RESEARCH BASED DESIGN MODEL FOR E-LEARNING IN KENYA'S INSTITUTES OF HIGHER EDUCATION: A PROPOSAL

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ABSTRACT

Over the last 10 years or more, there have been great strides made by players in both the public and private sector to implement e-learning in both the corporate and educational institutions. A look at various literature reveal that these institutions are adapting strategies to install and incorporate Learning Management Systems (LMS) as part of enhancing their modes of training their staff or students. Increase in the number of students who require to enroll into institutions of higher learning, has put a lot of pressure in the government, universities and colleges. They lack the capacity to accommodate the exodus and are therefore forced to find ways of coping, and still offer quality education. E-learning has been regarded as a panacea to this crisis. Distance education means that students and teachers must embrace ICT and tap it for teaching or learning.

The need to conduct this study arose from researcher's personal interest and experience. A look at literature reveals a lack of exposure, awareness and appreciation for e-learning programmes by both students and their teachers. The pace in adapting e-learning in Kenyan institutions is slow despite the strides made globally. The anticipated obstacles that impact on E-learning in Kenya's institutions of Higher Education may be those that are common to all around the globe or unique to the country. The challenges may be as a result of the structure, design of the systems, styles of learning or due to socio-cultural influences.

This study will eventually narrow down and focus on issues concerning the technical design of the systems, as an important factor of determining its effectiveness in learning. It will establish and consider the challenges affecting e-learning in selected institutions of Higher education with the aim of designing e-learning model, based on established Open source e-learning software. It is hoped that the outcome will guide Institution administrators, system developers and teachers involved in e-learning for effective learning. Data collected will help gauge the effectiveness of the currently installed E-learning systems by analyzing collected information for students' performance, attitudes, and satisfaction with the systems.

Object - oriented modeling will be used to improve the structure and design of a Learning Management system (LMS) – Moodle, in a typical learning environment. One tertiary level college's system will be used as a case, with the students and teaching staff taking part as the main sample group. The researcher will take into account the trends and progress made in other institutions of higher learning.

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INTRODUCTION

ICTs have gradually penetrated African countries' education sector with a wide range of programmes and projects being initiated or supported by the governments and donors from developing countries. Some of these include NEPAD e-Schools initiative, a high-level intergovernmental, multi-stakeholder programme, institutions focused on networking African schools and universities such as the African Virtual University (AVU) and collaborative learning projects that directly involve learners and teachers from schools in several African countries such as the Global Teenager Project (GTP) and the International Education Resources Network (iEARN).(Farrell& Isaacs, 2007).

Despite the fact that E-learning is still in its infancy across most of the continent, more African countries use sophisticated technologies to support online education. There is a wide variety of different e-learning practices in Africa. Technological advancement that has taken place in Africa and the range of ICTs currently being used in educational institutions are:

- financially assisted telephone dial accessed Internet connectivity for schools and rural communities;
- satellite transmission and e-mail;
- advanced fiber-linked ''skills centers'' equipped with videoconferencing for university courses;
- software job re-training packages; and
- telecenters – public sites that offer access for a fee to ICTs, which are becoming more common in South Africa, Ghana, Nigeria, Senegal, and elsewhere. In some cases, these are being expanded to offer access to learning. (Intelecon Research, 2000; Eke, 2010).

E-learning has been lauded as having come at an opportune time, particularly when the world is now a global village, where space and time is insignificant when people wish to interact for business, educational or social reasons. A lot can be achieved through the Web and distance education has made it possible for a large number of people to attend virtual classes due the cost, convenience or limiting circumstances. The lack of physical facilities like a classroom is a limitation that is no longer since as an obstacle, but a challenge or inconvenience that students and teachers can learn to cope without. Gyambrah (2007) observes that many higher educational institutions are turning to e-learning technologies for improving the quality of learning by means of access to resources, services, long distance collaborations and exchanges.

E-learning, just like every good thing that is constantly in transition and transformation, has its problems, issues pertaining to usage, design and adaptability. Research and development in e-learning technologies continues in all parts of the world, with many universities developing their own LMS,

customized to suit their needs. Gyambrah (2007) concedes that this transition has however been characterized by a mixed sense of optimism, skeptism and a lack of "adequate benchmarks. Jones, Farquhar, & Surry (1995) postulates that even though there exist many interface design guidelines available for instructional designers in e-learning, these guidelines were intended for software environments rather than learning environments. Therefore, for a successful implementation of Web-based learning environments, a design approach that integrates design issues of the human-computer interface system with those of the instructional system is required.

