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A global crash-course in teaching and learning online: A thematic review of empirical Emergency Remote Teaching (ERT) studies in higher education during Year 1 of COVID-19

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Abstract

The COVID-19 pandemic has impacted education in ways that academic institutions, scholars, administrators, educators, and students will strive to fully comprehend for years to come. The global spread of SARS-CoV2 in early 2020 prompted social distancing as the primary countermeasure against contracting and spreading the novel coronavirus, which in turn led academic communities worldwide to suddenly transition to emergency remote teaching (ERT) in order to maintain educational continuity. This review of the literature synthesizes findings from 38 empirical studies set in higher education about ERT in 2020 from all over the world. A thematic analysis of findings produced four major themes: 1) diverse ERT experiences; 2) digital divide and vast educational/socio economic inequalities; 3) commonly-experienced ERT problems, issues, and challenges; and 4) frequently-made adjustments in response to ERT. Findings are indicative of the immediate aftermath of transitions to ERT, and open areas of research for long-term impacts of ERT are discussed.

Keywords: emergency remote teaching, emergency remote education, COVID-19, remote learning, distance education, literature review

Introduction

The COVID-19 pandemic has impacted education in ways that academic institutions, scholars, administrators, educators, and students will strive to fully comprehend for years to come. The global spread of SARS-CoV2 in early 2020 prompted social distancing as the primary countermeasure against contracting and spreading the novel coronavirus, which in turn led academic communities worldwide to transition suddenly to emergency remote teaching (ERT) in order to maintain educational continuity (Hodges et al., 2020). The global scale of distance education that resulted is unique in educational history with no comparable precedent in living memory (Williamson et al., 2020). However, ERT is not tantamount to traditional online course offerings (Hodges et al., 2020) that are thoroughly developed, and often supported by dedicated staff (Means et al., 2014). Further, ERT is only meant to be temporary (Hodges et al., 2020) as a crisis response in addition to the practice being involuntary, undertaken by faculty, staff, and students often with little to no background in teaching and learning remotely (Jandrić et al., 2020). Moreover, the sudden transition to ERT has laid bare even more socio economic inequities in terms of educational continuity, course quality, and technology access; some institutions and students have fared much better than others as the pandemic continues (Beaunoyer et al., 2020). The resulting situation is one where the global academic community is greatly in need of research regarding the impact of ERT. Editorials (e.g., Bozkurt & Sharma, 2020; Dietrich, 2020; Fischer, 2020) and calls for papers with special issues on COVID-19 and education (e.g., JRTE, 2020; OLC, 2020) have emerged with the goal of documenting and addressing the many challenges and complications of ERT in real time.

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Key Research Objective

There are key differences in conventional experiences of learning online under ideal conditions and those under ERT (Hodges et al., 2020; Williamson et al., 2020). Moreover, ERT is not a typical research setting/context, nor one that would be deliberately created for research in distance education. Thus, this review was guided by a single research question: *What have we learned in 2020 about/from ERT in the context of higher education?*

Method

Data Sources and Search Process

The search terms *emergency remote teaching*, *emergency remote education*, *emergency remote learning*, *remote learning*, and *COVID-19* were used to search extant literature about the sudden transition to ERT worldwide. These terms were used in EBSCO, Academic Search Premier (a multidisciplinary research database consisting of over 2,000 peer-reviewed journals) as well as Google Scholar. Parameters of the search include language (that articles, abstracts, and/or keywords would appear in English) and published in 2020 (from January to early October 2020 when data was collected). The initial search produced a staggering 101 articles, primarily in academic journals published over a 6–7 month period from all parts of the world.

Processing the Literature

Organization and Classification

Using a matrix review approach (see Klopper et al., 2007), each paper was entered into a spreadsheet where metadata (e.g., authors, publication year, paper title, database source, publication venue, method type, method sub-type, analysis type, location of study, context of study, type of participants, etc.) and characteristics of each paper were recorded/assigned for organization and descriptive analysis. Once the matrix of literature was completed, inclusion/exclusion criteria were applied.

