflection on the efficient and effective use of the technology is still valued, critical thinking is also encouraged. The right section of this graphic illustrates the H environment, which dynamically intertwines knowledge and skill acquisition, practice, competency, and capacity. In this environment, the learner acquires information from human and non-human resources in their PLE, practices what is being learned, masters learning, and innovatively employs emergent technologies on a perpetual, or “omni-learning” basis (Wark, 2018). The transformative learner models leadership by “actively engaging in their learning, learning from and with others, and sharing what they have learned” (Wark, 2018, p. 92). The paradigm shift occurs when the P or A learner realizes that they alone control their learning path, and then make the conscious decision to step into the H realm and reclaim the natural learner within.

The far right of this graphic provides a closer look at the transformative learning and leading portion of this taxonomy. A learner’s emergent technology integration perceptions and experiences dynamically influence either other through reflexivity, instrumental reasoning, rational thinking, and creative intuition, and intrinsic motivators of purpose, mastery, autonomy, and innovation in an omni-learning process.

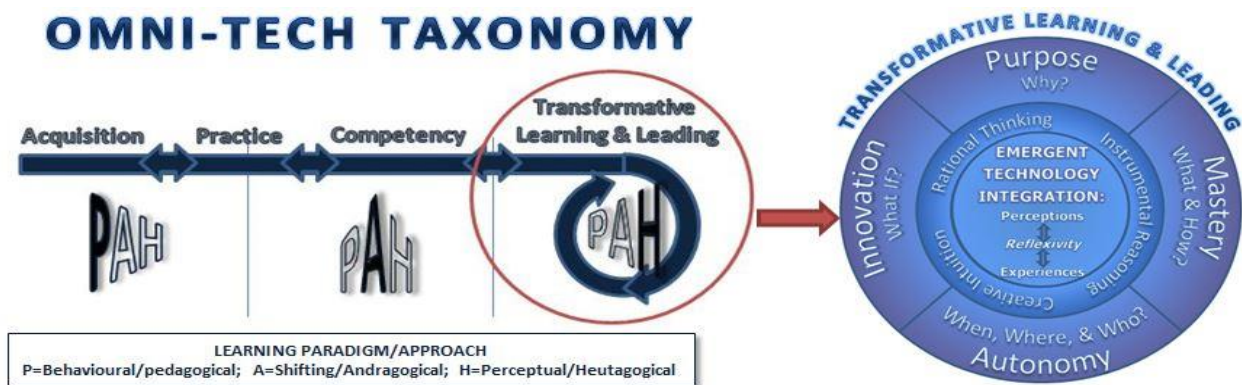


Figure 2. Omni-tech Taxonomy, Illustrating Transformative Learning and Leading Details

## Conclusion

Of the reviewed technology integration frameworks, models, and taxonomies, only the Omni-tech Taxonomy offers educational stakeholders with the necessary framework to design and participate in theoretically-founded online and distance learning contexts that empower learners in a dynamic, relevant, and transformative manner. Employment of the Omni-tech Taxonomy enables learners to relinquish dependence upon teacher-directed emergent technology integration instruction and become self-determined, transformative emergent technology integration learners and leaders. The Omni-tech Taxonomy and the



Paradigm Shift Model make significant contributions to the academic community because they enable stakeholders to adjust traditional focus from the “what” and “how” to the “what, how, when, where, who with, what if, and why” of emergent technology integration learning and, in doing so, replace formal learning competency measures with the transformative, lifelong and life-wide capabilities required to flourish in the 4IR era.

The Paradigm Shift Framework (consisting of the Omni-tech Taxonomy and Paradigm Shift Model) has been tested in one North American online graduate level university to date (Wark, 2018). The results of this dissertation indicated that student respondents who emulated the mindset of the perceptual paradigm and characteristics of self-determined learners significantly increased their level of mastery with the 16 emergent technologies included in the study. In stark contrast, respondents who adhered to a behavioural mindset and displayed pedagogical tendencies noted a slight decrease in their mastery level with these technologies over the same time period. While more research is needed with other groups of learners and contexts to further verify these findings, the academic community now has access to a theoretically, conceptually, and practically-cohesive framework, model, and taxonomy that can help educational stakeholders to not only identify existing learning environments, but to design future environments that reflect desired learning situations and potentially transform educational worldviews as humanity enters this new era.

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## **Aligning Professional Identity with Institutional Culture: The Role of Educators' Digital Fluency in Harnessing the Potential of Online and Technology Enhanced Learning**

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### **Abstract**

Globally, higher education is facing the challenges of a growing and diverse student body and the potential of digital technologies to transform their learning. How digitally fluent educators work to harness technology enhanced learning (TEL) is a defining factor in this. This paper presents an analysis of the power and possibilities of digital fluency. It draws on innovation theory (relating to diffusion of innovations and to acceptance and use of technology), and also on understandings of institutional culture – conceptualised as communities and landscapes of professional practice. It is set against recent doctoral work, comprising a thematic analysis of semi-structured interviews with key, digitally fluent academics in Ireland and of a national (Ireland) policy document; the Digital Roadmap. This analysis led to some rather unexpected conclusions about educators' professional identity and institutional cultures whose alignment (or lack thereof) can profoundly influence practice in online and technology-enhanced learning. Essentially, this research suggests that enthusiasm, educational qualifications, and prior experience of digital technologies are major influences in the development of digital fluency and related professional identity, but that there has been little consistency or predictability in how this happens. Major similarities emerged among participants around how fluency was pursued, but marked variations emerged between those whose career focused on TEL and those who mainly used TEL as part of their instructional practices. Similarly, the research identified differing practices at institutional level regarding the prioritising and fostering of this digital fluency and related professional identity. It also identified very mixed levels of understanding relating to institutional and national policy in the area. The paper presents a discussion of both individual and institutional aspects of identity development under headings relating to career focus; the interrelations of formal and informal learning; the institutional promotion of cultures of development; and reward systems and structures. In this way the paper foregrounds the importance of meaningful alignment of professional identity and institutional culture in harnessing the potential of online learning in higher education. By examining in particular the factors that influence the development of digital fluency among academics and the role of sustainable, supportive institutional cultures in this, it contributes to understandings of the ongoing transformation of online learning both globally and glocally, suggesting some measures for better facilitating and fostering that alignment. This paper aligns with the conference sub-themes of New Skills for Living and Working in New Times and Global Challenges and Glocal Solutions

**Keywords:** Digital Fluency, Digital Roadmap, Professional Identity, Institutional Culture



## Introduction

Internationally, higher education is facing the challenge of massification, of increasing student numbers from increasingly diverse backgrounds (Kubler & Sayers, 2010). Information and communication technologies (ICTs) have an important role to play in education by contributing to access, equity, the quality of learning and teaching and to teachers' professional development. However, the development of online and blended learning depends on the correct mix of policies, technologies and capacities being in place (UNESCO, 2014). Thus, the European Union (EU) through its *Joint Research Centre Institute for Prospective Technological Studies* is strongly supportive of the idea that digital competence is necessary for lifelong learning (Ala-Mutka, 2011). The *2019 Horizon Report* (Higher Education Edition) considers the improvement of digital fluency to be a challenge that higher education institutions can address through faculty development and hiring practices (Educause Horizon, 2019).

In Ireland, the *National Forum for the Enhancement of Teaching and Learning* (Forum) is addressing this challenge. The Forum aims to build on expertise within higher education to support and develop best practice in teaching and learning (NFETLHE, 2014). Following consultation, the Forum produced a report with recommendations, known as the *Principles and First Insights from the Sectoral Consultation on Building Digital Capacity in Irish Higher Education (Digital Roadmap – Phase 1)*. However, there is little research to show how experienced educators gain their experience with digital technologies, how they apply their strategies or the extent to which they reflect on their practice (Baran, Correia, & Thompson, 2013) or on how institutions can facilitate that practice (Porter & Graham, 2016; Reid, 2014). This paper aims to address that gap.

Digitally proficient practices can be described as digital fluency, further defined and discussed below. We draw on the work of the Digital Roadmap (Phase 1) in examining the role of educators' digital fluency in harnessing the potential of technology-enhanced learning (TEL).

## Theoretical and Conceptual Framework

### *Why Digital Fluency? Choice of Terminology*

This paper uses the term digital fluency rather than the more widely used terms of digital literacy and digital competence or the Digital Roadmap's term, digital capacity (Ala-Mutka, 2011; Lankshear & Knobel, 2008; NFETLHE, 2014). In the words of R. L. Wang, Wiesemes, and Gibbons (2012, p. 577) "We maintain that digital fluency could become a vital concept to explore technology-enhanced learning". Fluency represents a greater level of expertise than literacy or competence, similar to fluency in a foreign language (Resnick, 2012). Rather



than there being a digital divide, individuals have a position on the digital spectrum, a continuum from low levels of skills and knowledge towards fluency (Lenhart & Horrigan, 2003). Q. E. Wang, Myers, and Sundaram (2013) define digital fluency as “the ability to reformulate knowledge and produce information to express oneself creatively and appropriately in a digital environment”, while Hsi (2007) defines digital fluency more broadly as “competencies, new representational practises, design sensibilities, ownership, and strategic expertise that a learner gains or demonstrates by using digital tools to gather, design, evaluate, critique, synthesise, and develop digital media artefacts, communication messages, or other electronic expressions” rather than a technological fluency which is data, information, or knowledge-centred perspective. More concisely, Briggs and Makice (2012) define digital fluency, as knowing when to use a tool (or not) and why it should be used, whereas literacy is knowing what tool to use and how to use it. These definitions of digital fluency are consistent with higher order thinking as in Bloom’s Taxonomy. It is at Bloom’s higher levels of thinking that the potential of technology-enhanced learning (TEL) for deep learning as defined by Ramsden (2003) can be realised. Such potential is consistent with the values of higher education (Garrison & Vaughan, 2008).

#### *Landscapes of Practice in Higher Education*

Institutions of higher education can be seen as consisting of multiple communities of practice such as disciplinary, research, administrative, technological and pedagogical communities. Together these communities can be considered as forming a landscape of practice, where no single practice can represent the whole landscape. Educators have differing amounts of knowledgeability or levels of competence and engagement in these communities (Wenger-Trayner, Fenton-O’Creedy, Hutchinson, Kubiak, & Wenger-Trayner, 2015). Where practices meet, there is a potential for misunderstanding and conflict but also for collaboration and innovation, for engagement and self-reflection; thus, creating rich opportunities for learning (Wenger-Trayner et al., 2015). Institutional culture can create an environment which supports such engagement. To benefit from this opportunity practices needs to be consistent with the professional identity of the educators.

#### *Professional Identity*

Professional identity includes elements of technical and interpersonal skills, good reasoning and judgement, critical self-evaluation and a commitment to self-development as well as the embodiment of the attitudes, beliefs and standards of the profession (Trede, Macklin, & Bridges, 2012). Professional identity varies among academics as it may focus on either a disciplinary or a teaching identity (Slowey, Kozina, & Tan, 2014). It may also be influenced by their institutional identity and employment status (Cheng, 2014). Some academics draw on internal values untroubled by institutional culture while others may wish to change that culture (Skelton, 2012).



The professional identity of educators and its relationship to the practices of higher education influences the extent and manner in which educators develop their digital fluency and engage with TEL.

## Research Methods

The higher education workplace provides the context for this research which takes an explanatory case study approach through an in-depth investigation of real educators in the context of their practice (Simons, 2009). Such an approach can explain how and why things happened or the reasons for people saying what they did, focusing on an issue rather than the case (Bassey, 1999; Yin, 2015).

The cases were eight digitally fluent faculty members drawn from a range of disciplines and institutions of higher education in Ireland. Five of the participants were male and three were female. They were selected by intensity sampling (Simons, 2009), using a combination of frequent speakers at educational technology conferences and recommendations from speakers at those conferences. To capture the authentic voice of the participants, the researcher chose semi-structured interviews as a research method (Simons, 2009). Prior to the interviews the researcher obtained exemption from full ethical review and conducted a pilot interview to test his protocol. He also selected a “critical friend”, who could bring another perspective to the research (Costa & Kallick, 1993).

As a practising educational technologist in an Irish university, the researcher was aware that participants might see him as an “insider” and that this could influence their approach to the interviews (Visser, 2001). The interviews were audio-recorded, and the recordings transcribed. The participants were given pseudonyms in the transcripts and any potentially identifying information removed.

The researcher conducted a thematic analysis of the digital roadmap and the interview transcripts. This is an inductive approach where the themes are derived from a detailed labelling or coding of the text (Miles, Huberman, & Saldana, 2014). The researcher coded the interview transcripts using NVivo. The coding process went through many cycles to combine the codes into categories and to derive themes from those categories. These themes helped to address the research question by capturing the essence of the documents (Braun & Clarke, 2006). The outputs of that thematic analysis inform the research findings.

## Findings

Professional identity and institutional culture were identified as the two overarching themes in the analysis of the interview transcripts. The digitally fluent educators’ approach to developing their own expertise,



teaching their students, sharing their experiences with colleagues and engagement with policy are all aspects of their professionalism identified in the interviews. The participants approach to these aspects sometimes differed but was always guided by their own sense of professional identity. These differences were particularly noticeable in their approach to practice sharing with colleagues and their attitudes to policy.

### *Developing Their Own Expertise*

In this study, enthusiasm, educational qualifications and prior experience of digital technologies were found to be major influences in developing digital fluency. This corresponds to the work of Q. E. Wang et al. (2013); R. L. Wang et al. (2012). All the participants were intrinsically motivated to develop their digital fluency and claimed to be largely self-taught, developing their fluency through trial and error in experimenting with technologies. This is frequently how the digitally fluent develop (Resnick, 2001; Resnick & Rosenbaum, 2013). However, most of the participants had also pursued formal qualifications at masters or doctoral level in areas related to TEL and all had attended in-house courses and workshops. These courses and events helped many of them to further develop their digital fluency and professional identity by making professional connections, which often developed into personal learning networks (Dabbagh & Kitsantas, 2012; Hsi, 2007; Veletsianos, 2012). The participants gave experimentation and informal contact as their preferred means of learning, as do similar respondents in Hannon (2008). This suggests that, in terms of the *Unified Theory of Acceptance and Use of Technology (UTAUT)*, they had high performance and low effort expectancy with low requirements for facilitating conditions and social influence (Venkatesh, Morris, Davis, & Davis, 2003).

### *Applying Expertise in Teaching Practice*

All the research participants used technology because they wanted to teach well. Their activities ranged from providing formative feedback, collaboration with students in other institutions, making classes more engaging, allowing students to participate remotely, creating and evaluating multimedia artefacts, flipping the classroom and developing digital identities.

### *Sharing Experience with Colleagues*

The digitally fluent educators were all willing to help their colleagues when requested. However, they would only do so in a manner consistent with their professional identity. While enthusiastic about their own use of digital technologies, the participants were clear that they were not “cheerleaders” for technology and did not consider themselves to be better teachers than their colleagues. Such an approach would be inconsistent with both their and their colleagues’ professional identity. The extent to which they would help colleagues varied among participants.

Some participants went beyond responding to requests for help and gave practical, informal, demonstrations of how they and their students benefited from the use of TEL. In their own words, they provided a “shop window” or “showcase” for their colleagues. Their focus was on why they used the technology rather than



how they used it. This approach corresponds with definitions of digital fluency (Briggs & Makice, 2012; Hsi, 2007; Q. E. Wang et al., 2013; R. L. Wang et al., 2012). Other participants felt it inappropriate to share their experiences unless asked.

### *Engagement with Policy*

The interviewees' views on institutional and national TEL policies ranged from no knowledge, through scepticism to enthusiasm. However, policy scepticism did not reduce any participants' enthusiasm for TEL. Those with a background in TEL were generally more aware of policies and more likely to participate in policy development. According to the participants, policy tended to focus on areas such as data protection and Bring Your Own Device (BYOD) rather than teaching practice. Concerns were expressed that BYOD could change the role of faculty, giving them responsibilities for technology management, inconsistent with their professional identity. Some of the sceptics had serious visionary ideas about future policies in areas ranging from social media to BYOD, from openness to commercialisation and from the recognition of continuing professional development and to funding for TEL projects. Long-established practices, institutional culture and a lack of resources can all make it difficult to realise such visions.