The rising demand for higher education as seen previously implies that institute of Higher education will have to pay more attention to E-learning. Despite the fact that e-learning courses have been on-going in many HE institutions in the country; the number of students in these programmes is still low and there seems to be very little enthusiasm for online courses by key players in the economy. The progress in the country does not show any signs of catching up with the rest in the developed countries. This study hopes to look at the challenges and obstacles that have relegated e-learning to the place it is in now. The researcher will concentrate on the LMS's design and establish their suitability. It will use respondents' feedback and typical learning styles to develop a system that is based on a real life case. Research work will concentrate on the learning & teaching experiences with the LMS for online distribution of course material, communication forums, discussion boards, chat rooms, distribution and submission of assignments and assessments, use of electronic journals and embedded web-links.

Governments and Higher education institutions in Africa have realized that, 'A strategy of investing in high level skills, and increasing the proportion of adults with a degree, has a great potential to deliver a high economic benefit.' (Grambyah, 2007). Eke (2010) emphasizes that distance learning programs at the post-graduate level, delivered by universities in the developed world, can be accessed by self-motivated students in Africa without the need to incur the costs of living overseas.

The use of technology to teach and learn has had major impact in Africa's education sector. The impact has on the other hand borne challenges due to the limitations that prevail in most African countries. Some of these issues have arisen even in the developed countries. A questionnaire survey of people on the E-learning Africa database conducted in 2007 revealed some key constraints in the implementation and development of e-learning strategies and practices. Respondents cited the lack of infrastructure (particularly connectivity, and especially in rural areas), the need for appropriate training and capacity development, a lack of relevant digital content, and the cost of implementation as the main impediments to e-learning initiatives in the continent.

E-learning demands that teachers in higher education must learn and develop unfamiliar innovative teaching strategies far beyond their normal routines. For instance, teachers' roles are shifting from being sole providers of knowledge to facilitators of knowledge (Haddard & Draxler, 2002). Students' roles also are changing from being passive recipients of knowledge to becoming active collaborators of

knowledge. Inevitably, the resistance to E-learning innovations by stakeholders in many universities in the developing countries is and will remain of serious concern. The practicability of establishing and embracing Elearning within the universities in developing countries is questionable. It is not surprising that E-learning innovations have not yet taken deep roots, as it should be in many universities. Ndirangu & Udoto (2011) mentions the Commission for Africa report that describes many African universities as "in a state of crisis" without the basic physical infrastructure such as the internet connectivity, books, laboratory equipment and classrooms.

With the existing inadequate infrastructure, human resources and financial resources, exploiting technological innovations in ICTs and E-learning is still a challenge in most of the mushrooming and traditional universities in Africa. It is likely that the existing infrastructure may be too old and therefore incompatible to the rapidly changing technology. Universities may therefore be required to carry out expensive renovations to upgrade or replace existing infrastructures to accommodate the advancing technologies in ICTs and E-learning. The dynamics involved in implementing and embracing E-learning are somewhat complex and paradoxical. There is need for education providers to try to identify processes that will help them balance the competing demands emanating from their need for institutional control within the increasingly competitive business landscape and the learners or students demands for more individual control based on their experiences on the web.

Sekiwu (2010) cites technical, cultural and infrastructural elements that undermine universities efforts in the developing world to implement and embrace E-learning capabilities. MacGonald &Thompson (2005) add that, given that universities in developing countries are well known for their classroom/lecture room face-to-face delivery strategies such as tutoring, lectures, conferences, etc., E-learning may be perceived by many as being inferior in terms of academic integrity and rigor. It is therefore not surprising that many stakeholders tend to be reluctant to introduce and accept E-learning because of the fear to undermine the reputations of their institutions (Sekiwu, 2010). In a UNESO report, it is said that open and distance learning has for a long time been seen as barely legitimate in African some African countries. Its history is marked by the work of institutions that accepted student fees, gave them poor service, and kept their costs down by encouraging students to drop out once they had paid all their money (Perraton, Creed & Robinson, 2002).

