

Emergency remote teaching environment: a conceptual framework for responsive online teaching in crises

Emergency
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environment

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Received 12 April 2020
Revised 8 May 2020
30 May 2020
Accepted 30 May 2020

Abstract

Purpose – This study aims to provide an educational framework for not only the emerging COVID crisis but also future emergency remote teaching environments (ERTE).

Design/methodology/approach – Using participatory design methodologies, this study engages K-12 teachers and professional instructional designers in a design-focused discussion.

Findings – This work identifies thematic elements present across multiple subject areas, school districts, learner ages and socio-economic situations. Using these themes, as well as design solutions created by our participants, the authors propose the ERTE framework.

Research limitations/implications – The framework presented is grounded in the experiences of a limited number of teachers, but presents a theoretically grounded approach to teaching in an emergent field.

Practical implications – This framework is designed for practical application for use by teachers operating in ERTE.

Originality/value – Though multiple online teaching frameworks exist, the ERTE framework is novel in its emphasis on shifting constants and variables rather than planned pedagogy and is specifically for use in unplanned or responsive remote teaching situations.

Keywords Distance learning, Participatory design, Design research, Online instruction, COVID, Formal learning, Learning framework

Paper type Research paper

Introduction

In 2020, COVID-19 confronted teachers and administrators in the USA with unprecedented challenges. Encountering a shifting landscape, teachers engaged young students in online learning environments with marked variation in technological access, parental support and academic expectations.

Emergency remote teaching environments (ERTE) are a response to this crisis and differ in meaning from pre-planned online learning, in that ERTEs offer rapidly developed, temporary instructional support in a crisis (Hodges *et al.*, 2020) without pre-planned resources or infrastructure. We propose a framework to address moments of crisis in which



This article is part of the special issue, “A Response to Emergency Transitions to Remote Online Education in K-12 and Higher Education,” which contains shorter, rapid-turnaround invited works, not subject to double blind peer review. The issue was called, managed and produced on short timeline in Summer 2020 toward pragmatic instructional application in the Fall 2020 semester.

Information and Learning
Sciences
Vol. 121 No. 5/6, 2020
pp. 311-319
© Emerald Publishing Limited
2398-5348
DOI 10.1108/ILS-04-2020-0099

teaching environments can only be understood circumstantially and supported provisionally.

In addition to the likelihood of future wide-scale educational shutdowns because of outbreaks, wildfires, active shooter incidents and other situations may lead to increased ERTes in the future. For this reason, we assert that a new conceptual framework is necessary for understanding and planning learning in these environments.

Using a participatory design framework (Ehn, 2008), we engage four teachers and five instructional designers in a design-centered conversation. Based on the participant teachers' current practices, participant designers' design suggestions and scholars' theoretical work from the learning sciences, we propose a conceptual framework to guide the development and investigation of ERTes. Importantly, we construct the framework taking into account the learning of content and the socio-emotional needs of stakeholders (Richardson and Swan, 2003).

Overview of study design and participants

Teacher participants were directly recruited via social media. Respondents completed initial questionnaires to identify geographic location, school district socio-economic level, student-device ratio, student age range and subject(s) taught. To reduce situation-specific challenges and broaden applicability of our work, we chose four teachers representing significant variance in these dimensions.

The five instructional designers were recruited through professional ID organizations. These professionals provided insights and practical expertise in online pedagogy and distance education solutions. None of the five respondents had any official relationship with distance-learning technology companies or with the school districts for which the teachers work. Participant designers volunteered to participate to contribute their skill set to assist teacher-participants.

To illuminate participant insights, we engaged participants in participatory design (PD) activities structured to identify the challenges they face and potential solutions. Within PD, the participants, drawing on the authority of their experience, actively inform research goals (DiSalvo and DiSalvo, 2014). Thus, in many cases, participants direct researchers by highlighting their values and needs (DiSalvo and DesPortes, 2017). This approach has specifically been shown to be useful in addressing limitations in formal education (Janssen *et al.*, 2017).

The study was conducted in four phases. In the first, teachers responded to a written survey consisting of seven questions, which addressed the challenges and affordances presented by their situation and designed to prompt individual consideration prior to phase two.