Inclusion and Exclusion Criteria

To produce a data set within the context of higher education, two criteria were used to include/exclude papers by filtering the following criteria: 1) papers had to be an empirical study where quantitative/qualitative data were collected (versus an essay documenting how events unfolded, editorials, conceptual pieces, or basic online teaching guidelines); and 2) be set within the context of/include higher education to narrow the scope review. After applying the inclusion/exclusion criteria, 38 papers that had collected quantitative and/or qualitative data from faculty, administrators, students, etc., at/from institutions of higher learning remained for inclusion.

Concept Mapping

Then, findings sections of papers were examined for themes by assigning keywords or phrases (i.e., codes) as the foundation of a thematic analysis (Braun & Clarke, 2006). In the matrix review approach, this is also referred to as concept mapping (Klopper et al., 2007).

Results

Descriptive Statistics

The majority of papers in the resulting sample had data collected from the United States (23.1%) and the United Kingdom (10.3%), or had data collected from multiple nations (15.4%) such as Jandrić et al.'s (2020) compilation of individual teacher experiences from all over the world, or Hall et al.'s (2020) comparison of mobile learning strategies across six European nations. Nevertheless, studies on ERT in higher education that were included have come from all major geographic regions of the world, with papers' countries of origin illustrated in Figure 1.

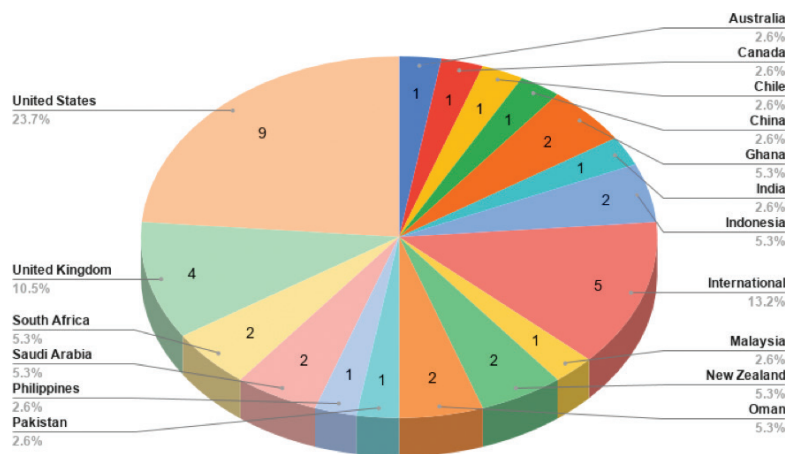


Figure 1: ERT Study Locations

Empirical studies were heavily concentrated in qualitative and quantitative paradigms. While some studies were distinctly conducted as mixed-methods (e.g., Alqurshi, 2020; Amin & Sundari, 2020; Crick et al., 2020; Gao, 2020; Perets et al., 2020; Petillion & McNeil, 2020), quantitative studies in this sample consisted exclusively of data collection through electronic surveys. It must be noted for good measure, however, that some studies utilizing survey instruments for quantitative data collection often included open-ended questions (e.g., Gillis & Krull, 2020; MacIntyre et al., 2020; Sundarassen et al., 2020) to collect qualitative data. Such studies, nevertheless, were categorized as quantitative (versus mixed-methods) in this review. Study types are outlined by major research method paradigms in Figure 2.