Most of the interviewees were familiar with the work of the Forum in developing policies to increase the digital capacity of Irish higher education. However, they considered that it would take time before any long-term results were evident. This is to be expected as such innovations in process tend to take a long time to emerge (Markides, 2006). While some participants were actively involved in Forum projects and were enthusiastic about its work; others were more sceptical, suggesting that the Forum should do more to reward teaching practice and provide funds for large-scale projects. A concern was that policies were over-promising what technology could deliver, often by focusing too much on tools rather than their role in teaching, learning and assessment.

Institutional and national policies on TEL may influence institutional culture, which in turn may influence professional identity. Changes in professional identity may then influence institutional culture.

### *Institutional Culture*

Institutional culture was identified as one of the overarching themes in the analysis of the interview transcripts. It affected the ability of educators to harness the potential of their digital fluency for the development of TEL. As noted by Knight, Tait, and Yorke (2006), to be successful professional development in higher education must be aligned with the "rules, tools and division of labour". The influence of institutional culture could be seen in areas as diverse as supporting usage, managing workload, and awards and rewards. Differences between participants were particularly noticeable in the latter.



### *Supporting Usage*

Most of the institutions in the study had specialist centres for teaching and learning, employing educational technologists to advise faculty on TEL. While professional development including support for doctoral and masters studies was available, support for TEL tended to focus on guiding participants in the use of the institutional Virtual Learning Environment (VLE). According to the participants, this could lead to an institutional, expert-led focus on tools and technologies rather than on teaching and learning. While VLEs can be useful tools for managing TEL, the participants sometimes found them difficult to use and lacking desirable features (Benson, Anderson, & Ooms, 2011; Blin & Munro, 2008). However, they were able to overcome any such difficulties using their digital fluency. This led them to suggest that faculty should be enabled and encouraged to develop their own fluency, giving them the skills and confidence to go “off-piste” and experiment with tools and technologies as they saw fit; rather than only providing guidance on the use of the VLE.

### *Managing Workload*

Participants considered that their workload was increasing; adding to time pressure and reducing the amount of time available for the development of TEL. Most of them considered its development to be time-consuming, a view shared by many researchers (Baran et al., 2013; Vaughan, 2007). Additionally, as institutions employ increasing numbers of lecturers on short-term or casual contracts; such lecturers are unlikely to invest their own time in the development of TEL whether or not they have the expertise to do so.

### *Awards and Rewards*

Interestingly, many of the research participants did not seem to be driven by the prospect of career advancement in the use of TEL, a finding shared by researchers (Fischer & Köhler, 2011; Porter & Graham, 2016). However, participants from the Institutes of Technology differed from their colleagues in the university sector in their attitudes towards funding and recognition for the development of teaching practice; with participants in the Institutes of Technology tending to be supportive while their university-based colleagues were often unconvinced of their value. These attitudes would seem to be related to differences in institutional culture, where less value or a lower social influence (Venkatesh et al., 2003) is placed on teaching in universities. The participants seem to have incorporated this aspect of institutional culture into their professional identity.

For the research participants digital fluency and the use of digital technologies in their practice had become part of their professional identity. For those participants who had built their career around TEL, it was an essential part of their identity while others had a stronger disciplinary identity and had developed an interest in TEL to improve their teaching and professional practice.



## Discussion

The findings have shown two distinct professional identities among the digitally fluent educators, with differing amounts of knowledgeability or levels of competence and engagement in the educational technology community of practice (Wenger-Trayner et al., 2015). This typology is based on drivers for practice as seen in Benson et al. (2011). While there is some blurring at the boundaries, most participants fit clearly into one of these identities which can be described as *TEL Career* and *TEL Practitioner*.

Members of the *TEL Career* group are all active researchers or consultants in TEL who can be considered as innovators (Rogers, 2003). While their academic backgrounds and their approach to TEL vary, the members of this group have all developed their careers and professional identity around its use. In several cases this arose from a transformative experience early in their careers. They make considerable use of theory in their praxis, taking a “researcher attitude” to their practice. They are all active researchers in TEL and are likely to be aware of and engaged in policy development, though they may be critical of these policies. As such, TEL can be considered to be their practice. In terms of the work of Skelton (2012) on teaching identities in higher education, they can be seen as “blended professionals”, who value both research and teaching as learning processes and thus believe strongly in their own professional development in both areas. This group can be considered as being at the core of the educational technology community of practice.

Members of the *TEL Practitioner* group have developed their digital fluency with a view to enhancing their professional practice in their own discipline, as such, they can be considered as early adopters (Rogers, 2003). They tend to take a more applied approach than the members of the *TEL Career* group. Their research largely focuses on their own disciplinary interests rather than on TEL and they tend to have less engagement with policy initiatives. Where they had a transformative experience regarding TEL, it came later in their career, while they were already lecturing. They expressed a pragmatic approach to the use of TEL that was not fundamental to their professional identity. In terms of the teaching identities discussed by Skelton (2012), they can be described as “researchers who teach” or “teaching specialists”. Their relationship with the educational technology community can be considered as more peripheral than that of the *TEL Career* group as they have a lower degree of knowledgeability. Interestingly, they mentioned students considerably more frequently, seemingly having a greater interest in student expectations. As early adopters, the practice of members of this group is more considered and with less tacit knowledge. This may help them to relate to their less digitally-proficient colleagues. Therefore, understanding their professional development, may help us to understand how those colleagues could also develop their own fluency (Porter & Graham, 2016; Rolfe, 2012). The *TEL Practitioners* were found to be more pro-active in helping their colleagues by discussing the benefits TEL brought to their own practice and offering informal demonstrations. However, like those in the





TEL Career group, they would only work with their less digitally fluent colleagues in a manner consistent with both their professional identity and beliefs (Cheng, 2014; Rogers, 2003; Slowey et al., 2014).

Educators both shape and are shaped by their working context which can either enable or constrain them in their professional roles (O'Byrne, 2014). Institutional culture and professional identity seem to combine in the participants' attitudes towards recognition for teaching and institutional funding for teaching and learning initiatives. The importance of professional identity and institutional culture needs to be considered in any programmes to increase digital fluency in higher education.

## Conclusion

Practice is influenced by professional identity and institutional culture with different communities of practice forming the higher education landscape. Educators' reasons for developing their digital fluency vary. However, independent of their professional identity or institutional affiliation, all the participants benefited from institutional support for higher degrees and expressed a preference for tinkering and informal learning over institutional courses. While cautious of being seen as zealots, they believed that their informal interventions were helpful to their less digitally-proficient colleagues. While the scope of this study is limited, its findings suggest that, in order to harness the potential of TEL, institutions of higher education should allow faculty sufficient time for experimentation and informal learning, while continuing to support masters and doctoral study in TEL-related topics. Where institutional courses are offered, they should not only guide faculty in the use of the VLE and institutional systems, but, also, give them the skills and knowledge necessary to make decisions about the best use of TEL in their professional practice. In other words, enable them to become digitally fluent. This should also help to change any focus of TEL on tools and technology to pedagogy and practice. Moving from the local to the global, these findings correspond with the 2019 Horizon Report recommendations of increasing digital fluency through faculty development and hiring practices (Educause Horizon, 2019). They also reinforce the need for the alignment of technology, capacity and policy in order to develop TEL, as advised by UNESCO (2014).

The Digital Roadmap from the Forum aimed to create policy to develop institutional digital capacity. It stressed the importance of consultation with educators among a wide range of stakeholders. The findings from this study suggest that any stakeholder analysis for policy development, would benefit from the inclusion of TEL Practitioners; as their identity seems to be similar to that of their colleagues at a lower point on the digital spectrum. As there are many professional identities and communities of practice in higher education, one roadmap is unlikely to meet the requirements of faculty in all institutions. By drawing more widely on the experience and knowledge of faculty, an "atlas" (Devine, 2015) of many roadmaps can be



created allowing for multiple routes towards digital fluency. Such an alignment of policy with practice should ultimately help to develop a sustainable approach to TEL which has the potential to transform teaching and learning in higher education.

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## Historical Issues, Advancement and Empowerment of Women through Open Distance Learning (ODL)

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### Abstract

Student's profiles have changed profoundly. Today's students are no longer the people our educational system was designed to teach and no longer required to serve in the fourth industrial revolution world. Open Distance Learning (ODL) is an excellent mode for teaching and learning that reaches these new types of student regardless of location, class, age, gender, and social status (like minority groups). However, women, as a minority group in the Higher education system of South Africa, suffered many constraints in the past and still struggle under oppressive, subordinate, and unequal environments. While, and where, misogyny prevails, women have to face obstacles such as demeaning, negative, and oppressive behaviour that makes their calling to become qualified and educated citizens challenging. In my quest for gender equality in the ODL environment, I want to voice the experience of women's struggles to become educated through open and distance institutions. A literature review will be conducted to address the aims of the article. The first is to present a brief history of the oppression, injustice, inequality, and more specifically, women's struggles to become educated citizens within their social context starting with the views on women held by the church fathers. The second aim is to reflect briefly on the history of how women suffered under a triple bind of injustice, particularly in South Africa during Apartheid, with a particular focus on education. Lastly, in my pursuit for gender equality in the ODL environment, I contest that women, who are determined to succeed in their educational training - regardless of the oppressive, subordinate and unequal environments they often find themselves in - may achieve equal teaching and learning opportunities through ODL. Women can gain more confidence, improve their career opportunities, update their skills, acquire new knowledge and enhance their social status in their respective societies irrespective of geographical, financial and time constraints. Not only does ODL offer equal opportunities and benefits for women to acquire life-long and self-directed learning, but it also empowers women to conquer many of the barriers they often face within society and specifically education.



## Introduction

Wood (2017) states that “history teaches us what people before us did, what their intentions were and where they failed or went wrong. If historical viewpoints about women reflect women’s subordination and oppression, they force women to discover their roots and their past”. Student’s profiles have changed profoundly. Today’s students are no longer the people our educational system was designed to teach (Prensky 2001:1) and no longer required to serve the industrial world. ODL is an excellent mode for teaching and learning that reaches these new types of student, regardless of location, class, age, gender, and minority group. However, women, as a minority group in the Higher education system of South Africa, suffered many constraints in the past and still struggle under oppressive, subordinate, and unequal environments. As a theologian and educator at an ODL institution, I am confronted with the challenges women experience within their faith-based communities as well as their experiences in the field of Higher Education. While, and where, misogyny prevails, women have to face obstacles such as demeaning, negative, and oppressive behaviour that makes their calling to become qualified and educated citizens challenging. In my quest for gender equality in the ODL environment, I want to voice the experience of women’s struggles to become educated through open and distance institutions.

A literature review will be conducted to address the aims of the article. The first is to give a brief history of the oppression, injustice, inequality, and more specifically women’s struggles to become educated citizens within their social context starting with the views on women held by the church fathers. A brief overview is offered to demonstrate how far back women’s marginalisation under patriarchy occurred. The second aim of the article is to reflect briefly on the history of how South African women suffered under a triple bind of injustice in South African during Apartheid with a specific focus on education. Lastly, in my pursuit for gender equality in the ODL environment, I contest that women, who are determined to succeed in their educational training - regardless of the oppressive, subordinate and unequal environments they often find themselves in - may achieve equal teaching and learning opportunities through ODL. It is not my aim to give an in-depth historical analysis of women’s marginalisation and oppression. It serves as a background to highlight, that regardless of the many obstacles women in history had to endure, there is hope to advance and to empower themselves through open and distance learning.

## The Church Fathers and Women

The marginalisation, oppression, and inequality of women are as old as biblical history itself. In the early Christian church, women were the second sex, and they took a secondary position to males. Although women were often highly regarded in their community, they were not permitted to teach. Gender inequality and stereotyping are an integral part of history and go back to Adam and Eve in the Genesis story. Eve was made



from and for Adam, and as the lesser of the two created genders, she persuaded Adam to eat the forbidden fruit. It was, and is still today, enough reason to justify the lower status of women by the church.

Reasons for the oppression of women stems from superstition and cultural myths. Man-made traditions and a lack of empirical evidence and uncritical thinking are factors that contributed to women's marginalisation and oppression. Because mortals may not question the word of God in history, the interpretation of Scripture remained reserved for a special group of men; men who felt inspired by the word of God; men who are nothing less than human mortals who are also prone to error in their thinking and reasoning (Casimir, et al. 2014:168-169). The Bible was often used to legitimise the marginalisation and subordination of women. The use and quotes to oppress women came from Scriptural texts such as Genesis 1:27, Genesis 2:20–23 and Genesis 3:1–24 in the Old Testament and New Testament scriptures 1 Timothy 2:8–15, 1 Corinthians 11:7–9, 1 Corinthians 14:33–35 and Ephesians 5:22–23.

During the life of Jesus on earth, women played an important role in his ministry and contributed to the formation of the Christian faith. Women such as the mother of Jesus, Mary, Mary Magdalene and the two sisters Mary and Martha were amongst his first followers. Mary Magdalene was one of Jesus' prominent disciples and the first to witness the resurrection. She was an influential woman and a leader of the early Christian movement and promoted leadership. There were other women disciples such as Joanna and Susanna, who accompanied Jesus throughout his ministry, and they also supported him from their private means (Luke 8:1-3). Not only were there female disciples but Jesus spoke to women, and he learned from them. For example, the Gentile women who taught him that God's ministry is not limited to a particular group but belongs to all who have faith (Mark 7:24-30).

Early Church Fathers such as Ambrose, Tertullian, Augustine, Origen and Chrysostom are closely associated with misogyny and hatred towards women in the early days of Christianity, and later Medieval Church Fathers (Apologists) such as Thomas Aquinas, John Duns Scotus, Luther and Bonaventure supported the Early Church Fathers views on women and teaching. St. Ambrose reminded believers that women were created with second class status and not in God's image. He also professed that the church office (priesthood) should be completely closed off to women and that they are not to teach because women were insufficient to occupy priestly offices (Lucas 2010:36). Tertullian contended that women were the source of all evil, pain, suffering, sin, and that there was nothing good about women. Women teaching in the church, he argued, lessened the dignity of men. Teaching and education, he claimed, was a task reserved for men (Adversus Marcionem 5:8; Virginibus Velandis 1; De Patientia 5).

Augustine wondered why women were created at all and concluded that it only could have been for procreation and companionship and he did not allow women to teach (Torjesen 1993:12), and Origen postulated that widows may have a teaching ministry but that they are not permitted to teach or minister to



men. Chrysostom was particularly anti-women in his theology, and because of the Fall, he restricted women's teaching ministry and their authority (Ford 1996:45, 103). Thomas Aquinas was the most influential theologian of the Medieval Era and argued that women are not allowed to receive Orders. Women, being in the state of subjection to men, may not receive the sacraments of Order because she cannot represent Christ (Børresen 1995:176) and because Paul forbade women to teach or to have any authority. Bonaventure argued that women do not have spiritual authority because they were not permitted to speak in church. Women could not be ordained as bishops, as a bishop is the husband of the church and women cannot be husbands (Tavard 1977:5).

John Duns Scotus states "I do not permit a woman to teach," speaking of the public doctrine in the Church (Scotus in Tavard 1973:214). In his opinion, as Christ had himself excluded women from the Holy Orders, the Apostles, and the Church did not exclude women on its own authority, but through that of Christ. Therefore women should not be teachers (Tavard 1977:101). According to Luther, women are not to teach in public spaces and may not fulfil the role of leadership (Ruether 1998:117). Girls, having diminished reasoning capabilities, may only receive education in piety, housekeeping and motherhood while preaching is entrusted to a man and not to a woman, as Paul also teaches, insofar as this has to do with Christian matters. The offices of leading, preaching, and teaching the word of God is for men. Luther also stated that women might not instruct nor teach in the public domain, but that older women should train younger women to be modest and submissive (Karant-Nunn & Wiesner-Hanks 2003:10). The above are only a few examples of how the church fathers played a major role in the history of women's subordination and how marginalised women were - specifically with regards to their ministries, teachings and social development. The church, as a guardian against women's oppression, did not fulfil its role to protect women from any form of oppression or harm (Wood 2019) and patriarchal South African churches sadly contributed to women's oppression and injustice.