Flexibility in learning is a good idea and the little success of the African colleges in e-learning has not been encouraging. Although difficult to achieve, a holistic approach to the whole organisation is needed, attending to diverse factors including processes, assumptions, regulations, services and methods - as well as technologies. Staton (cited in Feldstein, 2009) concludes his report by recommending policy changes that universities can adopt to significantly improve e-learning implementation and effectiveness. Two of them are that universities should adopt software to make its data available to other systems in a standard format; and that they should encourage bottom-up, agile

adoption practices within the university. Many are convinced that it is the non-technological factors - cultural, perceptual and organizational - which present more formidable barriers to introduction of e-learning in Africa's traditional university. What if there is crucial link between the technological and non-technological factors, and that the redesigning or restructuring of systems can help to improve e-learning's role in Africa's education system?

This research will dwell on the technical aspect of the Learning management System (LMS), to try and connect it to the non-technical, and in consideration of most of the above mentioned hurdles. The researcher believes that a good LMS design will go to solve part of the affecting effectiveness of e-learning in the Higher Education institutions.

E-LEARNING IN KENYA

The number of public universities in Kenya has increased to 7, with 14 affiliate colleges, with a total student population of 100,649 in 2008/2009. There are 23 private universities and over 200 post secondary school institutions which comprise of vocational and proprietary colleges (Ministry of Education, 2011; Mwiria *et al*, 2007 & Commission for Higher Education, 2008). There is a widespread perception of a decline in the quality of higher education and training in Kenya due to over enrolment, inadequate and out-dated teaching and learning facilities and low staff morale (Ndirangu & Udoto, 2011; Kinyanjui, 2007).

Information and Communications Technology (ICT) have been integrated in education in many developing and developed countries alike, but the use of ICT in Kenya's institutions of higher learning still requires work in order to have the kind of impact expected, and as compared to those in the developed countries. Kenya's universities and colleges have been fast embracing ICT into their educational programs. This is due to the high demand for education, the technological advancement in the global arena and the need to keep abreast. The African Virtual Universirty (AVU), based in Nairobi is a good example. It was initially a project of the World Bank that is now an independent intergovernmental organization. The AVU services 57 learning centres in 27 African countries. The AVU works with universities based in Africa and other countries such as the US and Australia to provide academic programmes and short courses through open and distance e-learning. (Farrell & Isaacs, 2007).

Juma (2002), in her report, cites the Mungai Report of 1995 as having recommended the establishment of an open university similar to the ones operating in Britain, Hong Kong and Tanzania be considered as a way of extending university education to as many Kenyans as possible. The report, however, cautioned against basing the Open University on the current restrictive system practiced in the public universities. It was of the view that it should be based on innovative strategies aimed at meeting the needs of as many Kenyans as possible that desire university education. She also mentions the Koech

Report of 1999 which hailed the external degree programme of the University of Nairobi as being particularly beneficial to serving teachers and other Kenyans in employment that would otherwise not have been able to enroll for university education on a full time basis. It recommended that the programmes be expanded in order to reach many deserving and qualified Kenyans.

There are two categories of learners in Kenya's institutions of higher education: The mature student and the young, IT savvy student – the Net or Information Generation. Both categories may appreciate e-learning, but for varying reasons. There has been great growth in the population of learners from these two groups over the last 5 years. The attendance requirements for students, especially mature students, in e-learning set up impose stress, especially as job insecurity and traffic congestion grow. Moreover, most of the Kenyan universities and colleges' operations are geared to daytime students, so that evening, distance and online students can find it difficult to access services.

Increasingly, mature students are entering higher education, yet the teaching and administrative practices in traditional universities strain to adapt. Many students in this group have young families, busy jobs and long working hours. To get their degree they attend lectures for 3 hours, 3 to 5 nights per week for one to two years. As experienced professionals the students learn much from each other and value the opportunity for collaboration with their peers. (McGinnes, 2010).