In the second phase, participants joined an online video-based structured focus group (Creswell and Creswell, 2017). The researchers led a structured discussion to identify challenges and opportunities shared by the diverse teacher group.

In the third phase, participants were divided into four groups, each with one teacher, researcher and designer. The fourth group included an additional designer. Following a divergent-convergent co-design approach (Senabre *et al.*, 2018), each group engaged in a 30 min design discussion to address a challenge identified in the previous phase. Groups then transitioned to the fourth phase, where they converged to share the specific challenges they had addressed and elaborate on the solution(s) they designed. The research team identified emerging themes in post-data collection group analysis using a non-coded interpretive approach, which is neither *semantic* nor theoretically driven (Braun and Clarke, 2006). Then, researchers iteratively synthesized the emergent themes with two frameworks – Sawyer's

(2005) framework for creating a learning environment and Garrison and Arbaugh's (2007) community of inquiry framework for online learning – to generate the ERTE framework. Sørensen (2009) described this approach as *methodological* and argued that the theories served as a tool to participate in knowledge building.

We argue this approach is well suited for this study for two reasons. First, this methodological approach balances the validity of existing frameworks with the emergent needs of participants. Second, this approach allowed us to acknowledge the novelty of the emergency remote teaching phenomenon rather than imposing an existing framework to make the data “fit” or purely collecting data to validate the theories.

We conceive the framework and the thematic elements informing it as intertwined, therefore the themes emerging from the initial interviews and focus group are discussed within the ERTE framework as elements informing its design. A brief description of the identified themes and how each informed the ERTE framework is present in Table 1.

Introduction to the emergency remote teaching environment framework

Sawyer (2005, p.10), in the introduction of *The Cambridge Handbook of the Learning Sciences*, identifies four elements that constitute a learning environment: the people in the environment, technologies, architecture and layout of the room and the physical objects within and the social and cultural environment. We propose the term ERTEs to highlight how crises can lead to sudden, widespread variation in these elements. Further, we propose the ERTE framework as a conceptual framework through which teachers can plan and researchers can conceptualize learning in these emergent environments.

By positioning the teacher as the first responder to an educational crisis, one with shifting resources, expectations and primary point of contact with the student, we propose ERTE as a framework for both understanding and supporting learning in emergent crises.

The ERTE framework (Figure 1) has three steps: inquiry, classifying available resources into *constants* and *variables* and designing educational experiences.

These steps are nonlinear and iterative. Participants indicated that crisis called for constant reevaluation. This iterative approach to learning design is a critical factor of both the ERTE framework and the realities of emergency education reported by participants as it enables adaptation to the unpredictable shifts in resources and goals that characterize a crisis.

Inquire

Based on our focus group discussion, teachers who considered their instructional responses to be effective began with an inquiry of the teacher's abilities, familiarity with technologies, and time; the students' health and safety, access to basic needs, and access to technologies; and their collective resources. By initiating an inquiry, teachers ensured that the pedagogies they put into place were actionable and based on available means. As one participant stated:

Those are all things that we need to know that we didn't have to know if we were doing residential face-to-face teaching. And so, I think for me, the biggest lesson that I've learned with this, just coming from being on the outside in, is we have to be doing more planning from the beginning.

Teachers who saw themselves as performing effectively during emergency remote teaching emphasized the value of revisiting inquiry regularly to stay aware of available resources. Additionally, as one teacher pointed out, regularly reaching out to students provides perspective on factors that are not apparent before the crisis, such as the home situation, parent involvement or other non-scholastic factors that might influence the students'

Table 1.
Emergent themes
and their relevance to
the ERTE framework

Theme	Description	Related design dimension
Hidden curriculum	A need for teaching how to interact with and within learning technologies	Critical learning goals
Student engagement	A concern for or focus on the teachers' ability to engage students in learning	Pedagogy and the student social role
Loss of teacher social presence	Observations that teachers serve a social purpose as well as instructional, one interrupted by remote teaching	Teacher–student ratio, communication method, social role of the instructor
Loss of student social presence	A concern for the social/emotional needs of students as well as difficulties in creating socialized learning opportunities	Pedagogy and the student social role
Parental connections	A significant increase in parental involvement with the student and teacher	Social role of the instructor
Learner agency	Observations that ERTEs may create more opportunity for learner agency	Building agency
Synchronicity	Conversations indicating a shift from valuing synchronous learning to valuing asynchronous learning	Communication method
Instability of expectations	Concerns over shifting technologies, assessment standards, learning goals and institutional factors	Critical learning goals, assessments

learning experiences as well as help teachers identifying mistakes or false assumptions made during their first inquiry attempt.