### **Historical Overview of Women's Inequality in South Africa**

In South Africa, women had put up with the same prejudice and inequality as women in other countries. Casimir et al. (2014:167) points out that the colonial church was originally considered to be a liberator to restore women's rights. Unfortunately, it continued to endorse the ancient views on women as inferior beings and preserved its views on women's subordination, equality and injustice. History of male achievement in society is replete all over the world, and their achievements and contributions are mostly well documented. Unfortunately, this is not true about women's achievements and contributions; they are second-fiddles (Okeke 1995:152). History indeed teaches us that women's liberation, marginalisation, inequality and subordination are always the last to receive attention. Desmond Tutu (2006:167) rightly stated





that “none of us is free unless all of us are free”. Women in the South African historical context suffered under triple oppression, namely racially, gender, and class.

It is often the case that when writing women’s history, it habitually refers to their struggles in the political sphere. Everyday struggles they encounter within the family, traditional and more specifically, educational contexts did not receive as much attention. Walker (1990:3) once stated that “where women’s presence is acknowledged, it is often to subsume them within the family and behind obstructions such as reproduction and oppression”. These views muddle the difficulty of women’s lives. Chung Kyung (1991:51) observes:

Women are always the last colony, so whenever there is a social reconstruction, the last people who are considered are usually women and children. Whether the social system is socialism, capitalism, a white government or a black government, women will still usually be the last colony. So if you want to know about the advancement of a particular culture, the humanisation of a culture, you have to examine the place of women in that culture.

Before 1994 women’s marginalisation in South Africa was at its highest point. After 1994, the policies enacted aimed to redress race-related issues in education. But, gender and specifically women’s inequality received minimal attention (Akala 2016:75).

Apartheid is a symbol of the ruling National Party’s ideology of oppression, dominance and supremacy at the time. Black South Africans received inferior education that undermined them in taking part in meaningful nation building. This racial separation resulted in them receiving inadequate and poor educational skills, which qualified them for menial labour and industrial training, thus keeping them from aspiring to become fully integrated into society; they were forced to occupy lower economic positions.

South African women experienced marginalisation, and the degree differs substantially for white and black women. Not only was patriarchy the norm under which women suffered but within both black and white communities, patriarchy as an ideology was visible and deep-rooted in Afrocentrism and Eurocentric Mythologies. Under Colonialism and the Apartheid system in South Africa, social inequalities were ingrained and mirrored in all spheres of life, including in the higher education system. Women in South Africa experienced decades of marginalisation and oppression under the patriarchal system of Apartheid (Akala 2016:74). Akala states that white women were the victims of a conservative culture, which was shrouded in patriarchy. Camaroff (1985) points out that while white hegemony was a currency for domination, white women in South Africa did not receive nor enjoy equal freedom with the white male. White women, for example, was not allowed to open a bank account or to make a loan without the permission of a white male and were mainly employed as clerks and secretaries. The positioning of white women during Apartheid was



impacted by conservatism through the existence of a superior and inferior relationship between white women within the Afrikaner and English communities (Msimang 2001).

Women and especially black women suffered under patriarchy and triple oppression, namely, race, gender and class. Bantu education was one tool used by the Apartheid Government to force women, as inferior beings, under oppression and male dominance. Colonialism and Apartheid imposed separate education for different race groups and higher education for blacks was not a priority for the government. Under Colonialism and Apartheid, African women's oppression was different than that of African men. They had few or no legal rights, no access to education, or property, and had to occupy jobs with low statuses such as domestic workers and cleaners. The Natives Urban Areas Act (1923) separated families and women were forced to live in rural areas while men could work in urban centres (Badza & Chakuchichi 2009:62-71).

The White Paper of Post-school Education and Training: Building an expanded, effective and integrated Post-school system (approved by Cabinet on 20 November 2013) reports that after 20 years the Apartheid regime was discarded and replaced with a democratically elected government. Although much had been achieved since the fall of Apartheid much remains to be done to rid South African society of the injustices of colonialism and Apartheid. Unfortunately, opportunities in the country remain largely based on race and gender. Patriarchy ensures that women continue to experience a subordinate position in many areas of their lives, including education and training. Women were kept marginalised and at the bottom of the education system under the Apartheid rule. They were not encouraged nor was their role in society emphasised. Although great strides were made to improve women's positions after 1994, the struggle for women to become educated citizens is far from over. Patriarchal values from within various cultures and ethnic groups are still prevalent, and women are not always free to acquire education. The South African Apartheid education system has hurt the socio-economical contributions women could have made. A democratic education system shall be responsive to women's needs to education and will take into account the philosophical, cultural and racial standing of women (Thobejane 2005:22)

### **Advancement and Empowerment of Women Through ODL**

Education is the most important tool for women's emancipation, and it is said to be a tool for women to gain guaranteed mental freedom. Women's empowerment all over the world is at its peak, and South African women are not left out. There is a major drive to ensure that women's voices will be heard to receive equal rights in the bigger scheme of things. However, it does not mean that women are still not experiencing gender bias in society (Olakulein & Olugbenga 2006:150). Garland (2010:181) states that Distance Education is an educational approach where learners and teachers are separated in time and space, and study material is designed to enhance self-directed learning for students. Open learning is a philosophical construct that aims



to address and to remove barriers and constraints that prevent students from acquiring quality lifelong education. ODL focuses on open access for all to receive equal access to education and training without the time and special constraints. ODL has become one of the most rapidly growing fields of education, and its delivery is prominently visible through Internet-based technology and the world-wide-web (Mossberger, Tolbert, & Stansbury 2013:).

The impact and effect that ODL has on women are amongst others:

- That women develop the ability to critical thinking;
- They become more confident in dealing with family and strangers that results in women gaining more respect in their communities;
- It increases women's opportunities to enter careers and finding jobs of their choice;
- Through the acquiring of knowledge women can make better decisions, contribute to changing of political-social perceptions of society and promote other women's empowerment;
- They can compete with males on the same footing;
- They can be actively be involved in the fight against poverty, abuse and social ills such as patriarchy and deep-seated inequality;
- They become autonomous scholars and independent citizens that can participate in decisionmaking, the formation of policies and research; and
- Women are enabled to enter self-help markets.

ODL may indeed advance and empower women; but there are situational, institutional and dispositional obstacles and challenges that confront them.

#### *Situational Related Challenges in ODL*

Angara et al. (2015) state that situational challenges are that of job and domestic responsibilities, and including, says Cross (1981), personal and family situations such as the lack of sufficient time to study and financial constraints. The regional centres are not always easy to access due to the distance from the home to the centre. Often women experience unfavourable home learning environments and a lack of support from the family and the employer. Most women in rural areas have difficulty with technology since access to the internet is not always available, and learning is often technically demanding due to a lack of experience and training in technology.

#### *Institutional Related Challenges in ODL*

Institutional barriers are poor logistic systems and a lack of proper advice (Arbauch, 2012). According to Cross (1981), it is the unresponsiveness on the side of educational institutions, a lack of flexibility and the inappropriate scheduling and content of provision that challenge education through ODL. The delay of study materials at regional centres, the lack of responsiveness from administrative staff, the delay of important



information, and difficult administrative processes for registration and financial assistance are challenges that make ODL difficult to accessed and often result in the withdrawal from studies. Late marking of assignments and late arrival of study material costs money and time for those women who already experience financial constraints.

#### *Dispositional Related Challenges in ODL*

Berge, Muilenberg and Hanegan (2012) state that dispositional challenges women face relate to their attitudes and feelings. They classify challenges in ODL as spiritual, epistemological, philosophical, pedagogical, technical, social and cultural. Zirnkle (2011) points out that challenges in the ODL environment are financial constraints, a lack of infrastructure and equipment, institutional concerns and poor technical assistance. Other challenges, according to Zirnkle, are inadequate feedback and poor teacher contact, alienation, isolation and poor support services. Women in Post-apartheid South Africa are in a better position today than 20 years ago. Open and distance education provides women with the chance to grow and to advance in their quest to get an education.

The above are all relevant concerns and challenges the ODL environment is faced with, and unless ODL institutions do not address the above concerns, students will be at the losing end in their quest for education. I propose that for women to receive equal and life-long knowledge through ODL, these concerns must be taken seriously. A woman can achieve life-long learning and academic excellence in ODL by acquiring proper coping mechanisms to assist her in being academically successful. Women can attain support from their husbands and family to share in family responsibilities, they can apply for a bursary, hard work, less involvement in social activities, make time to reading more, get assistance with household chores, attend discussion group classes, start an online study group, and communicate with other students via whatsapp and e-mails (Kimocho 2018). ODL also provides women with the opportunity to interact with each other, their lecturers and experts in their field of study since interaction through ODL close the physical distance.

The major benefit of ODL for women's education is that ODL institutions are flexible, affordable and provide a life-long learning opportunity for education, and it is more cost-effective than residential institutions (Pityana 2004). ODL reaches woman as previously marginalised and oppressed people who were denied access to education. Through ODL women who are unable to attend traditional education programs for reasons discussed earlier, may now become self-sufficient, worthy and educated citizens in all walks of life. Because of the fact that ODL uses cost-effective technology; women can collaborate with other students. ODL provides women with the opportunity to learn independently at their own pace, any time and any place because educational material can be accessed online from their computers and mobile devices.

## Conclusions

This paper set out to address the historical issues that hindered women's educational endeavours from the perspectives of the Church Fathers. It addressed women's struggles during Apartheid in South Africa that played a major role in keeping women from entering education through the patriarchal system. Both these eras hurt women in the many roles they played, and women had to redeem themselves through education that became possible post-Apartheid. It is clear from the brief historical overview that women were treated with humiliation and kept marginalised. Historically women were unequal, and in some cases today, are treated as the second sex.

With the introduction of ODL, women are enabled to grow and to make changes in her personal life. ODL is part and parcel of social change and an instrument to constructively reinforce women's growth and to democratise their rights by creating new opportunities and possibilities for women to achieve and reach their individual goals and dreams. Rodgers (1992:21) once stated:

Education is not the same as manipulation or indoctrination. Rather, education is a "meeting" between people, a living encounter with "a purpose".

Women from all walks of life should embrace the opportunity to acquire life-long learning through ODL regardless of the obstacles and challenges they may encounter.

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## The Evolution and Exploration of Distance Education Means in Rural China

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### Abstract

China is the most populous country in the world with a rural population exceeding half of her total. Distance education, as one of the ways of education, has been playing a significant role for many years in enriching the means of education, improving the quality and developing the practical skills of farmers. This paper focuses on the development and practices of the Central Agricultural Broadcasting and Television School (CABTS) as a major actor in rural distance education in China. It captures the development and changes in the means of education and ways of transmission in rural distance education since reform and the opening of China. It further analyzes the current situation and tasks with the aim of identifying experiences and regularities in the process of evolution and practicing. In addition, it uncovers shortcomings, so as to explore an optimal path for the future of rural distance education and highlight Chinese experiences for research and development of distance education internationally.

**Keywords:** Distance Education, Education and Training of Farmers, Evolution

### Introduction

Since China's reform and opening up in 1978, all sectors of society, including agriculture and rural areas, have developed strong vitality. The comprehensive development of agriculture, rural areas and farmers, especially in grain supply, has effectively solved the problem of feeding about one-fifth of the world's population, it has also made important contributions to world food security and economic and social development, and has helped China become the world's second largest economy. These achievements have benefited from the reform of the national agricultural system and mechanisms, the improvement of policy measures, and the strong support rendered by agricultural science and technology. They also benefited from the development of rural education, including the development of rural distance education, and the improvement of labor quality and skills. Distance education in rural China is like an invisible hand, and has been always promoting the development of China's agricultural and rural areas.





## Overview of Distance Education in Rural China

### *Modern Distance Education System in China*

China's modern distance education, as a supplement to general education, began after China's reform and opening up, in order to satisfy the public's thirst for education and knowledge. After 1978, China's education system, agricultural system and party cadre education system made full use of radio and television. By distance means, three large-scale distance education systems have been established basically constituting China's current modern distance education system. One is the National Open University System directly under the Ministry of Education of China. It was established on the basis of the Central Radio and Television University founded in 1978. It is a higher education institution that covers urban and rural areas and implements open and distance education. The second is the National Agricultural Broadcasting and Television School System, which is directly under the Ministry of Agriculture and Rural Affairs and is led by the Central Agricultural Broadcasting and Television School (hereinafter referred to CABTS). Established in 1980, it is a specialized institution that conducts education and training for farmers by means of a mixture of distance education and face-to-face guidance. The third is the modern distance education system for party members and cadres throughout the country. Established in 2003, it receives and broadcasts video programs through specialized TV channels, professional websites, and more than 600,000 village (residential) terminals throughout to serve party members and cadres in the country.

### *Distance Education System in Rural China*

CABTS System is a specialized institution for conducting rural distance education and training in China. There are currently more than 2,000 CABTS schools in the country. In addition to the central school, there are 36 provincial-level schools, 280 prefecture (city)-level schools, and 1922 county-level schools, more than 16,000 farmer field schools, forming a five-level school system covering the entire rural areas. It mainly undertakes the organization and implementation of farmer education and training, agricultural science and technology popularization, high-quality farmer cultivation and rural practical talent training. The basic school-running framework is "distance education plus on-site teaching plus practical guidance", that is, through radio, television, satellite systems, Internet and other means to carry out distance education to farmers, and at the same time rely on the national system to carry out on-site teaching, and organize experts to track the farmers' production practices in order to offer service and guidance. By the end of 2018, a total of 4.92 million farmer have received secondary vocational education through the system; cooperating with higher education, training of 800,000 kinds of agricultural and rural talents had been completed; training 2.87 million high-quality farmers had been achieved through implementing national programs; nearly 400 million farmers have been trained in agricultural practical technical; nearly 50,000 people have been trained in rural practical



talents. The CABTS System provides strong talent support for the development of the agricultural and rural economy. From the perspective of a cultivation and impact scale, it is the largest farmer school in the world.

### **Evolution and Practice of Distance Education in Rural China**

The development and change of the distance education method of the CABTS represents the evolution of the rural distance education means in China. This evolution has gone through three stages along with the progress and application of modern educational technology, and has realized an upgrade from a single means to a means of convergence, concomitant and intelligent communication.

#### *1) Stage of traditional media: radio and television opened the world of distance education*

The distance education of the CABTS began in broadcasting education. Since 1981, it has broadcast a teaching program on China's largest official radio station, the China National Radio, which has opened a new era for Chinese farmers to learn remotely through radio waves. In order to allow learners to listen repeatedly and to allow more people to listen, the CABTS also broadcast content into audio tapes for widespread dissemination. At present, CABTS at the Central People's Broadcasting Station still has four broadcasts of "Express to prosperity", "Sannong (referring to agriculture, farmers and rural areas), Morning Post", "Country Lecture Hall" and "Xiaokang (living standards), Farm Household". The daily broadcast time is up to two hours. In 1987, the CABTS distance education method added TV function. In the same year, it began to produce and broadcast agricultural science and technology education programs on China's largest official TV station - CCTV. Currently, there are two TV education sections on CCTV and the special national channel for rural party members. The total number of daily broadcasts reaches three hours. More than 80% of the leading varieties and main technologies released by the Ministry of Agriculture and Rural Affairs have been covered by video programs and broadcasted, which has become an important channel for the extension of agricultural technology in China. In addition, the CABTS also produced the program onto video tapes and CD-ROMs, which were sent to the teaching points as audio-visual aids to increase the use and dissemination of distance programs.