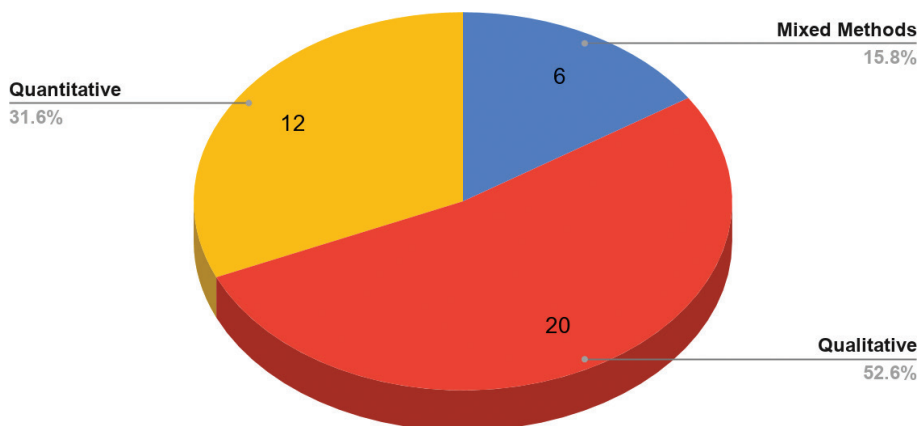


Figure 2: ERT Study Method Paradigms

Quantitative analyses ranged from purely descriptive statistics such as frequencies, means, standard deviations (e.g., Gillis & Krull, 2020; Kapasia et al., 2020; Wilcox & Vignal, 2020) to papers with more sophisticated parametric tests ranging from paired t-tests or factor analyses (e.g., Aboagye et al., 2020; Knudson, 2020). Additionally, there were nonparametric statistical tests (e.g., Alqurshi, 2020; Sundarassen et al., 2020) such as chi-square analyses given sampling methods under relatively restricted or non-ideal research conditions. While there was more diversity in methodology/analysis type among qualitative papers, studies predominantly consisted of case studies (68.4%) as shown in Figure 3. One study (i.e., Sethi et al., 2020) collected qualitative data through a survey instrument in a descriptive cross-sectional qualitative survey.

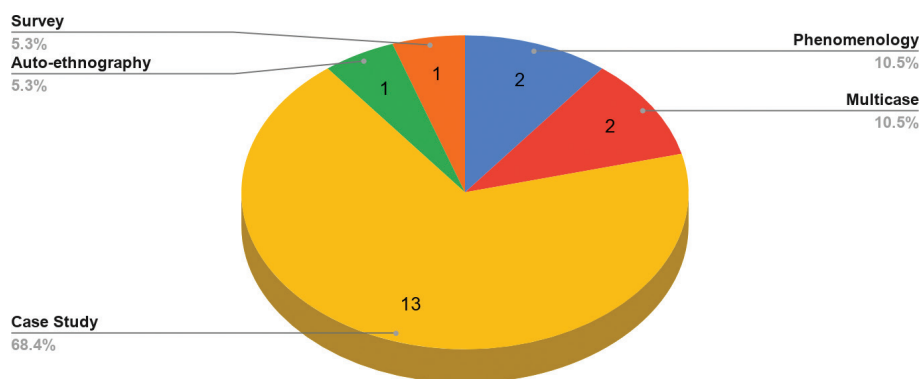


Figure 3: Qualitative ERT Study Types

Studies also covered diverse subject matter contexts as shown in Figure 4. Studies related to education (i.e., teacher education [13.5%], education programs [16.2%]) were relatively large, making up just over 1/4 of all studies in this sample. Studies involving participants (i.e., teachers, students, administrators) from multiple subject matter areas (e.g., cross-college surveys, multiple institutions, international participant pools) tied with education programs as a subject at 16.2%.

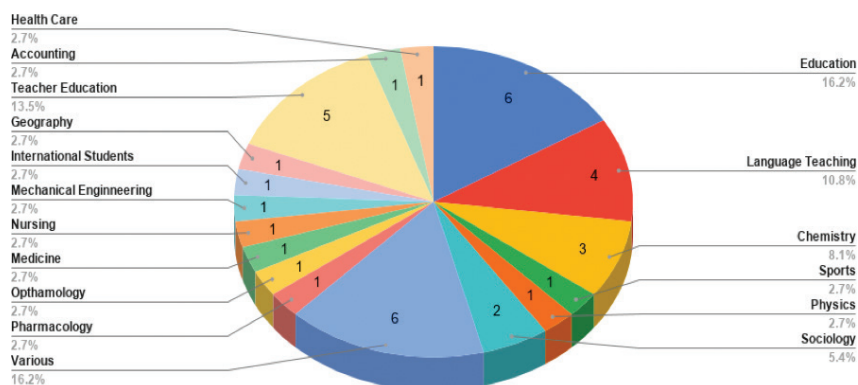


Figure 4: ERT Study Subject Matter Contexts

Thematic Analysis

A thematic analysis was performed in regards to findings of the studies. Findings sections were examined for themes by assigning keywords (e.g., ERT difficulty) and/or phrases (e.g., Lack of ICT

infrastructure in rural communities making ERT difficult) in a spreadsheet, serving as codes for the foundation of a thematic analysis (Braun & Clarke, 2006). Similar/related keywords and/or statements were merged together to form groups, and common groups were aggregated to produce themes, ultimately representing important patterns in the data (Braun & Clarke, 2006). These themes are presented in Table 1, and are subsequently used to structure the findings section of this review.