Ndung'u & Waema (2011) discovered that despite the increase in the demand for higher education and increase in the number of mobile phone and Internet users, the use of internet for e-learning was limited in both the surveys with preliminary survey having only 10 percent of the respondents who had done an e-learning course. An interesting observation was that internet and e-mail was seen mainly as a communication tool. Lack of appropriate skills to access e-learning courses may therefore not be the reason for the low usage, at least not among the young people who have made the Internet a part and parcel of their everyday life. Online networking, has seen in other studies has contributed considerably to equipping people with basic IT skills to be able to access online information. However, this is an assumption that this study will confirm with the sample population.
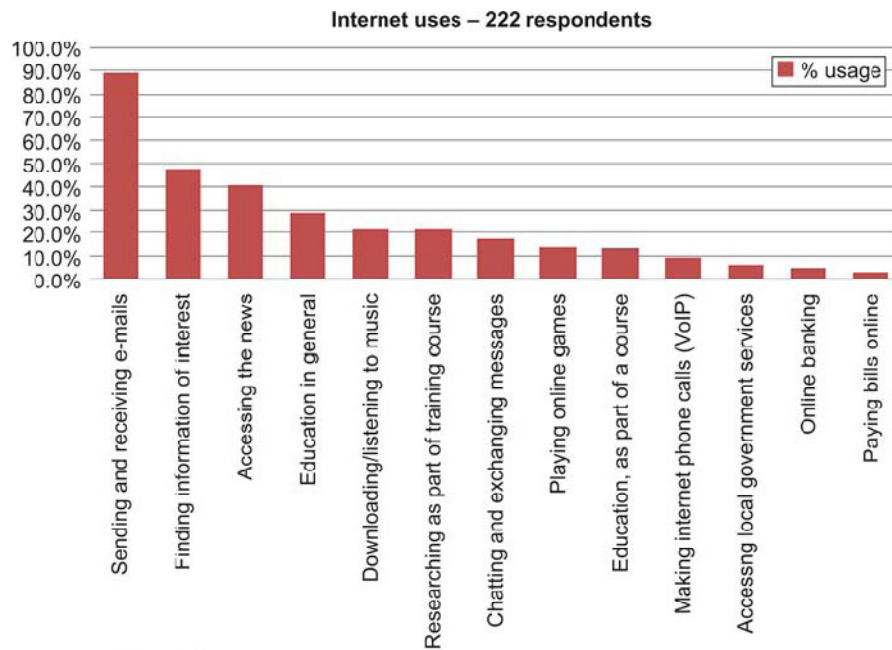
Figure 1: Internet uses in Kenya in the year 2007 (Ndung'u & Waema, 2011)

The low usage for e-learning in Kenya's institute of higher education may be attributed to factors mentioned earlier and others that may be revealed at the end of this research. This study will focus on issues that may arise from the technical or instructional design of the LMS. For comprehensive results, the sample group will be drawn from past and present e-learners i.e. people who have an experience with the LMS in the higher education institutions.

HYPOTHESIS

HYPOTHESIS I: Social, cultural, technical and other environmental factors play a major role in determining the effectiveness of the Learning Management system (LMS) in the learning institution.

This research study will explore the design weaknesses in Kenya's higher education institutions' e-learning systems, with the view of developing a user-centered, web-based learning support environment. E-learning will be used in the context of all that is covered within the term, i.e. computer based learning, web-based learning, virtual classrooms, and digital collaboration. The study will look at e-learning as the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM. (Eke, 2010)

The research will consider social, cultural and technical challenges affecting e-learning in Kenya's institutions of Higher education, with the aim of designing a framework that will result in a prototype

model. This prototype will also consider feedback received from other stakeholders in Kenya's Higher Education sector.

Objective

1. Critically look at the website and courseware used in Kenya's institutes of higher education
   a. Usability and functions of the different LMSs

2. Apply authentic principles for object-oriented modeling of a prototype e-learning system.

HYPOTHESIS II: E-learning increases learning flexibility and choice - particularly over time, place and pace – whilst retaining the all-important "University or college experience". This is something that appeals to learners who have busy schedules are not able to enroll into the rigid, classroom programme.

The model will not place the instructor or teacher as the sole source of knowledge. He/she will be a facilitator, supporting active technology mediated student learning. The system will create a learning environment that has the capacity to link the content with other learning resources, to focus groups (for group discussions, chat) and other student services support.

Objective

1. To incorporate up to date tools that will create flexible learning environment for both synchronous and asynchronous teaching/learning.

HYPOTHESIS III: A good Learning Management system (LMS) accommodates different learning styles in its design. Not all students learn the same way.

Objective

1. To define different means of enabling the students to choose their own learning path based on preferred learning styles.

METHODOLOGY

The study will use both qualitative and quantitative research methods to collect necessary data in order to design the system. Preliminary study will involve collecting of data from all the identified stakeholders or players and published literature on the advances in e-learning. Student views will be particularly important in measuring the effectiveness of current systems.