#### *2) Stage of network consolidation: Internet and satellite network make on-line education possible*

In 1999, the CABTS established the "China Rural Distance Education Network", and then built a satellite network with international assistance. At present, one main station has been built, with five provincial-level live broadcast sub-centers and nearly 1,000 satellite remote receiving stations. Through the establishment of a digital media resource repository, various audio, video, text and other teaching resources such as printed materials, radio programs, and television programs are continuously collected and deposited online, forming an online remote classroom for the Internet and satellite networks. At present, there are more than 6,000 audio and video resources on the Internet. In 2018, the "China Rural Distance Education Network" was revised and the online learning

platform of CABTS was established. It includes 6 major courses as secondary vocational education courses, high-quality farmers training courses, knowledge update courses for agricultural science and technology personnel, training courses for rural practical talent leaders, agricultural and rural areas practical technology and teacher training courses. The course content covers more than 20 categories such as policies and regulations, business management, agricultural technology, and rural governance. The platform has more than 6 million hits per year.

### 3) *Stage of mobile learning: smart phone becomes farmers' new farming tool*

With the popularization of smart phones and the application of information technology such as cloud computing and big data, the CABTS has changed the means of distance education to mobile communication. The massive educational resources have been re-integrated and classified and fragmented for dissemination. In 2016, we started to establish micro-education, developed Wechat public number such as agricultural broadcasting micro-education and high-quality farmers, and released relevant knowledge information through mobile phones. Under the framework of the national science and education cloud platform, we focused on the development of "Cloud Smart-Agriculture" mobile APP. The Cloud Smart-Agriculture APP user group is positioned as a majority of farmers, and its core function is to provide online learning, technology extension and support services to farmers. At present, the platform learning content covers technical video, agricultural information, market information, technical questions and answers, etc. It has nearly 5,000 online learning courses and agricultural technology videos, and the number of registered users exceeds 3 million, of which 2.4 million are high-quality farmers. The convenient way of learning makes Cloud Smart-Agriculture and mobile phones on the cloud become the new agricultural tools to guide farmers' production. In the first national "Helping Agriculture APP Model" selection activity in 2018, Cloud Smart-Agriculture won the most popular cultural and educational APP award. Moreover, the massive information of farmers, agricultural information and agricultural technology information collected by the platform have initially formed a big data cluster effect, and have far-reaching promotion and application value in agricultural monitoring, high-quality agricultural material promotion, and credit information system construction.

### **New Situation, Tasks and Issues Faced**

At present, China's economy and society have entered a new era of all-round development, the mode of agricultural production and development has been accelerated from traditional to modern, and the implementation of major national strategies and major tasks such as rural revitalization and precise poverty alleviation has constituted new challenges to farmers' education and training.

*Implementation of Rural Revitalization Strategy has Become the New Context and Task of the Current Stage*



The implementation of the rural revitalization strategy is a major decision made by the Party Central Committee for China's "Sannong" work in the new era, and it is also a major historical task for decisively building a well-off society and building a socialist modernized country. The "Strategic Planning for Rural Revitalization (2018-2022)" issued by the Central Committee of the Communist Party of China and the State Council proposes to train a new generation of high-quality farmers who love agriculture, understand technology, operate well, and optimize the structure of agricultural practitioners. Document No. 1 of the Ministry of Agriculture and Rural Affairs in 2019 also proposed "to vigorously develop agricultural vocational education for the actual needs of rural revitalization." With the issuance of the National Vocational Education Reform Implementation Plan and the introduction of the policy of enrollment expansion for higher vocational colleges, the vocational education of farmers has ushered in a great opportunity for development. Therefore, strengthening the support of rural revitalization of talents, and vigorously cultivating high-quality farmers in line with the requirements of rural revitalization, has become the latest situation and core task of carrying out education and training for farmers.

#### *IT Development and Media Transmission Means Presented New Trend*

The rapid development of information technology has changed the way people learn and receive information and communicate with the world. The 43rd "Statistical Report on the Development of China's Internet Network" shows that as at the end of 2018, the number of Chinese netizens reached 829 million, of which the proportion of mobile Internet access was as high as 98.6%. Mobile phones have become the first carrier for people to obtain information. With the popularization of smart phones, the application of cloud computing, big data, 4G, 5G network technology, the pattern and mode of media communication have undergone profound changes, the integration of new and old media has deepened, and the whole media has been continuously developed, presenting "four full" features (Jilin Daily, 2019). These are full-process media, holographic media, all people media and full-effect media, of which, holographic media and all people media have great influence. AR, H5, short video and many other new media communication methods are increasingly favored by people, and also greatly promoted the development of the self-media, everyone can become a recipient, communicator and manufacturer of information at anytime and anywhere. The new development of information technology and the new changes in the media communication environment have put forward new requirements for the content design and application of education and training of farmers, especially distance education training.

#### **Major Problems of Distance Education t Present**

In general, there is still a gap between education and the training of farmers in China in terms of content planning, curriculum, approaches and means to meet the requirements for agricultural and rural social



development and rural comprehensive revitalization. Radio and television means are limited by the production cycles and the national public media broadcast. The distance programs have problems such as insufficient subject matter, poor timeliness, one-way communication, and insufficient innovation. The online education carried out by the application network also has problems such as insufficient development of high-quality learning resources, inadequate system services, and insufficient evaluation of applications and operations by farmers. Weak policy support, lack of relevant funding support, and insufficient professional talent are the main causes of problems.

### **Lessons Learnt and Inspirations**

#### *Using a Mainstream Transmission Platform to Ensure the Efficiency and Impact of Transmission*

CABTS has four broadcast programs, two TV programs and the network communication platform, which are all national media platforms. In the current public opinion and media environment in China, these platforms ensured the rights to speak and outreach of the content. Taking the mainstream communication resources has become the access advantage of CABTS to carry out distance education, it ensures the broad spectrum, authority and influence of the dissemination of educational content.

#### *Relying on the Organizational Advantages to Ensure Joint Efforts in Implementation*

Education of farmers is a non-profit public undertaking, and the delivery of work often requires multi-sectoral participation. CABTS will pay attention to the advantages of the two organizations. Firstly, it is the horizontal organizational advantage of joint education. It fully utilizes the unique advantages of the joint operation of 21 ministries or departments such as the Ministry of Education and the Central Organization Department in communication and coordination, expert cooperation and resource mobilization. It is to effectively win support and work together to advance the work. Second, the top-down national system advantage, the entire CABTS system is a family, the national system enables us to share resources, teaching design, program production, teaching equipment, etc. within the system, and support each other. Distance education resources can serve grassroots education to maximum value of teaching resources.

#### *Having and Using the Latest IT to Gain Upper Hand in Transmission*

In terms of technical means, from broadcasting and TV programs to online courseware, on-demand platforms and smart phone APPs, CABTS always grasps the latest and most effective information means to carry out distance education, and guarantees the right to speak. In terms of communication methods, we actively meet the actual needs of people to obtain information fragmentation and immediate availability, and rationally disassemble and differentiate the distance program resources, or develop online learning modules for



specific agricultural technologies and key technical links. It has cultivated the loyalty of the audience and occupied the opportunity of communication.

*Teaching Contents Advancing With Time to Satisfy the Needs of Farmers for Education and Training*

Adapting to the requirements of the development of agriculture, rural areas and farmers, the CABTS has continuously adjusted its functional tasks. It has experienced three stages of rural grassroots education, new farmers technical skills training, and high-quality farmer team building. Each stage involved corresponding adjustments of teaching and training contents. Curriculum setting has evolved from soil chemistry at the very beginning to nine major aspects: farm production and management, animal disease prevention, integrated rural management, and agricultural machinery use and maintenance. Numerous courses have been designed around high-quality farmers, and a large number of textbooks and distance education programs have been developed. In the way of education and training, the combination of remote and face-to-face teaching will explore the “four major classrooms” mode of the air class, the fixed class, the mobile class and the field class. It effectively guarantees to meet farmers' practical characteristics and diversified learning needs while studying and working in agriculture, and strives to provide education and training that makes farmers satisfied.



## Teaching the Art of Computer Programming at a Distance by Generating Dialogues using Deep Neural Networks

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### Abstract

While teaching the art of Computer Programming, students with visual impairments (VI) are disadvantaged, because speech is their preferred modality. Existing accessibility assistants can only read out predefined texts sequentially, word-for-word, sentence-for-sentence, whilst the presentations of programming concepts could be conveyed in a more structured way. Earlier we have shown that deep neural networks such as Tree-Based Convolutional Neural Networks (TBCNN) and Gated Graph Neural Networks (GGNN) can be used to classify algorithms across different programming languages with over 90% accuracy. Furthermore, TBCNN or GGNN have been shown useful for generating natural and conversational dialogues from natural language texts. In this paper, we propose a novel pedagogy called “Programming Assistant”, by creating a personal tutor that can respond to voice commands, which trigger an explanation of programming concepts, hands-free. We generate dialogues using DNNs, which substitute code with the names of algorithms characterising the programs, and we read aloud descriptions of the code. Furthermore, the application of the dialogue generation can be embodied into an Alexa Skill, which turns them into fully natural voices, forming the basis of a smart assistant to handle a large number of formative questions in teaching the Art of Computer Programming at a distance.

**Keywords:** Transformative Online Pedagogies, Deep Neural Networks, Algorithm Classification, Chat Bots, Alexa Skill, Programming Assistant

### Introduction

Teaching programming to novices is a recognised problem in computer science education, and authors such as Windslow (1996), Robins et al. (2003), and Haiduc et al. (2010) have shown that automated summarisation of code is a promising direction. What’s common in these pedagogical approaches (Schulte, Clear, Taherkhani, Busjahn, & Paterson, 2010) is the assumption that automated teaching tools are an auxiliary means to the face to face teaching at traditional offline Universities.



Studies about how people read programs reveal a number of layers to understanding code: for example what each statement means, how control passes from one part of code to another, or what algorithm has been employed (Douce, 2008). The ‘obvious answer’ of how to read code – reading from the top of the page downwards – may not be the best one. We may perhaps attempt to build up a picture of what code does by reading documentation to form a first impression and then work our way down to see how the end effect is achieved. Of course, the documentation may be wrong, or our interpretation of the lower-level code may be faulty. We may also understand code in terms of higher level structures such as methods or classes and how they relate to each other to solve a problem – a more integrated approach, as it involves a mixture of intermediate and higher and lower level code analysis.

One aspect of this integration knowledge is the ability to recognise design patterns or common sub-problems and their solutions. Unlike English texts, which can be read from start to finish through speech synthesis (Zen, Senior, & Schuster, 2013), the understanding of programming concepts requires frequent navigations back and forth, up and down, in two dimensions. However, traditional accessibility helpers, such as Emacspeak (Raman, 1996), read out the texts sequentially; whilst the presentations of programs are hierarchical in nature. Nevertheless, we need to understand the code, which is the only reliable documentation of what it does (Kernighan and Plauger, 1978). Others have argued that the external context of code – e.g. its inputs – are also required to understand a program (Brooks, 1987).

Furnas (1999) points out, in an earlier age of small digital displays, the issues of understanding large structures when viewed through a small window. He proposed a ‘fisheye’ strategy to balance local detail and global context. We suggest that it would be possible to develop a similar approach to program comprehension using audio descriptions, beginning with a high-level description of what code does, and then proceeding to lower-level structures, and lines of code, as needed. Often it may be possible or desirable to skip over some levels of detail. Indeed, the high-level view may be all that is needed in some contexts. Other software geared towards helping visually impaired users to understand programs has also used this approach, e.g. JavaSpeak (Smith et al., 2000) supports navigating trees representing a program’s structure.

For online education offered by the Open University, the fundamental ideas behind programming languages are taught through distance learning modules such as *M250* (The Open University, UK), with the aim that students gain first-hand support from the very start, and learn more advanced concepts continuously throughout the course of study. An example of this is the unique learning experience of Software Engineering through the distance education programme (Quinn et al., 2006), where, in addition to students learning technical content, regular interactions with tutors are required, e.g. to elicit stakeholder requirements and refine design.



Given the need for scalability in modules with large cohorts, it is reasonable to aim at fully automating some recurring tasks to alleviate the burden on the tutors. One of the major obstacles to achieving this goal is to support those students with visual disabilities, who require sound as an assisting modality to drive adaptive user interface design (Akiki, Bandara, & Yu, 2017, 2016). However, audio delivery has wider application: it is also relevant in Adaptive User Interfaces (AUIs) (Akiki, Bandara, & Yu, 2014), i.e. software systems that can adapt their modality of use (from desktop to laptop or mobile phones, e.g., from visual to audio) as appropriate to the context. This flexibility of presentation mode, and audio presentation of information in general, can benefit all users of such systems, whether visually impaired or not (Hadwen-Bennett, A. et al. 2018). To illustrate the task at hand, consider the canonical 'Hello World' program students often begin their programming with. *Figure 1* provides an example in Java, which consists of only 5 lines of code.

```
1 public class Hello {  
2     public static void main(String args[]) {  
3         System.out.print("Hello, world!");  
4     }  
5 }
```

**Figure 1: A Java program to illustrate programming concepts**

Through the use of spaces and indentations, the structure of the program will be clear to most visually capable students. At the highest level, it is the specification of a class, which has 'public' visibility to other classes, named 'Hello'. The pair of curly braces '{' and '}' encloses the members (such as methods) of the class, nested in further structures. The method begins with a header, which includes several modifiers: 'public', 'static', 'void' in this case, the name of the method, 'main', and a list of typed parameters. 'String args[]' here indicates that 'args' is an array variable where each element of the array is of a 'String' type. Beneath the method signature, another pair of curly braces encloses the body of the implementation of the method. In this case, the method body consists of a call to a member of the 'System' class. The recipient of the method call in the 'System' class is a variable 'out' of the 'PrintStream' type, and the 'print' method has an argument 'Hello, world!'. When the program is compiled and executed, the string 'Hello, world!' will appear on the console display.

The above description has a narrative that helps a reader to navigate the syntactical elements from top to down. However, since the program has many details, it is rather tedious to talk through everything, just to find out that what the program is actually doing by listening. A summary may be more useful, or the user may wish to drive an interactive description. With the advent of voice-interaction technology and products such as Alexa Skill Kit (ASK, <https://developer.amazon.com/alexa-skills-kit>), we seek the opportunity to translate sequential narratives into hierarchical ones, driven by the requirements (Lapouchnian, Yu, Liaskos, & Mylopoulos, 2016) of students.



This new proposal aims to focus on any part of their programs, whilst maintaining an overview relevant to the studied concepts. To implement this proposal, we introduce a deep neural networks (DNN)-based pedagogy called *Programming Assistant (PA)* that can respond to voice commands that trigger an explanation of programming concepts. Analogous to pointing a mouse to program elements in an integrated development environment (IDE) such as Eclipse (<http://eclipse.org>) or BlueJ (<https://www.bluej.org>), the new hands-free mode of interactions could generate intelligent dialogues that answer students' questions about the program or a programming concept, meaningfully (Yu, Tun, & Nuseibeh, 2011). For example, an interaction might be as follows:

Student: *Alexa, open Program Artist on a Hello World program*

Alexa: *Okay, Program Artist is open. What class would you like to examine?*

Student: *Examine the 'Hello' class.*

Alexa: *Okay, I have opened the 'Hello' class.*

Student: *Does the class have method calls?*

Alexa: *In the Hello class, there are method calls to main and to print.*

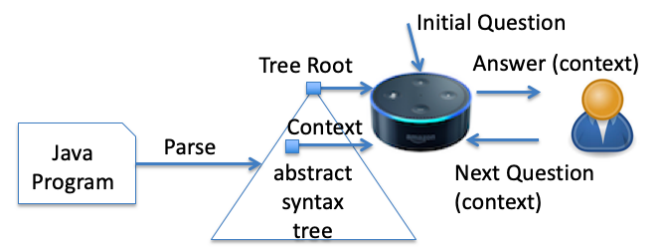
Student: *What is going to be printed?*

Alexa: *"Hello comma world exclamation mark" will be printed.*

However, instead of asking the previous question, one may ask instead *'Tell me more about the method call to print'* and the answer might be *'The print method is called through a static variable "out" of the "System" class.'* A further question can be asked about the 'out' variable too, and so on. This scenario indicates the advantage of using Programming Assistant, which does not have to provide every detail of the program, while partial answers will be provided and will be expanded further by answers to follow up questions. In other words, a dialogue rather than a monologue results from the new way of communicating with students. In the remainder of the paper, Section 2 presents an overview of the approach and deep neural networks, Section 3 compares with related work, Section 4 discusses our initial evaluation and concludes.