Table 1: Major Themes from Empirical ERT Study Findings in Higher Education

Theme	Source
Diverse ERT Experiences	Abdulrahim & Mabrouk, 2020; Abel, 2020; Aboagye et al., 2020; Amin & Sundari, 2020; Bal et al., 2020; Bozkurt et al., 2020; Chatziralli et al., 2020; Choi et al., 2020; Jandrić et al., 2020; Johnson et al., 2020; Kidd & Murray, 2020; Mohammed et al., 2020; Osman, 2020; Perets et al., 2020; Peters et al., 2020; Petillion & McNeil, 2020; Rapanta et al., 2020; Sangster et al., 2020; Sepulveda-Escobar & Morrison, 2020; Van Heuvelen et al., 2020; Wang & East, 2020
Digital Divide and Vast Educational/ Socio Economic Inequities	Abel, 2020; Aboagye et al., 2020; Alqurshi, 2020; Bozkurt et al., 2020; Crick et al., 2020; Czerniewicz et al., 2020; Gao, 2020; Gyampoh et al., 2020; Jandrić et al., 2020; Kapasia et al., 2020; Knudson, 2020; la Velle et al., 2020; Motala & Menon, 2020; Peters et al., 2020; Rahiem, 2020; Sangster et al., 2020; Sepulveda-Escobar & Morrison, 2020; Sundarasan et al., 2020
Commonly-experienced ERT Problems, Issues, & Challenges	Abel, 2020; Aboagye et al., 2020; Alqurshi, 2020; Bal et al., 2020; Bozkurt et al., 2020; Chatziralli et al., 2020; Gao, 2020; Gillis & Krull, 2020; Green et al., 2020; Gyampoh et al., 2020; Johnson et al., 2020; Kapasia et al., 2020; MacIntyre et al., 2020; Osman, 2020; Peters et al., 2020; Petillion & McNeil, 2020; Quezada et al., 2020; Rahiem, 2020; Rapanta et al., 2020; Sangster et al., 2020; Sethi et al., 2020; Sepulveda-Escobar & Morrison, 2020; Sundarasan et al., 2020; Van Heuvelen et al., 2020; Wilcox & Vignal, 2020
Frequent-made Adjustments in Response to ERT	Aboagye et al., 2020; Amin & Sundari, 2020; Gillis & Krull, 2020; Green et al., 2020; Johnson et al., 2020; la Velle et al., 2020; Mohammed et al., 2020; Osman, 2020; Perets et al., 2020; Petillion & McNeil, 2020; Quezada et al., 2020; Van Heuvelen et al., 2020; Wang & East, 2020

Findings from the Review

Diverse ERT Experiences

Given the vastly different information and communications technology (ICT) infrastructure in different countries around the world, as well as institutional knowledge, it comes as no surprise that ERT experiences are diverse. This spectrum makes characterizing ERT monolithically problematic, and educationalists world-wide were very aware of just how challenging experiences could potentially be, even if their own were positive (Abdulrahim & Mabrouk, 2020; Crick et al., 2020). Moreover, the timing of ERT transitions similarly had effects on the nature of the experience (Petillion & McNeil, 2020). For example, students might have already been oriented to their courses if transitioning mid-semester when the pandemic shifted from Asia into western countries, yielding a more positive experience (Van Heuvelen et al., 2020). Similarly, countries in Asia with semester start dates in early March (versus early January) and which had experience with prior epidemics (e.g., SARS, MERS) were more successful in transitioning to ERT unlike many Western ones (Sangster et al., 2020). Nevertheless, a common experience was an initial state of shock.