Classify

Factors identified in the inquiry stage are classified into *constants* and *variables*. We define *constants* as factors shared by all students and teachers within an ERTE. One teacher gives an example of a *constant* with the district's 1:1 device ratio, "We have lots of money and wealth in the district. So, we have been a 1 to X, lots of devices for the better part of a decade".

Variables are factors shared by only some students and teachers. Several teachers identified social variables such as students struggling with basic needs such as food, access to the internet or technical devices.

Design

We propose eight dimensions of course design for ERTEs, informed by Means *et al.* (2014) and based on our data. These dimensions, a reflection of the identified themes, guided participant teachers in gathering related information and organizing it systematically to create a coherent design. These dimensions form a progressive but iterative design strategy. In the ERTE framework, teachers design a plan using the *constants* as a foundation for each aspect of the pedagogy and *variables* as a means of maximizing individual learning.

Critical learning goals

The first step in the design process requires identifying critical learning goals. In the ERTE framework, learning goals might be guided by *constants* and applied to an entire class or *variables*, with specific goals identified for specific students.

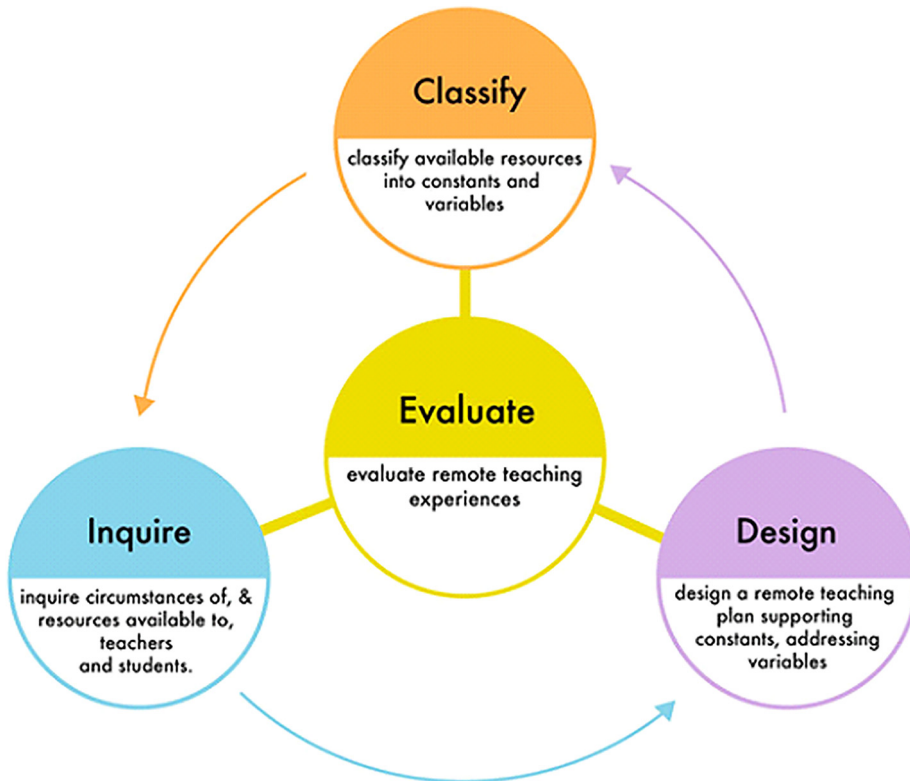


Figure 1.
ERTE framework

A powerful theme identified in our research was the inadvertent obfuscation of learning goals. During COVID-19, participants experienced a focus on the method of delivering instruction rather than the learning goals, leading to uncertainty around assessment for both teacher and student. The emergent theme of the *instability of expectations* highlights the importance of a step that is normally “assumed” in lesson design. One teacher expressed her frustration:

We’re being told different things about how much work to assign, which I agree, you know you really shouldn’t overload them, but there’s no structure for that. There’s no official guidelines.