## **Our Approach**

*Figure 2* illustrates an overview our Programming Assistant architecture. First, a program will be parsed into abstract syntax trees (AST), which represent the nested structure of code. The system will translate an initial question with respect to the initial parameter (typically configured as the root node of the AST). Combining the question and the parameters, PA will report a result back to the student. The student can ask follow-on questions using the returned parameters as the new context.



**Figure 2: An overview of PA architecture**

The parsing to an AST can be done on the server side of the Alexa Skill, while the interactions with the student would alter the parameters depending on the additional questions students asked. In this paper, we have shown an example dialogue based on the simple program in the last section. *Figure 3* lists the AST in terms of XML tree, which is generated from our FAST parser (Yu, 2019) efficiently on the server side.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<unit><class><specifier>public</specifier> class <name>Hello</name> <block>
<function><specifier>public</specifier> <specifier>static</specifier> <type><name>void
</name></type> <name>main</name><parameter_list>
(<parameter><decl><type><name>String</name></type>
<name><name>args</name><index>[]</index>
</name></decl></parameter></parameter_list> <block>
<expr_stmt><expr><call><name><name> System</name><operator>.</operator><name>out
</name><operator>.</operator><name>print </name></name><argument_list><argument>
<expr><literal type="string">"Hello, world!" </literal></expr></argument></argument_list>
</call></expr>;</expr_stmt> </block></function> </block></class> </unit>
```

**Figure 3: An XML corresponding to the AST of the example program**

The rest of the infrastructure follows an AI agent approach, where the front end to the agent is a human-friendly voice interface using a cloud-based Alexa Skill Kit environment, and the back end to the agent is a cross-language machine learning model trained on a large corpora of curated source code.

*Deep Neural Networks (DNN) for Algorithm Teaching Tasks*

Knuth's *The Art of Computer Programming* is an example of traditional teaching materials for students to learn programming (Knuth, 1968). In his preface, the intention of using assembler language to explain algorithms was to provide an intermediate representation closest to the machine instructions. For example, *Figure 4* presents one example of an Insertion Sort, which consists of five statements at a high-level on the right and the corresponding machine instructions to implement them on the left.

**Program S** (*Straight insertion sort*). The records to be sorted are in locations INPUT+1 through INPUT+N; they are sorted in place in the same area, on a full-word key.  $r11 \equiv j - N$ ;  $r12 \equiv i$ ;  $rA \equiv R \equiv K$ ; assume that  $N \geq 2$ .

01	START	ENT1	2-N	1	<u>S1. Loop on <math>j</math>. <math>j \leftarrow 2</math>.</u>
02	2H	LDA	INPUT+N,1	$N - 1$	<u>S2. Set up <math>i</math>, <math>K</math>, <math>R</math>.</u>
03		ENT2	$N-1,1$	$N - 1$	$i \leftarrow j - 1$ .
04	3H	CMPA	INPUT, 2	$B + N - 1 - A$	<u>S3. Compare <math>K : K_i</math>.</u>
05		JGE	5F	$B + N - 1 - A$	To S5 if $K \geq K_i$ .
06	4H	LDX	INPUT, 2	$B$	<u>S4. Move <math>R_i</math>, decrease <math>i</math>.</u>
07		STX	INPUT+1, 2	$B$	$R_{i+1} \leftarrow R_i$ .
08		DEC2	1	$B$	$i \leftarrow i - 1$ .
09		J2P	3B	$B$	To S3 if $i > 0$ .
10	5H	STA	INPUT+1, 2	$N - 1$	<u>S5. <math>R</math> into <math>R_{i+1}</math>.</u>
11		INC1	1	$N - 1$	
12		J1NP	2B	$N - 1$	$2 \leq j \leq N$ . <b> </b>

**Figure 4: "Insertion Sort" in the assembler of Art of Computer Programming (p.80)**

However, the essence of an algorithm may be presented in different high-level programming languages, such as Java or C#. A question is, could there be a programming language-agnostic way to represent an algorithm?

Recently deep neural networks (DNN) have been proposed to represent source code, such as Tree-Based Convolution Neural Networks (Mou, Li, Zhang, Wang, & Jin, 2016) and Gated Graph Neural Networks (Li, Tarlow, Brockschmidt, & Zemel, 2016). Comparing to traditional representation of code as a bag of words, or a sequence of tokens (n-grams), deep neural networks that take into account structures such as nested syntax trees and/or semantic graphs in the code have been shown to be more effective (Nghie, Yu, & Jiang, 2019). For the algorithm benchmarks in Java and C++, it is shown that over 90% accuracy can be achieved in classifying the algorithms regardless of which programming language was chosen. For example, the DNN model trained to learn from algorithms implemented in Java could still be used when the underlying programming language becomes C++.

As a result, we can query the underlying algorithm classifier using any input program to get 90% accurate answer without any human tutor intervention. In fact, recent progress in ASTNN (Zhang et al., 2019) has shown a 98% accuracy when the DNN are highly tuned for the benchmarks. Furthermore, DNN's such as TBCNN and GGNN have applications in summarisation of code snippets into natural language utterances (Mou, Meng, et al., 2016, Fernandes, Allamanis, & Brockschmidt, 2019). As a result, the DNNs can be used for teaching different tasks in programming as long as there is a high accuracy. Of course, even with 90% accuracy, it demands human interaction to explain the remaining 10%.

#### Alexa Skill

Initially we have concentrated on high-level program classification. We used the open-source project flask (<https://github.com/johnwheeler/flask-ask>) to simplify the development and deployment of server side



implementation using its python interface. On the client side, the ASK must be configured in such a way that many types of questions can be asked (using Alexa’s powerful synthesis model), while we have to define the context variables by recognising the parameters used in the answers to previous questions. Since open-ended questions can be asked, we have some predefined parameters to prompt students when they are stuck, e.g. the initial landing node of the AST in the navigation is chosen as the root node of the AST.

### Online IDE

To be able to demonstrate the PA, we have also implemented a pedagogical online IDE, which does not have a voice interface through Alexa. A screenshot of the IDE is shown in *Figure 5*, which is the result of clicking at the URL <https://gitpod.io/#https://github.com/yijunyu/demo> in a Web browser.

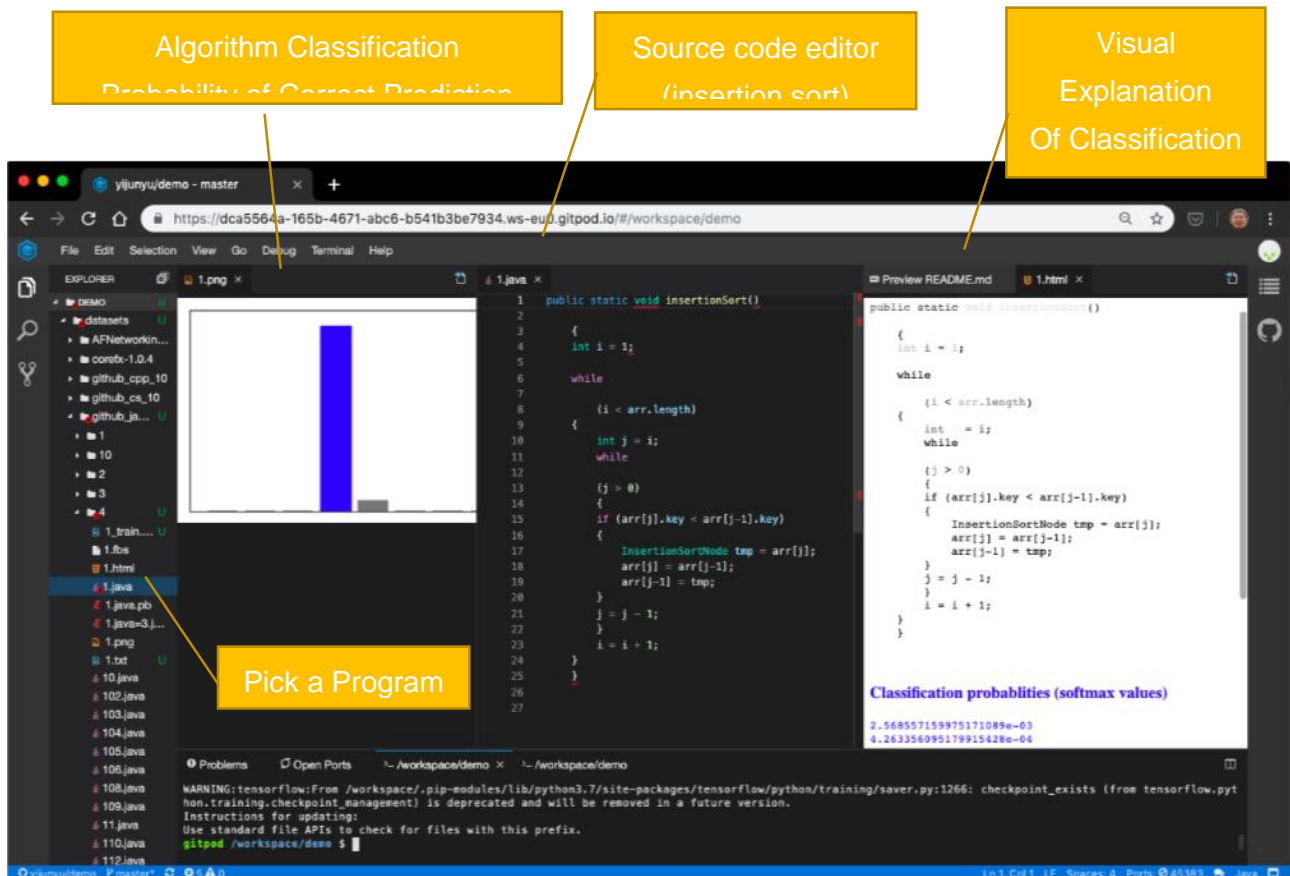


Figure 5: A screenshot of the PA back-end in an online IDE, showing the underlying computation of DNN: the code snippet in the centre shows an InsertionSort algorithm implemented in Java; the bar chart on the left shows which one of the algorithm class has the highest probability according to the tool, which is correct in this case; and the grey-scale decorated preview of the code explains the underlying reasoning of the classification.



In this IDE, it is possible to see how the DNN works from end-to-end, and in particular how an input algorithm can be classified into one of several predefined algorithms. The students can also preview the code decorated with colours in grey-scale corresponding to the importance of the tokens assigned by the underlying PA.

## Related Applications

As we have suggested already, programmers not only have to write code; they have to read it also. We may read code for a variety of reasons: to determine the implementation language, to decide whether it is of good quality, to decide whether it is correct, or to decide what it does from a functional point of view, being just a few examples. Some studies in program comprehension have considered how novices and experts read code, and it is recognised that the ability to quickly summarise what code does is a mark of a superior programmer (Robins et al., 2003). Studies reviewed by Winslow (1996), for example, have concluded that novices approach programming “line by line” rather than using meaningful program “chunks” or structures. Studies collected in Soloway and Spohrer (1988) outline deficits in novices’ understanding of various specific programming language constructs (such as variables, loops, arrays and recursion, etc.) It is said that novices are “very local and concrete in their comprehension of programs” (Robins et al., 2003).

Deimel and Naveda (1990) ask how people read computer programs and how to teach students to read code. They point out that the ability to read code is an often overlooked skill. It provides an opportunity for programmers to share and learn from each other’s work, including from code deposited in repositories. This also allows a programmer to learn good style by example. In the current age of computing, we would argue that discovering and reusing code in repositories is likewise an important skill. In this context also, a quick summarization of what code does could be helpful.

Difficulties in reading code share some difficulties with reading in general. For example, we may not know how to pronounce certain symbols, and this reduces our ability to understand them and internalize their meaning. Hearing such symbols spoken aloud mitigates against this issue. A related issue is whether code itself can be considered to be readable, or is inherently unclear, whether deliberately or through inferior or perhaps excessively optimised coding strategies. This in turn relates to standards for coding style that relate to readability. Algorithms that attempt to verbalise code may provide new insights in this area. In the context of education, particularly where large groups of students are involved, scalability is important, and a quick summarisation of what a program does is potentially a very useful tool to humans in assessing their students’ work. Such software does not relieve us of the burden of carefully checking whether code is correct, but it may help to identify where it is not, or to help markers target their efforts more quickly to where advice is needed. This is similar to the approach adopted in ‘code reviews’, so also of interest in this context.



## Conclusions

We have proposed a novel pedagogy to teach the art of programming, i.e., algorithms, at a distance. Using utterances for conveying programming concepts in different programming languages, and implemented as an Alexa skill, the proposed programming assistant becomes a tool to answer queries about what source code means. In the future, we plan to expand PA to an intelligent chat bot. . *Chatbots are computer programs used to conduct auditory or textual conversations* (Winkler & Söllner, 2018). An intelligent chatbot can facilitate the teaching of a wide range of open-ended programming tasks instead of certain sets of prepared algorithms. In doing that, we can leverage the potential of a chatbot in teaching a variety of students who come from different backgrounds and have different level of expertise. This could be particularly interesting in the context of teaching secure coding practices. Students can be taught to avoid vulnerabilities in code taking into account the conversational flow between a chatbot and a student. A chatbot can intelligently give answers to students in the context of their security understanding and expertise. Interestingly, studies have also shown that the effectiveness of chat bots increases many-fold if the associated social and cognitive contexts are addressed in their design (Brown & Parnin, 2019). These social and cognitive contexts for our PA include how chat bots fit into the workflow of students' learning environments and programming practices. For example, we might consider various layers of correctness in source code (Dil, 2019) such as compilation errors, style guidelines and the passing of unit tests, and the extent to which the code conforms to them, in formulating feedback.

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## MOOCs Format of Open Educational Resources (OER) Repositories: An Alternative Route in China

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### Abstract

The term “Open Educational Resources (OER)” was coined during the forum held by UNESCO with the definition as “the open provision of education resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes (UNESCO, 2002).” Since then the OER movement was officially inaugurated and stretched to the whole world. China followed the trending activities with the national initiative on setting up Chinese Quality Courses Project with free accessed one-stop platform and China Open Resources for Education (CORE) platform. In 2013, MOOCs were introduced into and emerged in China, only one year later than Western counterparts. It is the government, especially the Central Educational Authority, that has pushed higher education institutions and then vocational and technical institutions to follow international steps. However, just in the year of 2013, the CORE stopped updating. To date, there are five top platforms for MOOCs as well as some other platforms operated by commercial companies and school consortiums. Contrarily, the Open Educational Resources Movement, though it started in 2001 in Western Countries, made either no or little impact on China’s educational institutions. Even the term OER seldom appeared in the directives from governments. The UNESCO OER forum in Tsingdao, China, has been renamed in Chinese as the Informatisation Conference by officials. The OER has been categorised as a lower tier under the umbrella of Informatisation. Take publications for example. There are 1627 papers published by browsing with key word MOOCs. However, only the humble number of 135 papers published appears with the key word OER in the Chinese CJNI website. In this paper, the authors firstly set up scenarios by introducing the diverse definitions of OER with a literature review about the initiatives and projects concerning the MOOCs and OER in China. Secondly, they list and analyse the special phenomenon systemically, and explore the deep reasons from political, social, cultural and technological perspectives why the term MOOCs accepted but not the term OER, though they are closely related. The authors argue that OER applications in different countries or regions might take different formats or terms with the same core of OER.

The authors conclude the paper by discussing that the MOOCs, because of easy access in a one-stop repository, appeal to diverse stakeholders of diverse levels of governments, educational authority, educators and audience. That is to say, the OER in China has adopted a quite different format and manifestation in Open Education Practices (OEP). It does exist but with a different name and a different format.

**Keywords:** OER, MOOCs, OEP, Informatisation, Repositories.

## Introduction

In the digital world, higher education institutions in every country are facing dramatic challenges in providing access to education to digital natives and lifelong learners. Open education in a sense offers opportunities for diverse stakeholders of education to increase equality, access and quality in educational resources. The practice of “Open Educational Resources (OER)” , for instance, in the past years, the radio and television delivery of education by some countries, has a long history. However, the term was coined only during the forum held by UNESCO with the definition as “the open provision of education resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes (UNESCO, 2002).” Since then the OER movement was officially inaugurated and spread to the whole world. China followed the trending activities with a national initiative on commencing a Chinese Quality Courses Project with a freely accessed one-stop platform and China Open Resources for Education (CORE); the national repository. In 2013, MOOCs were introduced into and emerged in China, only one year late than Western counterparts. It is the government, especially the Central Educational Authority, that has pushed higher education institutions and then vocational and technical institutions to follow international steps. However, just in the year 2013, the CORE stopped updating for this or that reason. To date, there are five top platforms by the Ministry of Education with its agents for MOOCs and some other platforms operated by commercial companies and school consortiums.

Contrarily, the Open Educational Resources Movement, though it started in 2001 in Western Countries, made no or little impact on China’s educational institutions. Even the term OER seldom appeared in directives, initiatives or policies from the governments. The UNESCO OER forum held in Tsingdao, during which an action declaration was made, has been renamed in Chinese as the Informatisation Conference by the educational authority. The OER has been categorised as a lower tier under the umbrella of Informatisation. Take publications in China for example. There are 1627 papers published by browsing with key word MOOCs, however, only the humble number of 135 papers published with the key word OER in the CJNI website which is a profit academic journal repository in China.



In this paper, the authors first set up scenarios by introducing the diverse definitions of OER with a literature review about the initiatives and projects concerning the MOOCs and OER in China. They then list and analyse the special phenomenon systemically, and explore the deep reasons from political, social, cultural and technological perspectives why the term MOOCs is accepted but not the term OER, though they are closely related. The authors argue that OER applications to different countries or regions might take different formats or terms with the same core of OER. The authors conclude the paper by discussing that MOOCs, because of easy access in one-stop repositories, appeal to diverse stakeholders at diverse levels of governments, educational authority, educators and audience. That is to say, the OER in China has adopted a quite different format and manifest in Open Education Practices (OEP). It does exist, but with a different name and a different format.

### **The Concepts of Open Educational Resources**

The idea of OER can be traced far back in 1998 when David Wiley proposed 'open content'. The concept of OER was initially defined as "the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for noncommercial purposes (Johnstone, 2005)". Alongside the development of the OER movement, more efforts have been made to conceptualise and redefine OER. In a report of the Organization for Economic Co-operation and Development (OECD), it was suggested that OER should refer to "accumulated digital assets which can be adjusted and provide benefits without restricting the possibilities for others to enjoy them," including learning contents, tools, and implementation resources. Wiley (2010) assumes common understanding of the term educational resources, and argues that 'open' concerns just the cost and copyright licensing and related permissions. For Wiley, and of course for many people, open means that a resource is available free of cost and that four permissions (called the "4Rs") are also made available free of cost, though later he added one more Rs. These permissions include:

- Reuse: The right to reuse the content in its unaltered/verbatim form.
- Revise: The right to adapt, adjust, modify, or alter the content itself.
- Remix: The right to combine the original or revised content with other content to create something new.
- Redistribute: The right to share copies of the original content, revisions, or remixes with others.

This frequently cited Wiley's definition has set the cornerstone for the OER movement. More specifically, learning contents should contain "full courses, courseware, content modules, learning objects, collections and journals (OECD, 2007)". To clarify further, OER is illustrated as follows:

- Learning content: Full courses, courseware, content modules, learning objects, collections and journals.
- Tools: Software to support the development, use, reuse and delivery of learning content, including searching and organisation of content, content and learning management systems, content development tools, and online learning communities.
- Implementation resources: Intellectual property licences to promote open publishing of materials, design principles of best practice and localize content (OECD, 2007, pp 30-31).