ERT Shock

It comes as no surprise that the switch to ERT was often met with a state of shock by institutions, educators, and students (Rapanta et al., 2020). The closure of schools and subsequent efforts to maintain educational continuity at the expense of physical classrooms and co-presence was akin to coping with loss for many (MacIntyre et al., 2020; Peters et al., 2020). The initial transitions have also been described as extreme disruptions and whiplash (Osman, 2020). This critical juncture in education was also, unfortunately, coupled with the need to confront human and racial prejudice in education against Chinese, Asian, and Asian heritage students at universities around the world as well as intrinsically discriminatory views of distance education or educational technology more broadly (Peters et al., 2020). While intrinsic teacher beliefs and the use (or lack thereof) of digital/computer technology in education has long been known in the field of educational technology (Ertmer, 1999), the COVID-19 pandemic has forced institutions of higher learning, faculty, and students worldwide to confront these views head on in a trial-by-fire, ultimately making teaching and learning in novel ways unavoidable (Abel, 2020; Alqurshi, 2020). As noted from a study in Ghana, this was not easy; years of prior face-to-face teaching experience did not prepare faculty for the demands of teaching at a distance (Gyampoh et al., 2020).

Positive Experiences

While experiences with ERT have been diverse and complex (Bal et al., 2020), there have also been positive ones. In Saudi Arabia, for example, Abdulrahim and Mabrouk (2020) found that digital learning had actually improved learning outcomes for students, and this was achieved in no small part by having a robust ICT infrastructure in place. Teachers were able to adapt quickly and successfully. They noted, however, that participants in their study predominantly came from the humanities, suggesting it was likely that successful ERT realization may not be as easy in other fields, even with a strong ICT foundation in place. For students studying fields related to information technology or computer science, there were few interruptions to common classroom practices or assignments (e.g., programming, coding), which enabled a relatively smooth transition (Crick et al., 2020). Students in the United Kingdom also were mature in their perceptions of ERT and were reported as being flexible and understanding of changes made to their classes and curriculum (Choi et al., 2020). Amin and Sundari (2020) reported that students in Indonesia, though still preferring face-to-face learning, viewed various digital tools and platforms positively for learning. In Chile, teachers reported that ERT allowed them to experiment with technology-supported teaching since there were no punitive risks in doing so since the primary goal was simply to maintain classes for students (Sepulveda-Escobar & Morrison, 2020). Similarly in Saudi Arabia, Alqurshi et al. (2020) reported that teachers were forced to try new/different assessment methods over conventional paper-based proctored tests. The unavoidable use of ICT and educational technology fostered a greater appreciation and awareness of its value for teachers in Crick et al.'s (2020) study in the United Kingdom. Nevertheless, the vast majority of experiences were negative in one form or another.

Negative Experiences

Institutions, educators, students, and even family members have experienced a collective crash course in distance education. The sudden transition and goal of maintaining educational continuity in many ways exacerbated existing problems in addition to creating new ones. Teachers and students were both unprepared for online learning as a whole. Students reported not knowing the requirements of assignments (Alqurshi, 2020) indicating how certain traditional elements of courses

could be lost in translation from face-to-face teaching to ERT. Teachers' strategies for conducting classes often relied on mimicking face-to-face instructional practices (Bozkurt et al., 2020; Chatziralli et al., 2020; Van Heuvelen et al., 2020). This often led to reduced or limited interaction with peers and instructors, which then led to negative perceptions of online learning, and ultimately lower levels of satisfaction (Alqurshi, 2020). Students also suddenly found themselves sitting for 6–8 hours a day not only at computers, but also on mobile phones as their primary device for accessing and participating in their courses (Sundarasan et al., 2020). This could be tiresome if not exhausting (Rahiem, 2020) for both students and teachers (Johnson et al., 2020). Makeshift learning spaces required significant engineering at students' and teachers' homes, which could be uncomfortable and/or full of distractions (Sepulveda-Escobar & Morrison, 2020). Sethi et al. (2020) also reported on how working adults, whether teachers or students, had to take on additional care-giving roles if other dependents were at home. Jandrić et al. (2020) also pointed out that institutions of higher learning have found themselves almost completely reliant on commercial platforms and for-profit services (e.g., Zoom, WebEx) to maintain educational continuity. This power imbalance ultimately places educational stakeholders in a rather precarious position should such companies' altruism fade.