Donnell (2010), points out that, by analyzing students views (as the end users) on the educators' use of technologies, feedback is available to learning designers and educators for the purpose of improving the pedagogical design of e-learning platforms and the use of technologies in higher education. This study will collect this information from regular and evening class students. The responses received from students will clearly indicate their opinion of the current system and how it has transformed their learning, if any. In essence, the benefits that can be achieved through the use of technologies are totally dependent on the ways they are employed pedagogically by lecturers.

To establish and confirm challenges that are specific to Kenya's Institutes of Higher education, preliminary data, using published literature, questionnaires and face-to-face interviews will be collected from:

(1) The Ministry of Education, Science and Technology.
(2) Deans of the Institutes of Distance Education in public and a few private universities
(3) African Virtual University Directors

An overall picture of the currently implemented LMS will be drawn from the findings from this group. The researcher will look at the online systems, for those that will be made accessible, depending on the access restrictions and the institutions' permissions.

Participatory action research methodology which is "learning by doing" - a group of people identify a problem, do something to resolve it, see how successful their efforts were, and if not satisfied, try again. (O'Brien, 2001), will be adopted. Data collected from a few students and lecturers from the selected institutions of higher education will be evaluated using this model. (Fig 3)
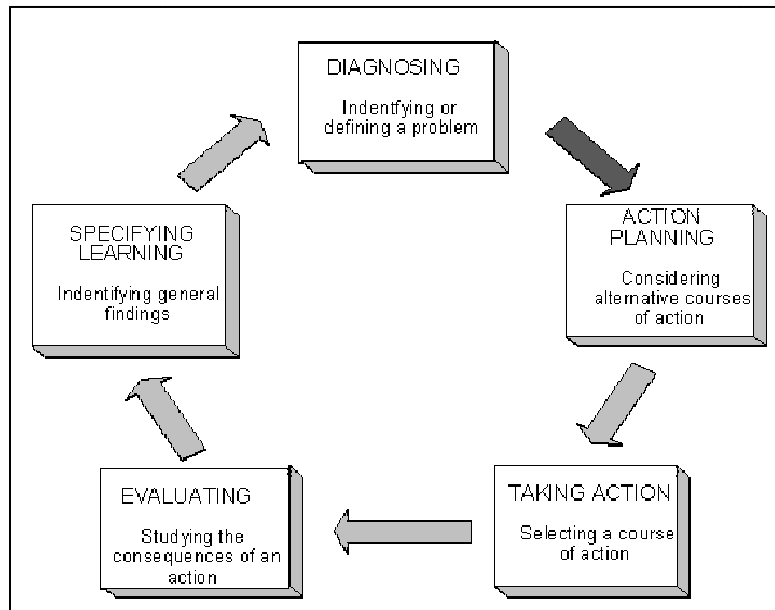
Figure 2: Participatory action research model (O'Brien, 2001)

The researcher will look at the documented problems in a systematic way and recommend interventions that will be considered in the design of the prototype for the case study. Other key attributes of action research that differentiate it from common problem-solving activities is that there should be occasional refining of the methodological tools to suit arising situations during the collecting, analyzing, and presenting of data. It is an ongoing, cyclical process.

Due to its availability and ease of use, the **Memletics learning styles inventory** style will be used in the case study to establish learning styles and to help design default e-learning environment using Moodle as the main courseware. The inventory will help to guide the sample group in choosing their own personal learning styles. It contains a series of questions that will be answered by the sample. The results will be scored to help indicate which are the learner's dominant and secondary styles. (Fig. 5). The seven outline styles are used to gauge user learning capabilities and preferences.
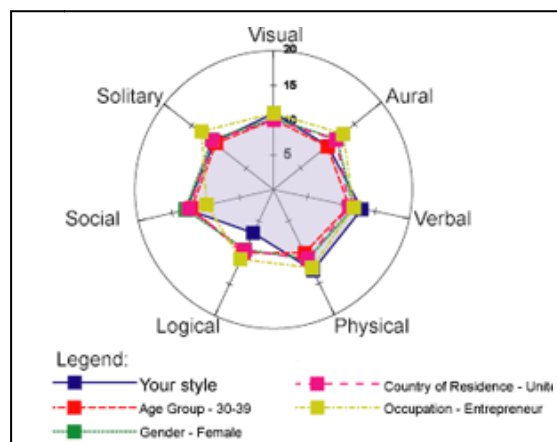