UNESCO recently updated its definition of OER:

"Open Educational Resources (OER) are learning, teaching and research material in any format and medium that resides in the Public Domain or are under the copyright that has been released under an open license that permits no-cost access, reuse, repurpose, adaptation and redistribution by others (UNESCO, 2019)."

To summarise, the concepts of OER still have diverse connotations and denotations, but generally cover these perspectives: open content; sources of services; resources that provide educational content etc. Any materials used for educational purposes that exist in the public domain or that use a Creative Commons license and are free of copyright (thus providing permission for users to engage in the 4R activities) are open educational resources. Consequently, OER is a generic term that entails open textbooks, opencourseware, and other designations. In fact, the contemporary OER in practice can take any format if it is in compliance with the above generic principles; although some scholars hold different opinions (Miao, Mishra and McGreal, 2016).

### **Scenarios for OER and OEP in China**

The practice of open educational resources has indeed existed for quite a long time in China. In the 1950s, education was delivered openly by television systems for the public in some cities in China. The educational materials used in this television teaching can be accessed by anyone theoretically, because quite a few people could access the television sets. The first television university was set up, and then later offered educational radio programmes, especially for teaching foreign languages in the late half of 1970s. Open educational resources were brought to the viewers and listeners in regions far and wide in China with free access and free cost. In 1979, the establishment of Central Radio and Television University, with later 44 provincial branches around the country, acclaimed the fulfillment of the slogan 'Education for All'. In retrospect, we can see some primitive components of OER. However, up to then, the term OER was still an unknown concept even in the academic community. Interestingly in China, the Open Education Practice (OEP) comes before the OER. This is a special and prominent phenomenon in the context of education in China. In 2003, the Ministry of Education (MOE) of China initiated a pilot plan for the development of online courses in the new



century. It was aiming to promote distance higher education with a consortium of universities made up of 26 traditional universities and 44 Radio and Television Universities, with a total enrolment of 5 million students in China, collaborating together. The initiative provided Chinese universities, which have created their own online courses, with free and easy access to global open educational resources, exploring the framework for Chinese-speaking universities to participate in the shared, global network of advanced courseware with MIT and other leading universities. In so doing, the central educational authority intended to utilize the opportunities of Information and communication technology in pushing the higher education institutions to profoundly transform through digitalization of education. Subsequently, the China Open Resources for Education (CORE) consortium was established in November 2003, following an MIT open courseware conference in Beijing. At the same time, a shared online course platform, the website CORE was set up; however, unfortunately, the CORE has been offline since 2013. Currently, MOOCs is the most prominent format although it is not the start of OER in China.

### **National and Regional OER Repositories in China**

2012 is considered to be the year of MOOCs' commencement in the USA. In 2013 China witnessed the start of the Massive Open Online Course at the national, regional and institutional level. Consequently, the conception of OER has been accepted, redefined and discussed among some scholars, especially the experts of educational technology, in academic circles since then.

Nonetheless, the term OER rarely appears in the official documents of the MOE, though the words *open* and *resources* demonstrate themselves frequently in different directives or policies. The OER was covered under the umbrella of information of education. In 2003, the MOE issued the directive on the construction of quality courses and teaching reform in colleges and universities with financial support for quality courses. In 2010 and 2016, the MOE put forward a ten-year development plan for ICT in education and the 13<sup>th</sup> five-year plan for ICT in education. All these plans are considered to be relative to the Western conception of OER (MOE, 2018). In practice, the MOE financially supports the digital and online courses and the platforms on which the courses are uploaded with only one purpose, that is, to make these educational resources open to all and to serve all. Nowadays, the concept of OER has been used in synonym with MOOCs. In the national OER repositories, there are two MOOC platforms connected with the MOE, and others were established and supported by some elite universities or college/university alliance or some IT companies.

In China, in a sense, specific and special discourse systems differ itself from the other cultures and countries in the world. OER and OEP demonstrate themselves in the format of MOOCs, not in other forms such as open textbooks, open databases and so on. MOOCs started to gain popularity in China in 2013, and the courses often benefit those who live in remote areas. Together more than 10 MOOC platforms in China, and



over 460 universities and colleges have introduced over 3,200 online courses through these platforms, with more than 55 million viewers. Meanwhile, over 200 Chinese online courses have joined international MOOC platforms, winning a reputation across the world. Some people think that China has the largest number of online courses in the world and leads the world in MOOC construction.

Prior to MOOCs becoming prevalent in China, the MOE introduced prestigious online courses (Jingping Kecheng in Chinese), which represented the highest level of open online courses in China. Around 70 percent of the courses were provided by China's top universities, and of course, it would be an honour if the online courses provided by the lower tier of the universities or colleges were selected and awarded the name the prestigious online courses. The MOE proposes creation of 10,000 MOOC prestigious courses and appeals to educational authorities at the provincial level to offer a similar number of quality online courses in 2020. Universities and higher education institutions are currently the main force developing the most MOOCs in the country.

The special feature of the MOOCs in China is that full time on-campus students were by far the largest cohort to undertake MOOCs, 70 percent of which are shared by the universities for credits, although the national qualification network has not been constructed to recognise more credits from different universities for their full time students. The other 30 percent of the online courses on the MOOCs learning platforms are pursued by learners who might be entry-level employees, or governmental officials or personnel in the military, and 93% of users were either in higher education or had already completed a degree. These 30 percent of online courses are fully open to all learners, the lifelong learners who like to follow.

At the same time, in China where demand for education is vast and growing, the rise of MOOCs can play a powerful role in expanding opportunities, access and equity in education whether it is higher, secondary, or elementary education. In line with China's legendary speed at economic and technological development, "new forms of residential education won't be able to expand as rapidly as the Chinese state and private sector working together to provide new forms of learning on phones, on laptops, and online (Reich, 2015)".

### **OER in China: Challenges and Opportunities**

We have browsed for a comprehensive investigation of 10 major platforms, 20 universities, 50 MOOCs, exploring four dimensions including platforms, courses, learners, colleges and universities based on huge empirical evidence and 2000 faculty members and learners. Our investigation mainly focused on seven topics: platform construction and operation, learner groups, curriculum organization form, teaching interaction, learning evaluation model, learning support service, and course certification and academic score system.

We have also browsed the CKNI database with the key words OER to find 135 papers which were published in the CSSCI and/or Core journals. With the key words OER plus lifelong learning, only 43 papers appeared and with the key words in Chinese 'Kaifang Jiaoyu Ziyuan', there were 246 papers. Compared with the papers published with the key word MOOCs, more than 2,000 papers were found in the CKNI database, and there were much to be desired in terms of research and publications. As Tuomi (2006) commented that OER is still not 'a household word', even among the academic world.

Based on the investigation, we have found that there is a strong connection among diverse stakeholders such as governments, universities and IT entrepreneurs in the creation and development of MOOCs in China, which has provided excellent and equal opportunities to develop an innovative educational service system for full time on-campus university students and lifelong learners in all kinds of life including government officials and military. The results revealed some characteristics in OER and OEP in China, which might differentiate themselves from the other countries in Asia and in the world.

First, China has a long history of distance education in terms of multimedia, such as television and video, so MOOCs feel like an extension of that work rather than a new phenomenon. Second, Chinese instruction is generally didactic, so the gap between listening in a lecture hall and listening online is modest. Third, there is some sense of a Confucian tradition where teachers are revered orators and students are responsible for the hard work of memorizing and synthesizing from these teachers. And fourth, the internet connection covers widely in cities and remote regions in the countryside. Cost is not the consideration of the telecommunication companies, it is the mandate from the governments. So, in a learning culture with rote learning, OER realised in the form of courses better suits politically, socially, culturally and technologically the needs of diverse learners of different ages in China .

The findings of the OER might be summarized as follows:

- governments funding;
- awards for the selected quality courses,
- public and private sector involvement and cooperation;
- inter-constitutional collaboration;
- MOOCs format, open courses based;
- credits for on-campus higher education and no credits/credentials for lifelong learning;
- one-stop platforms;
- quality first;
- integration into the curricula of the relative universities.





Moreover, the results saw a burgeoning increase in openness of the academic journals. The results also showed that at the macro level the OER demonstrated effectiveness and efficiency in linking traditional teaching and learning and online learning, and proposed a hopeful prospect for lifelong learning in the future.

As might be expected from the semi-structured interview participated by faculty members, familiarity with online instruction positively impacts attitudes toward OER. In fact, online teaching experiences had a drastic impact on faculty members' attitudes and interests towards OER development such as the motivation to develop OER, ways to develop OER and the value of developing OER in the format of MOOCs. Such findings indicate that opportunities to engage faculty members in OER-related practice, such as online teaching, are vitally needed to encourage them to develop and use OER. The good news is that the faculty members who develop or participate in the making of the online courses will be awarded with merits from the MOE if their online courses are selected to upload onto the MOOCs platform and are selected to be a prestigious online courses.

### **Future Prospects**

Several months ago in April in Beijing, the China MOOC Conference attracted more than 600 scholars, educators and teachers attendees, It wa webcasted by nearly ten relevant channels to the whole country, and faculties and staff at different levels of education and tertiary educational institutions viewed the conference. A representative from the Ministry of Education (MOE) in China issued a Declaration for Action in MOOCs Promotion. With the background of foresight, transformation and innovation, the Action Declaration declares some actions to be taken: in 2013, the starting year of making MOOCs guided and facilitated by the MOE, and then the MOE recognized and awarded 490 MOOC courses as national prestigious courses. In this year, 2019, the MOE will select and awarded the second batch of 801 MOOC courses as national prestigious courses. For six years, the China MOOCs experienced dramatic changes from zero to more than 12,500 courses on MOOCs platforms, providing credits for full time on-campus university students. In addition, more than 20 billion of citizens have viewed the relevant courses for lifelong learning. The China MOOCs not only provide content for academic studies but also offer training courses for more than 89 million of the Communist Party members or cadres in their learning app. Of course more than 700 courses cover the Military Services for lifelong learning too. In retrospect, the secrets for success of China MOOCs rely on the following six points:

- Quality - good universities with good teaching staff to create the good courses.
- Equity - spread the good and open educational resources to the any educational institutions and any regions which needed them.

- Learner-centred - the focus is on how the students learn, catering for the digital natives learning needs and learning cultures.
- Teacher created - the teacher initiates the courses and organize his/her own teaching to create the open courses.
- Open and sharing - all courses are open on the learning platforms, with only simple signing-up.
- Cooperation - the MOOCs integrate diverse stakeholders, the governments, universities, entrepreneurs and academic faculties.

## Conclusion

To further promote the educational reform and comprehensive implementation of the China Education Modernisation 2035 Plan, the MOE vows to build more MOOCs to provide the service to the country and the world. Let us cite the five ways offered by the MOE; the way to equity, the way to sharing, the way to service, the way to innovation and the way to cooperation (Wu, 2019). The five ways suggest for diverse stakeholders of diverse levels of governments, educational authority, educators and audience to realize the full benefits of OER infrastructure and to focus more on OEP. Hopefully, the creation of OER can find its way into the more practical OEP in more diverse formats and thus integrate themselves into the secondary and higher education and lifelong learning in the near future. China's experience in implementation of OER and OEP might provide some insightful reflections to the world.

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## Forestry Education in Action: Team-based Approach Delivering Collaborative Learning for Large Online Repurposed OER Courses

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### Abstract

Global challenges such as climate change, forest degradation and illegal logging are having a major environmental, economic, and social impact around the world. Global access to relevant open education resources is extremely important to address these challenges and improve sustainable forest management practices. Under this context, since 2014 the University of British Columbia (UBC) Faculty of Forestry has led a multinational, multi-university collaborative forestry online program to develop a series of self-directed online courses in sustainable forest management (SFM) for global learners as open educational resources (OER). As the only SFM online program of its kind, it provides world-class forestry education resources created and supported by leading professors and experts from internationally recognized universities around the world. This award-winning program has attracted over 9000 students and professional learners from over 90 economies around the world since 2016. The paper will address how an existing self-directed OER course was repurposed and implemented through a team-based approach to foster collaborative learning outcomes in forestry-related majors. At UBC, the Faculty of Forestry partnering with the Centre for Teaching, Learning and Technology (CTLT) repurposed one of the SFM self-directed OER courses to become instructor-facilitated online courses to educate a target audience not only about core SFM knowledge but also about communication skills in an online environment. It introduces active learning pedagogical approaches to facilitate the online forestry courses benefiting a wide range of learners worldwide. The paper will demonstrate two current practices developed by the UBC Faculty of Forestry in 2017 and 2018 using one of the available OER courses of the program. It will showcase good examples of delivering SFM knowledge using available quality OER to global audiences from various cultural backgrounds, as well as creating an effective learning community to promote learning and experience sharing in forestry practices in the Asia Pacific region. In the paper, we will share our learning on issues and challenges that we have experienced while offering these online courses.

We will also share the strategies that we adapted to address those issues and challenges to enhance student learning experience. Student achievement and satisfaction will be presented. Implications for future delivery will be discussed. We believe our experience in international collaboration targeting international students will provide useful lessons and information that could benefit higher education practitioners who are interested in seeing examples of delivering online courses using repurposed OER.

**Keywords:** OER, Flexibility, international Collaboration, Global Learners, Communication, SFM

## Introduction

According to the United Nations Forum on Forests (Gabay & Rekola, 2019), there are several major challenges facing forestry education. Namely, climate change effecting global ecology, environments, and biodiversity, changes to technology, to the economy and globalization, world demographics, and government and policy (Gabay & Rekola, 2019). In addition to these evolving complications, there is a worldwide lack of training and education in core competencies such as communication, leadership, and management (Gabay & Rekola, 2019). These skills are highly valuable when students enter the workforce and must communicate effectively, manage time and resources, and take initiative in leadership positions. This trend is found in forestry programs around the world, and it is difficult to address these interconnected challenges on a global scale with traditional forms of classroom education alone. A significant number of students worldwide are unable to access forestry education due to location, income, careers, and family responsibilities. Additionally, many students have already completed or are in the process of completing a degree, but need to develop their knowledge and skills further. The traditional classroom teaching method was unable to satisfy the changing role of forestry and produce global forestry practitioners, online learning will be an alternative for forest education (Längin, Ackerman & Lewark, 2004).

In collaboration with international partner universities, UBC has been making efforts to meet the demands of learners and provide solutions to these problems since 2016, with five SFM self-directed OER courses covering a variety of topics, such as sustainable forest management, forest governance, community development, forest restoration, plantation development, and resource management and protection. The courses were developed by UBC along with five renowned universities in the AP region, University of the Philippines Los Banos, University of Melbourne, and the Beijing Forestry University.