Differing Stakeholder Priorities

While it is commendable that universities and colleges have invested great amounts of resources into maintaining educational continuity for students through ERT, this priority was not necessarily shared by all stakeholders (Mohammed et al., 2020). This consideration, however, does not seem prevalent across the literature in this review's sample. Abel's (2020) student interviews in the Philippines highlighted that some students felt as if educational continuity under the circumstances was perverse when they were suffering from stress and anxiety regarding their own personal health, as well as that of their families if caring for others during lockdowns. The relative importance of educational continuity was also questioned by students in Ghana given the numerous challenges that institutions, faculty, and students faced in suddenly teaching and learning online (Aboagye et al., 2020). Digital and socio economic divides, in no small part, also had a significant influence on the experiences and perceptions that students and teachers have had worldwide with ERT (Gao, 2020; Kapasia et al., 2020).

Digital Divide and Vast Educational/Socio Economic Inequities

As outlined in Table 1, COVID-19 and ERT has exacerbated existing socio economic inequalities, making up a significant aspect of findings from these empirical studies. The pandemic and ERT have simply functioned as a proverbial insult to injury in terms of the digital divide. Studies spanning the globe from the Europe (Crick et al., 2020 [United Kingdom]), North America (Johnson et al., 2020 [United States]; Petillion & McNeil, 2020 [Canada]), Asia (Abel, 2020 [Philippines]; Kapasia et al., 2020 [India]; Mohammed et al., 2020 [Oman]; Sethi et al., 2020 [Pakistan]; Sundarasan et al., 2020 [Malaysia]), Oceania (Gao, 2020 [Australia]; Green et al., 2020 [New Zealand]);, Africa (Aboagye et al., 2020 [Ghana]; Motala & Menon, 2020 [South Africa]) to South America (Sepulveda-Escobar & Morrison, 2020 [Chile]) have all reported on the extreme complexity of how this has played out. Jandrić et al. (2020) have argued that the term 'digital divide' is arguably far too simple when "what disadvantages people is multidimensional, and dialectical with so many individual aspects of their personal, economic and cultural contexts" being deeply interconnected, interdependent, and inseparable (p. 151). While justice to these issues can hardly be given in such a short space within this review, the most common (and unsurprising) results from interviews

and surveys (e.g., Jandrić et al., 2020; Kapasia et al., 2020; la Velle et al., 2020; Motala & Menon, 2020) is that learning online is not and has not been equal for all. The pandemic has simply amplified these existing inequalities in ways that have yet to be fully understood. It has potentially, however, exposed these deep structural problems to a large portion of the population that would not have otherwise been aware of them (Crick et al., 2020; Czerniewicz et al., 2020; Jandrić et al., 2020). In the field of educational technology and distance education more specifically, this reality has long been one of discussion (e.g., Saleh & Sanders, 2014). Distance education, as a practice, normally grapples with higher attrition rates than face-to-face education (Means et al., 2014) and disproportionately negative performance by students associated with lower socioeconomic and/or minority statuses (Stoessel et al., 2015; Xu & Jaggars, 2014) which are also often associated with the digital divide. The combination of these known issues with the pandemic and ERT, and its long-term effects on students, stands as a very necessary and open area of research.

Commonly-experienced ERT Problems and Challenges

First-time Teaching and Learning Online

Distance education is not a fringe educational activity (Dunlap & Lowenthal, 2018) with a history of practice dating back to the late 1700s (Bower & Hardy, 2004). Students in the United States alone take at least one online class per year in the course of regular academic programs (Seaman et al., 2018). Around the world, hundreds of thousands of students participate in MOOCs yearly (Jordan 2014, 2015), and there are open universities (e.g., Anadolu Open University, Indira Gandhi National Open University, National Open University of China) and/or distance programs with annual enrollment in the millions (Moore & Kearsley, 2012), in addition to traditional brick-and-mortar universities offering their own catalogues of classes at a distance (Stewart, 2019). Thus while distance learning is not uncommon today by any means (Means et al., 2014), it has never occurred on a global scale simultaneously until COVID-19. Moreover, the rush to enable learning remotely via ERT saw vast amounts of institutions, instructors, and students experiencing some form of formal distance learning for the first time (Chatziralli et al., 2020). Johnson et al. (2020) noted that teachers in their study were not particularly fond of ERT, meanwhile the lack of know-how (Sepulveda-Escobar & Morrison, 2020) or lack of teaching presence in digital environments (Rahiem, 2020) often led to negative perceptions of learning (Wilcox & Vignal, 2020). First-time ERT teaching and learning was an additional source of stress in addition to the stress intrinsic to the pandemic (MacIntyre et al., 2020).