If teachers identify a technology as a constant in the inquiry phase, they can consider effectively using that technology to interact with the coursework as a viable learning goal. Garrison and Arbaugh (2007) refer to this as the *hidden curriculum*, an emerging theme in our data. Teachers found the rapid introduction of multiple learning management tools disruptive rather than supportive, and participants describe their ERTes as more successful when time is taken to teach required technologies. One teacher described this mismatch in technology skills:

So they don’t have those same innate technological skills, I guess, or sort of literacy on these platforms to, I think, be able to use them to the full extent in order to get that social connection.

So, I think it comes down to scaffolding them through the process of connecting online through other than just one-to-one text messaging [...].

This echoes findings that indicate introducing new technologies without an adjustment and instruction period can disrupt learning (Garrison and Arbaugh, 2007).

Ratio of teacher to students

Our data suggest that these ratios, though recognized by the participant teachers, were not initially considered. Only as the impact of teacher–student ratios, specific to online environments, became apparent through practice did participants reconsider lesson designs. The ratio concern was especially apparent as teachers considered their social role in the classroom, contributing to the emergence of the *teacher social presence* theme.

Communication method

With learning goals in mind, the teacher must determine whether to use either synchronous or asynchronous learning strategies. Initially, participant teachers overwhelmingly felt that synchronous education was the ideal and asynchronous learning was a conceit to circumstance. However, designs and solutions introduced by our designer-teacher teams demonstrated that asynchronous learning presents a valuable opportunity in many circumstances, contributing to the emergence of the *synchronicity* theme. Teachers and designers identified opportunities to explicitly engage learners in activities that could not be achieved in the classroom's time-constrained environment. Examples include time-intensive consensus discussions and collaborative writing exercises, which allow a teacher to respond to each student individually, improving *teacher social presence*.

Building agency

Unexpectedly, participants explored the theme of *learner agency* in online education as teachers discussed the possibilities of learner-driven assignments with their designer partners. Participants expressed that students' ability to pursue learning in their own homes and at their own pace might allow teachers to engage learners in topics and approaches of particular interest, instead of being limited to lessons and formats that appealed more generally to the class. For example, one teacher emphasized a flexible observational assignment:

That sort of journaling aspect is something I have been trying to do in my science lessons, which is becoming a science reporter and reporting on the seasonal changes [...] if they are going for dog walks, or whatever, just kind of reporting on the changes each week [...].

Variables identified during the inquiry phase can illuminate obstacles to implementing generalized learning approaches for students. However, allowing the learner some agency in how they approach those goals can serve to increase engagement with material (Barton and Tan, 2010; DiSalvo and DesPortes, 2017) and empower learners to use *variables* unique to their environment. In an ERTE, both learning goals and instructional methods can serve as a means of facilitating agency.

Assessments

Data suggest that assessment was deprioritized in initial planning in participant districts. During our focus group, participant teachers saw assessment expectations as unstable or unfair during a crisis:

That's probably one of my biggest challenges, is the district has been changing the plans about every four days and kind of slow walking it [...] we started off no grades, just completion, and have slowly worked our way to the kids are getting actual numeric grades [...]

Within the ERTE framework, the assessment must be prioritized in designing learning, but only after a proper inquiry has taken place. When assessment standards are determined by the administration, this framework suggests that the inquiry phase should incorporate a broadened perspective to identify assessment *constants* and design fair assessment standards aligned with these.

Furthermore, consideration should be given to measures that lower stakes and that help students maintain a healthy perspective on grades. Causing students to focus on grades or teachers to focus on student evaluations during emergency remote situations may make crisis management more difficult, or, as both designer and teacher participants indicated, put the goals of educators and administrators into conflict.