Figure 3: This is a sample Memletics Learning Styles graph produced by the online test
Source: http://www.learning-styles-online.com/inventory/

An Object-Oriented System Analysis and Design (OOSAD) approach will be used to remodel and improve on the design of the LMS within the case study. Design factors to be considered include:

(1) Multimedia (picture, graphic, animation, text, sound, and video)

(2) Interface

(3) Content

(4) Navigation

(5) Usability and

(6) Accessibility

The study will consider measures that the college can take to help evening students participate more successfully in education, even when not in class. Some of the innovations to consider are self-study e-learning tools, online discussions, podcasting of lectures and the use of social computing techniques.

PRELIMINARY RESULTS AND DISCUSSION

Most studies indicate that there are basic conditions that e-learning systems need to comply with for them to acceptable and usable. There are plenty of organisations that have given up their e-learning dreams because of complete failure or because of the projects not meeting the desired targets. (Cleary, Cleary,& Susta, 2010). Filimban (2008) attributes high attrition rate in e-learning programs to lack of preparedness for the challenges involved in offering quality online learning; especially. He states that there is a lack of a reliable assessment tool for evaluating and improving online courses. There is need to develop methods to systematically collect continuous feedback from users to revise or improve learning environments. Few attempts have been made to develop formative evaluation frameworks for Web-based learning environments whose foci are both the instructional system and user interface system. Zajac (2009) observes that there is a tendency to claim that personalization is an imminent feature of e-learning. The content placed on the e-learning platform, easily accessible from any place at any time, seems to fulfill individual needs of the learners. However, easy access to learning content does not ensure better results of teaching and learning environments..

In his study, Nam (2003) asserts that many of the design approaches lack three important considerations to be used for implementing web based e-learning applications. These are:

1. integration of the human computer interface design with instructional design

2. development of the evaluation framework to improve the overall quality of Web-based learning support environments

3. development of an individualistic approach to the Web hosting of courses.

For a successful implementation of Web-based learning environments, a design approach that integrates design issues of the human-computer interface system with those of the instructional system is required.

Pin˜a & Eggers (2007) study which involved discussions with hundreds of LMS users, including students, instructors, system administrators and support personnel revealed that the systems were designed to function primarily as a repository of materials and did not contain tools for the development of rich multimedia based instruction. They observed that, although a number of teaching tools exist within the LMS, tools to guide the instructor in the design of online instruction and in sound pedagogical practice are virtually nonexistent. The LMS, Moodle that will be used in this study considers pedagogical principles and learning theories in its conception. The limitation with Moodle however is that it does not include adaptability features, except for the lesson module which provides a limited form of adaptability.

Compared to engaging and customizable environments of social software, such as MySpace, FaceBook and YouTube, a learning system interface can seem inflexible and boring. New research indicating that users are accessing the Internet and performing other advanced technology tasks with mobile devices, rather than computers, suggest that the LMS of the future will need to adapt to the ''small screen'' (Ranie & Keeter (2006) cited in Pin˜a & Eggers, 2007). Most of the popular and frequently used LMSs include the standard interactive feature, but lack in adaptive or intelligent ones. Examples apart from Moodle, are Atutor, Blackboard, Dokeos and Ilias.(Santos, 2009)

One of the participants of a British Computer Society (BCS) video debate held in America contributed that, 'One of the barriers to e-learning is people's experience with e-learning. Much of the e-learning that we've seen in the past has been of a very poor quality, it is about educating our customers and showing them how e-learning can be used,'(E-learning, 2009).

The researcher's personal experience reveals that there might be challenges and obstacles in Kenya's e-learning programmes. These could be related to issues to do with the systems' design & usability, students or tutors' inability to fully utilize the e-learning systems, or wrong perceptions by the designers or users. There is ample evidence to suggest that the use of technology does not always necessarily meet user requirements. (Donnell, 2010).