## Research Background Information

### *Methods*

Online course - Sustainable Forest Management in a Changing World was selected as a pilot course to examine different pedagogical approaches and technology application using OER. Two pilot offerings of the same course (2017 & 2018) were led by instructor and facilitator from the Faculty of Forestry, and supported by the Centre of Teaching, Learning and Technology (CTLT) at UBC. The participants of the pilot courses and the surveys later on were made up of international online learners, including undergraduates, graduates, and practitioners, from UBC's partner universities and the Asia Pacific Forestry Education Coordination (AP-FECM) networks.

Comparison analysis between the two pilot offerings of the same course were conducted by UBC based on observations, learning data and student feedback from post-course surveys. There were 109 registered learners in 2017 and 128 in 2018. The comparison analysis was done to examine student backgrounds, preferences, performance and effectiveness of teaching methods, challenges and areas of improvement in the two offerings of the course.

## Course Description

Course - Sustainable Forest Management in a Changing World is designed to provide in depth knowledge on seven main criteria and indicators that has been used to guide sustainable forest management practices and then extended this concept to management of forest through the lens of climate change. Apart from theoretical knowledge relevant with the SFM, several case studies were presented related to wide range of sustainable forest management practices in the climate change perspective from Asia-Pacific region so that learners have opportunity to familiar with both theory and practice.

By the end of this course, learners should be able to:

- 1) Explain the principles of sustainable forest management;
- 2) Apply the principles of sustainable forest management within the context of climate change;
- 3) Compare and assess the major components of sustainable forest management;
- 4) Analyse and solve the complex problems faced by modern forest managers.

## Course Delivery

### *Pilot Course in 2017*

In 2017, the course was offered as an open enrolment instructor-led session to learners from Asia free of charge. In this session, there were 109 learners registered from Vietnam, China, Cambodia, Myanmar,



Indonesia, Bangladesh, Pakistan and Congo to name a few. Their educational background ranges from undergraduate to graduate level while many lecturers in the university also participated in the course.

In such a large-scale online course, a detailed instruction manual along with a schedule of the course were provided to guide learners' participation. Ten days prior to the course, registered learners were required to follow the instructions and get familiar with procedures and structure of the course. The duration of the course lasted for 9 weeks, during which learners were required to study video lectures from the course website, participate in the online discussions, as well as complete required reading materials and a final assignment. The online discussion was facilitated on the Piazza platform which is an online question-and-answer application for instructors to use to encourage written discussions involving students, teaching assistants, and other instructors.

On the Piazza platform, the instructor posed statements and questions in relation to given modules and topics on the first day of each week (Monday). Learners needed to watch video lectures under assigned modules from the course website, then answer instructor's questions and respond to peer's posts on Piazza.

#### *Course in 2018*

In 2018, the same course was offered to global learners through Canvas, which is UBC's primary learning platform for delivering online course content. There were 129 learners registered in the course from Bangladesh, China, Myanmar, Cameroon, Chile, Indonesia, Mongolia, Sri Lanka, and Ethiopia. The course was again offered as an open enrolment, instructor-led, and free of charge session. The learner's background in 2018 was the same as 2017.

The 2018 session adapted a very different method of delivery compared to the session in 2017. At the beginning of the course each student was asked to prepare a short video 30 seconds or less in length, introducing themselves including information like their name, country, affiliated university, favourite hobbies, and expectations from the course.

The 2018 course focused entirely on group learning and discussion to enhance the learner's engagement and ability to gain new and interesting knowledge. At the start of the course learners were asked to form groups of 4 diverse individuals and designate one person as group leader. The group leader in each group would change every two weeks, along with the discussion topic. During discussions, all members except the leader would initiate discussion on the topic. The leader would encourage active participation from group members and then at the end of the two-week period, the leader summarized his/her group's learning on the topic and assessed the group performance in a short, concise paragraph. Learners would then be asked to comment on other group's summaries within two day after the group summaries were posted in class forums. All learners were encouraged to think critically about topics and bring in examples from their own countries.



While the main focus of the 2018 course was on group discussion, learners were also required to watch online videos and read supplementary material assigned every two weeks according to the course modules. Additionally, learners were required to challenge themselves by completing self-tests on each topic, and then complete self-administered quizzes on the entire module to assess their own learning and discover what areas may need more focus.

## Comparison Analysis

### *LMS Platforms*

A key difference between these two course sessions that had an effect on student learning ability was the chosen platform. The Piazza Q&A platform used in 2017 proved to have a less friendly user interface compared to Canvas, which was the chosen full- fledged LMS platform in 2018, and which is the platform used by all UBC students and faculty now.

*Piazza* - Piazza is much less intuitive than Canvas. It was not easy for users to tell how each part of the course was organized within the platform. The course content (announcements, assignments, messages) in Piazza was all listed on the left-hand side of the main screen in a drop-down bar, with very little organization or categorization of the notices. If a student wanted to make a post, they would click a “new post” button on the main screen, opening a text box area in the centre of the screen where they could select the type of post, include their name, their comments, and what their comment was addressing. Another component of Piazza was the Knowledge Café, which was a discussion board set up for students to post and answer questions regarding course topics. This part was confusing for students, because they had to leave Piazza to get to the course page, where they found a link for the Knowledge Café and were required to select the instructor led discussion, where they would then follow a link to an additional sign up page, login, and then were taken back to Piazza to answer the discussion question. This complicated platform ultimately resulted in low interest in the discussions and low course engagement overall.

*Canvas* – Canvas has a very clear interface and was user-friendly to both students and instructors in the course offering. The course was organized into sections; home, syllabus, content, announcements, discussions, assignments, user groups, grades, and course evaluation. There is also a section of Canvas called the “dashboard”, where students are able to see notifications from all their courses at once, organized by what is due first or what was posted most recently. The instructors contact information is easy to see on the home page, and instructors can be privately messaged if a student has a question they want to address specifically to them. Additionally, all posts and comments are contained within Canvas. Students were able to answer discussion questions within the discussion section, ask questions within the announcements page, communicate more effectively with their peers/groups, and view what assignments were due next within the assignments page. Canvas was found to have more effective functions to enable student ability to





effectively navigate the platform, discuss topics with their peers, and access knowledge on SFM topics in a clear and organized manner.

### **Learning Activities**

The learning of students in the 2017 offering of the course mostly relied on instructor-led instruction and students' self-learning on course content. The instructor announced topics and then led each discussion. Some of the students also participated in peer-to-peer discussions when answering questions posed by the instructor, but there was not as much success with that style of discussion in terms of student engagement. The instructor led discussions made up 40% of the marks for the course. The students were also required to complete self-test quizzes pertaining to each module (worth 15%), read supplementary materials, watch online videos, complete mandatory writing assignments at the end of each module, and then do a final writing test at the end of the course worth 35%.

Bloom's Taxonomy, a hierarchical ordering of cognitive skills that can, among countless other uses, help teachers teach and students learn (Heick, 2018), was used to associate the learning activities in each offering of the course with its course objectives. Bloom's 'Taxonomy of Educational Objectives' (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956) increase from less complexity to highest complexity are the following objectives; remember, understand, apply, analyse, evaluate, and create. For 2017 offering of the course, at the most basic level, students were encouraged to remember information in the course by completing self-test quizzes. They understood with reading materials on each topic, then they applied their knowledge with instructor-led discussions, and participated in peer-to-peer discussions. The 2017 group did not get to the evaluating and creating levels.

While the 2017 course relied on instructor-led instruction, in 2018 the course was structured so that students could take more control and therefore being initiative in their own learning. More focus was placed on using group discussion as an effective pedagogical approach to learning, which allowed students to compare their own experiences with their peers, therefore gaining practical and applicable knowledge from other countries in an engaging manner. This approach to learning is made possible through online courses.

Students were able to gain the knowledge and skills required to reach the second highest level of the Bloom's Taxonomy learning objectives. In the 2018 session, learners were able to surpass the highest 2017 level, analysing, and continue on to critiquing on group leader summaries and writing peer responses to the summaries. Four group discussions made up 36% of the course marks. Group leaders facilitated communication between members and each group leader would complete another 25% of their course



marks after writing a summary of their teams learning on a topic. Members of each group asked questions, shared personal experiences, and responded to summaries (worth 24%).

Another key approach used in 2018 was the opportunity for students to co-create knowledge within the course using text, images, and videos to share valuable knowledge from their own countries and local areas. Placing more weight on activities that promoted student engagement resulted in more motivated learners with intrinsic interests in the topics, and contributed to a 33% higher passing rate in the course compared to 2017.

### **Operation and Support**

Comparison of the planning, preparation, and support that went into operating each of the two sessions brought some key differences to our attention. How the courses were formatted had a significant effect on the percentage of students that completed the course (23% for 2017 versus 56% in 2018). Both the 2017 and 2018 pilot sessions were repurposed, instructor led, and open to the public. They also both targeted the same categories of audience; undergraduates, graduates, and instructors. However, all other details differed between them.

In 2017 the pilot session was 8-9 weeks long and expected students to commit 3-4 hours a week, while the 2018 session was 9 weeks long and expected students to commit 5 hours a week. There was less preparation for the 2017 session, as only one instructor led the session and prepared the time table and discussion questions. CTLT was asked at the last minute to support with the creation of the Piazza discussion forums. A team of one instructor and one facilitator led the 2018 session, creating a syllabus, timetable, course schedule, and discussion questions. They also had the assistance of a learning designer from CTLT providing instructional design and technical support in terms of review and input on syllabus, timetable, and course schedule, creation of course site with the Canvas LMS platform, integration of learning analytics visual tools, and review and input on other aspects of the session.

### **Findings Through Comparison**

#### *Lessons Learned*

A number of issues were identified through this comparison analysis between the two sessions. One of the main reasons for a low completion rate in 2017 was due to the breakdown of the marks. The 2017 session contained too many assignments, such as instructor led discussions, quizzes, and a writing test worth 35% of the final mark, creating issues with student retention throughout the course. For online education especially, the learning platform chosen for the course affects students' ability to access information, and therefore



their ability to succeed in the course. Based on the results from our surveys, it was found that the Piazza Q&A platform used in 2017 was not very user friendly for the students or the instructors. Another key issue identified through the surveys was the length of the videos used for instructional/supplemental purposes. Students found that the videos were too long, and they lost interest and were less engaged in the material. An aspect of the session that was missing in 2017 was the use and implementation of learning analytics as a tool to improve student motivation. Since there was not enough preparation for the 2017 session, CTLT was not able to support the course with this tool. The level of instructor leadership in the course also had a major impact on student engagement. Students in the 2017 session struggled to remain active because they had less of a role in the course and therefore lost interest in the material more quickly.

#### *Responses to Key Research Results: Adapted Strategies*

Most of the issues and challenges found in 2017 were recognized and addressed in the 2018 session. The marking breakdown in 2018 was changed from an assignment heavy workload to a marking distribution mostly made up of group discussion activities focused on peer-to-peer interaction. There were four group discussions, one summary of a discussion completed by a student when they were selected to be group leader, and 4 peer responses to group discussion summaries. All students were positively encouraged in the discussions by either an instructor or the designated group leader. This adapted learning technique increased student engagement and encouraged students to actively participate in the course, communicate with their peers on interesting topics, and facilitated cross country learning, increasing retention overall. A full-fledged LMS platform was also adapted for the 2018 session. Canvas has a much more user-friendly interface for students and instructors, which allowed students to easily access information. According to the survey done in 2018, students rated the course organization, relevancy, and clarity of content very high.

#### *Key Outcomes and Analysis*

Looking forward for future course development, we would like to make some practical suggestions and recommendations that could be beneficial to others implementing or repurposing OER courses. It was evident after the 2017 session that sufficient preparation time is needed in order to create an effective, well-functioning, and engaging online course. We advise OER developers to be prepared to invest time in the course throughout the entire duration, not only the beginning. This is best done using a team-based approach to the learning and instructional design. Additionally, it is recommended that course designers and developers include learning analytics in the preparation and assessment of online courses. These can be extremely useful to make observations and predictions on how students interact with different aspects of the course, and how those interactions affect their success. To keep students engaged in course content for multiple weeks at a time an interactive learning approach must be used with a variety of activities. Diversify



how the material is presented, including short videos, text, graphics, and trending/emerging technologies to deliver engaging assignments that will enhance learners' retention.

## Conclusion

In order to provide the new generations of forestry students with sufficient knowledge to manage, conserve, protect, and govern our natural resources in a world that is becoming more complicated by the day, we must be able to offer a multidisciplinary education in a way that is accessible to all who have a desire to learn. Education through OER courses plays a vital role in the process of internationalizing information and connecting individuals, communities, universities, businesses, and industries. The future of forestry education needs flexibility, accessibility, practical experiences, engaging pedagogical approaches, diverse learning activities and environments, and transformative connections. To achieve these goals, we have adapted our own approaches through data collection from student surveys which has resulted in several successful modifications to the OER courses offered by UBC. From assessing the results of the surveys, we were able to determine that a significant amount of time must be invested in the creation and involvement of online courses. Proper preparation is needed in the selection of LMS platforms, course organization, choice of learning activities, planning distribution of course marks, media types, and distinction between student and instructor expectations.

A possible limitation to this study is the limited participation from students in the post-course surveys. This will be another opportunity for growth in the future, since the development of a complete analysis of all areas of both success and failure in the course relies on receiving the maximum amount of responses from students.

By conducting comparison studies such as this, we hope to be able to share our knowledge and experiences to further improve the quality of online education, student achievement, satisfaction, and successful acquisition of needed knowledge and skills through self-directed, repurposed OER courses everywhere.

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## How Agricultural Television Programmes Aid the Training of High Quality Farmers: With the Former “Land of CABTS” of the China Central Television 7 as an Example

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### Abstract