Social role of the instructor

The social presence of the teacher in online learning is acknowledged to be beneficial to learning (Lehman and Conceição, 2010). However, some teachers indicated remote teaching initially hindered their social contact with learners, with initial interactions with students increasingly defined by the academic relationship. Teacher interviews and focus group data indicate that the perceived importance of the instructor's social presence is heightened in ERTEs, as K-12 learners are not accustomed to user-driven learning environments.

The teacher reestablishes their social connection to the learner and their presence within the learning environment by making themselves visible through daily or weekly formal or informal contact either within or outside of the instructional context. Several participants viewed the move to remote teaching as an opportunity to connect to parents. *Parental connection*, even though not a universal theme for all participants, indicates an increased engagement with parents which provided helpful insight into the learner's needs and their environmental constraints, and providing context for the social presence of the teacher. As one teacher put it:

I feel like this at least has given me the opportunity to reach out and I've formed solid relationship with most of the parents. That is something that I feel really good about [...] those one on one relationships.

Pedagogy and the student social role

Given this and the unique *variables* and *constants* present in any ERTE application, this framework does not recommend a specific pedagogical approach. In general, we do advise using social-driven learning in the ERTE framework for two reasons. First, students with an engaged social presence in online learning report increased satisfaction with their experience (Richardson and Swan, 2003). Additionally, in our focus group, teachers observed a perceived negative impact on students who experience a sudden loss of classroom social engagement because of emergency online learning, an emerging theme we refer to as *loss of student social presence*. For example, participant teachers observed a marked decrease in student engagement with learning, with the teacher and with other students during the move to remote teaching.

This theme arose frequently and appears to have been exacerbated either by the failure to apply familiar classroom engagement strategies or by the misapplication of these strategies in an online context. Furthermore, participants indicated that students experienced feelings of isolation from each other. As one teacher noted:

One of the biggest needs that I'm hearing from my students, but also from my schoolboard, the employer, is that we – the students want to talk to their friends, they want to reconnect with their friends.

Thus, socially driven learning approaches help address the concerns participant teachers expressed for their students' socio-emotional health.

Feedback

The final design consideration in the ERTE framework is the strategy for providing learner feedback. The sustained communication necessary for a traditional assessment–feedback–assessment cycle is not always possible in an ERTE. Thus, alternative feedback strategies, not connected directly to assessment, may need to be explored. These strategies include peer feedback, self-feedback and non-graded formative feedback.

Evaluate

The ERTE framework includes an iterative evaluation of the overall process of remote teaching as [Hodges et al. \(2020\)](#) recommend. This is an evaluation not of the student or the teacher, but of the efficacy of the approach taken for learning with the goal of identifying strategies that will lead to success in continuing or future ERTEs.

Notably, this evaluative process does not, either in our framework or in the experiences of participants, take place in a single session. Rather, in an ERTE, the educator must revisit and reevaluate their learning design frequently, both during and following the ERTE to determine the efficacy of the current approach and identify necessary adjustments as soon as possible. As *variables* such as technology access or standardized learning goals change, the teacher must evaluate their current approach to determine what, if any, elements remain viable in the changing learning environment.

Limitations and future work

Limitations

This research was conducted during and in response to the COVID-19 crisis of 2020. Though the ERTE framework is based on a combination of teacher input, modern learning theory, instructional design practices and empirical evidences from previous studies, the timeframe did not allow testing of this framework. Though not all educational design-based research projects involve longitudinal interaction with the teachers and students, the value of iterating the tool or framework after studying its use *in situ* has been well documented ([Klopfer and Squire, 2004](#); [Nolen et al., 2020](#)). Interestingly, this lack of finality was echoed in the experiences of the participant teachers, who could not make accurate predictions toward the efficacy of their own learning approaches.

Additionally, this project involved a relatively small focused group of teachers with 5–10 years of teaching experience. The framework is informed by their specific experiences.

Future research

The current study yielded several future lines of research into both pedagogy and methodology. First, our team suggests a longitudinal study of the framework proposed by this project. Distance learning in K-12 education is not a revolutionary concept. However, the COVID-19 crisis marks the first mass attempt at distance learning. As such, the framework proposed in this paper is one of the first attempts at a generalized framework for online teaching in emergency situations. Longitudinal research into the implementation of this framework may yield valuable insight and inform future iterations.

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