McGinnes (2010) asserts that while it is easy to envisage and plan improvements, structural change in a well-established higher education institution is more difficult. It may be relatively simple to introduce the technology, but harder to alter mindsets and practices - including those of students. The very features of flexibility and accessibility which make e-learning an attractive option to the part-time adult

learner also mean that it has frequently been viewed with suspicion by conventional institutions and the public, who are more comfortable with the traditional face-to-face education delivery. Perraton, Creed & Robinson (2002) believe that most parents and probably most educational planners would encourage their own children to study at a conventional university rather than an open university. Few would argue that open and distance learning matches the best of conventional education. Resistance to change, according to Jamtshoa, & Bullenb (2007), is the most inevitable hurdle of all that has to be overcome for e-learning to have a high impact in the educational sector. They have noted that attempting to implement an ICT-based education program encounters various types of resistance. Even in countries with highly developed ICT infrastructures that have adopted the "e-culture" in their personal, leisure, and financial spheres, there is still a resistance to e-learning methods, and a preference for traditional face-to-face approaches.

On the other hand, Grambayah (2007) points out that e-learning has the potential of undermining faculty status prerogatives and may lead to the loss of faculty jobs, threaten ownership of intellectual property and decrease personal contact with students. E-learning will require the acquisition of new technological skills and knowledge for the teaching staff. It may also require that they provide 24-hour access by e-mail and to give prompt and clear responses to all queries in the e-learning classroom. It should be no surprise, therefore, that attempting to use e-learning in a developing country such as Kenya would generate resistance.

IMPLICATIONS FOR RESEARCH

This research comes at a time when there are many initiatives already undertaken to address the ICT issues in Kenya. However many of them are concentrated in big cities and towns especially in higher learning institutions. The Kenya National ICT Policy of 2006 puts ICT at the heart of national development with a vision of "a prosperous ICT-driven Kenyan society by the year 2015". Apart from the large number of school leavers looking to further their education in the institutes of Higher education, Juma (2002) cites the steady reduction in the funding of public universities by the government as another reason for educational institutions to explore and implement distance education option. She argues that despite the recommendations by important policy documents on distance education for Kenya, e-learning remains a tiny component of higher education.

An important point to ponder is how colleges and universities in developing countries can take advantage of E-learning innovations in order to make their services easily accessible to more people, regardless of the existing obstacles (Sekiwu, 2010). How can these innovations be improved or localized to match the learner's preferences and needs for learning to be effective? What are the design

issues that arise in the currently installed systems that students and lecturers need the designers to consider when setting them up?

The universities must therefore spearhead the generation of new knowledge and innovative strategies to deal with existing and emerging issues in e-learning. Although difficult to quantify, there is a broad consensus among researchers in education that quality educational facilities have a positive impact on student motivation and achievement, as well as academic staff performance (Ndirangu & Udoto, 2011)

Previous studies have confirmed that for an e-learning environment to be successful, various aspects of the learning environment as a Web-based supplemental learning program should be considered such as application domain knowledge (i.e., target subject field), conceptual learning theory, instructional design, human-computer interface design, and evaluation about the overall quality of the learning environment.(Nam, 2003)

Cleary, Cleary,& Susta (2010) state that e-learning can be a very useful and powerful tool when properly implemented. Having a big budget and a reliable IT department are not enough to create a successful e-learning project. They caution e-learning projects managers to distinguish between myths and reality and be aware that e-learning differs from technological gadgets and distance education.

According to Greer, et al (2010), there is increased pressure on lecturers to incorporate audio/visual digital technologies (e.g. podcasts) into their teaching. As a matter of fact, McGarr, 2009; Baker, 2008; & Lazarus, 2008 (cited in Greer, et al, 2010) have found that the existing body of published research in Higher Education is predominantly focused on studies of perceived value, usage of e-learning technology, as supplementary teaching material.

Little attention has been paid to design issues of the human-computer interface system, which is one of the most important components in the Web-based learning environment. Learners should be able to easily focus on learning materials without having to make an effort to figure out how to access them for any learning to happen. An effective user interface can fulfill that requirement. However, many instructional design principles and models proposed for the development of Web-based learning environments have not explicitly addressed usability issues of the human-computer interface system, which are critical factors to the success of Web based instruction. (Nam, 2003). The main focus of most instructional design models has been on the effectiveness of instructional interventions. In effect, there exist many interface design guidelines available for instructional designers, but these guidelines were intended for software environments rather than learning environments.

This study will help to confirm or refute some of the recommendations and proposals made by previous researchers. It is envisaged that the findings of the research will inform the government, educators and students on how to reap the most from e-learning technologies. The prototype will factor in the

preferences of the learners and take into account the cultural and social factors that may contribute to the usage of the systems installed for e-learning in Kenya's institutes of higher education.

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