High quality farmers who love farming, understand technologies and are good at business management are becoming leaders of invigorating agriculture through science and technologies and the mainstream workforce in the construction of the new countryside. Through producing agricultural programs, television media has made beneficial explorations and played important roles in serving the training of high quality farmers and supporting the implementation of the rural reinvigoration strategy. This paper presents the improving and innovating series of programs of “Field School” and “On the Way to Prosperity” in the former “Land of CABTS” column of the China Central Television 7. Distance television was used as a means to transmit new models, new technologies, new concepts and new ideas of agricultural production and business operations, set up a model of high quality farmers and share the experiences and practices of farmers’ education and training. At the same time, it explored how to use agricultural program resources to produce more targeted and flexible video instructional courses for popularization and application through new media terminals to enhance the results of training of high quality farmers. The running of agricultural television programs in China and other countries is different. Some of these have successfully transited to agricultural channels, some only host agricultural programs, some urgently need agricultural programs. China is a big agricultural country and its large scale, multiple groups and high ending agricultural television broadcast have opened up a path with Chinese characteristics for the professionalism and public broadcast in the world. This paper is under the subject matter of “global challenge and solution”, from the perspective of agricultural column as it demonstrates the practices and experiences of agricultural television broadcast.

**Keywords:** Rural Reinvigoration, High Quality Farmer, Agricultural Television Program, Land of CABTS



## Introduction

The report of the 19th Congress of the Communist Party of China tabled a rural reinvigoration strategy. In the efforts to reinvigorate rural areas, farmers are the subjects and talents are the key. High quality farmers are the core component of talents of rural area, therefore, the training of high quality farmers is an inevitable path to realizing agricultural modernization. Recording the development stories of high quality farmers in the reforming era, broadcasting and popularizing their new thoughts and good practices, and revealing the social forces that support the success of the group is a subject that television media should pay attention to and study. This paper uses the former “Land of CABTS” column of CCTV 7 (it is now transformed to “Field Demonstration Show” of CCTV 17) as an example to demonstrate the role and practices of agricultural television programs in fueling rural reinvigoration and the training of high quality farmers. At the same time, it also explores how to use television resources to produce more targeted and flexible video instructional courses and how to integrate with new media to jointly enhance broadcast to rural areas.

## Rich Program Types to Meet Diversified Needs

Agricultural television programs in China have a pattern of multiple stations and diversified channels of broadcast based satellite, local TV stations, cable TV and wireless coverage. These have great influence in the vast areas of China and contribute greatly to agriculture, rural areas and farmers. The former CCTV 7 was the only national level agricultural channel with 11 columns (it was 13 at the peak) and there was clear division of work among the columns that explained policies in agriculture, rural areas, and farmers from different perspectives and dimensions. It popularized advanced production technologies, trained and developed skills of labors, popularized experiences of prosperity and communicated information about agricultural products market and circulation, which facilitated urban residents understanding about agriculture, farmers and rural areas.

Land of CABTS was one of the columns, which had been running for nearly 32 years until August 2019 when it was transformed. For many years, the column had been upholding the objective of training new farmers, developing new agriculture and serving new countryside. It had been consistently striving for education and training of farmers in science and technologies, technological know-how extension, information dissemination and popularization of sciences. Therefore, Land of CABTS had rich program themes, which could be roughly divided into 5 categories as: (i) “from farm to table” that focused on the quality and safety of agricultural products; (ii) “pastoral countryside” that focused on the construction of new countryside; (iii) “on the way to prosperity” that shared experiences of business initiation and prosperity; (iv) “new variety and good practices” that demonstrated and popularized modern agricultural science and technology results; and (v) “seeking nostalgia” that focused on handcrafting and memories of childhood. The contents of the columns involved crop farming, animal production, agricultural product processing, skill training, services for daily living and quality and safety of agricultural products. The first airing each day was in two sections totaling one hour and about 570 programs were aired yearly. Since the programs included practical knowledge of sciences, they were well received by farmers. It is safe to say that Land of CABTS was an



important television classroom for education and training of farmers and equally an important window for urban residents to gain knowledge about consumption of agricultural products.

### **Focusing on the Training of High Quality Farmers and Innovating Program Form**

Even though the programs aired by Land of CABTS covered many fields that could meet the needs of the audience of different levels, its themes covered many disciplines and sectors with the technologies of many fields explained, which caused weak positioning, uneven reception and poor visibility in some cases. Along with increased attention given to agriculture, rural areas and farmers, the community of high quality farmers has been developing rapidly. Land of CABTS closely followed the new situation and new demands of the development of agriculture, rural areas and farmers, and continuous efforts have been made to improve the categories of programs and service contents. Starting from 2017, the column regrouped its series. In the end, the series of “on the way to prosperity” and “from farm to table” were kept and a new series of “field school” was developed. These three series respectively, from different perspectives of human actor, technology and agricultural products, demonstrate results and experiences of agricultural modernization process. As such, the contents had more accurate targeting and the quality of programs, results of reception and social benefits have been greatly enhanced. From 2013 to 2017, the television viewing rate of the column of CCTV 7 increased gradually from 13 to 7 (there were about 40 programs surveyed). From 2015 to 2018 the nationwide viewing rate was also increasing.

### **Materializing the Dream of Income Generation for Prosperity**

There are many columns featuring stories of income generation for prosperity as the core, which explored the successful experiences of farmers in the agricultural economy, demonstrated their practices of business initiation and experiences of income generation for prosperity. These subjects are popular among farmer audiences. The difference of “on way to prosperity” of Land of CABTS and common income generation for prosperity is that the former focused on the development experiences of high quality farmers in the context of a new era as well as modern agricultural production and operation rationales and development models. Furthermore, the starting point of the actor was not high and many projects selected have good replicability.

For example, the program of E-commerce Rose in Yimeng Mountain, the protagonist Niu Qinghua is a high quality farmer of Shandong Province, she is also a representative of Shandong People’s Congress. About 5 years ago, she was a rural woman who farmed land and raised pigs. Niu Qinghua had primary school education only. The turning point of her life was started from her participation in education and training of farmers hosted by local CABTS school; such education and training enabled her to produce more and sweeter peaches, furthermore, the training enabled her to know how to overcome the barrier of big mountains through the Internet. She attempted to market locally featured products through network platform. With several years of hard work, she has now become an expert in e-commerce with production values of several million CNY each year. She branded her products, established a farmer cooperative and helped over 100 farmer households shake off poverty for prosperity.





The category of programs followed the story line of an individual to promote the development of high quality farmers. In the process of uncovering such stories, we often found out that many business initiators in agriculture indeed started their way from watching and listening to our programs, from which they got the information and inspirations. These are the starting point of this series of programs of “on the way to prosperity. Through the leading role of classic cases, it can encourage more high quality farmers to start their businesses; it can speed up the development of high quality farmers who love agriculture, understand technologies and are good at business operations; it therefore provides strong human resource support to reinvigoration of rural areas.

### **Resolving Practical Problems in Production**

“Field School” series target at hundreds of millions of small holders, builds a platform that links the small holders with modern agricultural development and solves difficulties in production and operations. The series are problem driven. Reporters and farmer specialists formed a supporting team that gets down to the front line of agricultural production in association with the current farming seasons to provide solutions to problems encountered in production and operation. It adopts a hands-on approach to teach small holders, at the same time, senior specialists are invited to comment on key technologies and define the scope of use of such technologies to guide small holders to use such techniques in their own setting to increase production and income. During the program airing, mobile phones are used to allow farmers in the country to raise questions to seek answers from specialist, which attracted interactive exchange among audiences.

As an example, the viewing rate of the first broadcast of the program of “Stopping crazy grape branches” topped the CCTV 7. The entry point of the program was the rampant growth of grape branches in summer, which can cause production loss or even no harvest, but small holders cannot do much about it. In Xiayi of Henan Province, the reporter brought a team of farmers who encountered the problem in their vineyards to the grape greenhouse of Wang Fei - a farmer specialist. Wang Fei’s secret weapon can achieve total victory with one action. During the face-to-face exchange, Wang Fei demonstrated the operation while other farmers looked at, studied and discussed it, and then practiced it with the hands-on coaching of Wang Fei. Soon, all of them mastered the secret weapon. Wang Fei also answered the questions of grape producers from thousands of kilometers away via mobile phone video. Once the program was aired, Wang Fei quickly becomes a household name as a farmer specialist and he helped many more farmers resolve the problem of grape production to achieve good harvest.

There are millions of farmer specialists like Wang Fei who are active in the country. They have unique skills and can use key know-how to lead farmers of communities to prosperity. And our program is aimed to uncover such farmer specialists all over the country to help small holders to address practical problems, which brought about hope to the small holders towards modern agriculture. Seeds of income generation for prosperity with the aid of science and technologies are sown on the vast land of the country.



## Helping Branding in Agriculture

Looking at the title of the series of “From Farm to Table” of Land of CABTS, one can immediately realize that it is a chain and a bridge from farmland to dining table. A bridge that at one end roots in rural areas and the other touches down in urban areas; one side is the producers and the other side is the consumers. The program centers high quality farm products in localities and traces back to stages of production, processing and consumption. It demonstrates a rich and colorful food culture, disseminates scientific production and healthy consumption rationales, and popularizes technical knowledge that ensures the safety and quality of agricultural products.

From the back stage of the public Wechat account of the column, we can see that once this category of programs was aired, the response of the audience was overwhelming active. Most questions from the audience focused on “where can I buy such good farm products?”, “is there an on-line shop?”, and “how to get this variety to my area?”. For example, the program of “Happily tasting *Mesembryanthemum crystallinum* Linn. and the freshness in Dujiangyan” presents the high quality farm product of *Mesembryanthemum crystallinum* Linn., as well as rainbow trout and sturgeon of Dujiangyan. Once the program is aired, many people called asking where to buy the caviar of sturgeon. The producer of the program even helped bridge consumers with the farmers, which resulted in a large quantity of sales. There are many cases of this kind. The program production team, in the end, published the contact numbers of the farmers (with prior consent) through the public Wechat at the top of the comments section to facilitate consumers contact with producers directly.

When shooting the programs, we often find out that difficulty selling their products is a common problem for farmers. It is not difficult to master techniques of crop and animal production, but what is worrisome is the marketing channel. Helping farmers sell their products will remove the concerns and worries of farmers. Our program builds a bridge between the supply and consumption sides, hence playing important role in expanding market channels of agricultural products.

## Program Promotion and Interactive Service, Uplifting the Value of Information

In recent years, the maintenance and operation of Wechat and Weibo platform of Land of CABTS have been updated very frequently and promotion of the program has been strengthened with good results achieved. Firstly, the promotion methods have been enriched. It has transformed from text plus image to text plus image plus short video. Secondly, the quality of promotion has been improved in order to catch the eye. All efforts are being made for each program to distill a sensitive topic of the greatest interest of the audience. For example, “one frog makes a million a year” (the title of the program is the “stone frog kingdom of Wang Tingting”), “in order to raise pigs, he shamefully cheated her wife for 10 million CNY” (program title “one net catches all wild pig pork”). Thirdly, suspension is placed in the presentation of the contents to stimulate the expectation of the audience. After airing, there were reviews of contents and websites, and at the end of the



paper, readers can also voice their opinions. As such, an increasingly human-centered service attracts more and more audience.

In addition, network promoters of the column has also established a Wechat group for viewers who can discuss the contents of the program and share their opinions after viewing. If viewers want to ask technical questions of the program, we will identify experts to answer them as timely feedback. As far as viewers are concerned, participation in interactivity would allow them to find the sense of presence and feel the features of freshness of agricultural programs, as well as enhance their coherence to the program. As for the column is concerned, it is easier to know the needs of the farmer audience so as to adjust the direction of production of program. More importantly, some viewers can, through the platform, obtain technologies or business initiation information for use in practical production to succeed. Therefore, in-depth dissemination of information is very beneficial to the promotion of the development of modern high efficiency agriculture.

### **Strengthening Utilization and Development of Programs After Production to Expand Ways of Transmission**

Some of the programs of Land of CABTS have high technological elements that are worthy of repeated viewing which are also very suitable for courseware production for uploading to on-line learning platforms to maximize the use of resources. The host institution of the column is CABTS - a nationwide comprehensive and specialized education and training system for farmers. It uses modern distance education means to deliver education and training of farmers and has its own on-line learning platform, which can effectively achieve the utilization and development of program video resources of Land of CABTS. For instance, the practical technology courses of China Agricultural Distance Education Network of CABTS and the refreshing training courses of agricultural technicians of Cloud Smart Agriculture App have all selected video materials of Land of CABTS. The videos are broken into different modules, in association with a menu navigation, hints and comments of experts, knowledge extension and quiz after classes, courseware are hence developed. These republished video resources are well received by learners and have become a well-known brand for on-line learning of high quality farmers.

Since 2017, short video industry has attracted consumers. In the field of broadcast in agriculture, rural areas and farmers, short video is flexible and convenient, which is good for farmers to use fragmented time to watch on their own, it also supports playback. It has become a new favorite for agricultural technological extension and dissemination of government information. The Land of CABTS is also exploring how to develop and use short videos to disseminate agricultural technological knowledge and promote agricultural product brands. For instance, it plans to use Tik tok and Kwai short video platforms that are popular at present with large number of users. From the CABTS system (it has over 2200 schools over the country and provides training to over one million career farmers), good hands can be recruited to establish video blogger groups. The column can select suitable materials from the video blogger groups to produce programs or publish the videos on the platform at the same of shooting programs. It not only can enrich the resources of themes, but also expands the channels of program broadcast and enhance the influence of the column. As a television media specialized in producing agricultural programs, Land of CABTS has genuine original video contents,



which is the greatest advantage that many other new medias do not have. The integration of new and old medias to maximize the advantages of both and attract the attention of more non-agricultural groups to the column and agriculture.

## Conclusion

For a long period of time, television media has had a large audience in the vast rural areas and its influence is also great. As a means of distance education in agriculture, agricultural television programs has made great contribution to aid rural reinvigoration and training of high quality farmers. However, along with the continuous development of Internet technologies, the types of media farmers can access are becoming increasingly diversified. As the next steps, we need to broaden the platform and expand the means of distance education. One product can be displayed at multiple platforms for dissemination through multiple channels to allow more convenient access for farmers. After August 2019, Land of CABTS will be transformed to Field Demonstration Show and migrated to the new agricultural special channel. New forms of programs, however, assume the consistent mission of continuing to assist the training of high quality farmers and contribute to the development of agricultural modernization. In the past 32 years, with over 18,000 programs we progressed persistently with solid steps on the ground and contributed to the advancement of agriculture, rural area and farmers. The author has been working on the column of Land of CABTS for 15 years. With this paper, I wish to commemorate the old column and to express my warm feelings toward the explorations, breakthroughs and achievements over the years. Even though the title has changed, the original objective remains unchanged. The development space of agricultural programs in China is becoming more and more broad and more and more powerful.