Mental Health Issues

Empirical studies also revealed accounts of mental health issues (Gao, 2020) in numerous capacities ranging from stress (MacIntyre et al., 2020), decreased motivation (Petillion & McNeil, 2020), confusion and disorientation (Bal et al., 2020), fear of the unknown and anxiety (Green et al., 2020), depression and anxiety (Kapasia et al., 2020), decreased enjoyment (Gillis & Krull, 2020), feelings of remoteness and isolation (Green et al., 2020), and maladaptive coping strategies (MacIntyre et al., 2020). For example, MacIntyre et al. (2020) examined the various instructor coping strategies and found that one of the most common, avoidance, was correlated with more stress. The additional planning and preparation that distance courses require was also a source of more stress (MacIntyre et al., 2020). Teachers and students also had to take on additional care-giving roles during lockdowns and quarantines, which resulted in more stress in trying to maintain work-life balances (Sethi et al., 2020). This often led to fatigue and burnout (Sangster et al., 2020). Teachers often reduced course-workloads due to the extra time required for students to complete activities and assignments in a

digital manner. Nevertheless, despite the modifications, activities and assignments often required more time than anticipated (Wilcox & Vignal, 2020). Osman (2020) noted how there was difficulty in addressing the needs of students with special needs, and Sundarasan et al. (2020) reported higher levels of stress and anxiety among female students, implying that the collective negative effects of ERT and the pandemic are likely highly nuanced and subtle. How certain groups and sub groups of teachers/students (e.g., international students vs. exchange students, humanities vs. science instructors) have experienced and managed mental health issues in relation to ERT is an area wide open for empirical study.

Technology Obstacles and Barriers

Instructors and students also reported numerous challenges and difficulties with technology in interviews, open-ended responses, and surveys. Internet access (poor bandwidth, limited availability) was described in communities all over the world (Aboagye et al., 2020; Alqurshi, 2020; Abel, 2020; Gillis & Krull, 2020; Kapasia et al., 2020). While this is not necessarily surprising, Internet and computer access could be more problematic than had initially been anticipated (Gillis & Krull, 2020). While some studies only reported few or minor technology-related obstacles or barriers (e.g., Abdulrahim & Mabrouk, 2020; Choi et al., 2020; Crick et al., 2020; Knudson, 2020), the relatively smooth transition to ERT and seemingly “easy” educational continuity only highlighted how unusual this outcome was when compared to other accounts emerging on social media, personal/professional networks, and emerging literature on the subject (Jandrić et al., 2020). The transition in modality from offline to online, however, required numerous changes to common practices in addition to having to learn how to perform common teaching and learning tasks anew.

Frequently-made Adjustments in Response to ERT

Modality Changes

Studies frequently noted how teachers were forced to confront how to teach differently at a distance. This often included changing the modality of assignments or activities (Amin & Sundari, 2020), as well as approaches to the course format itself. For example, Aboagye et al. (2020) found that lecturer issues in their final regression model could have been addressed by utilizing a blended-learning format versus courses being conducted fully online. Green et al. (2020) noted how teachers valued being able to team-teach in ERT rather than having to go it alone throughout the pandemic, which was especially valuable if a team member had expertise/experience in digital and/or distance learning. Quezada et al. (2020) saw course structures and practices being modified and adjusted in real-time based on student feedback, coming to the realization that assignments and activities should not be mimicked from the face-to-face experience, which is a long-standing principle (equivalency theory) in distance education (Simonson, 1999). Petillion and McNeil (2020) also witnessed how the use of synchronous lectures were able to recreate a sense of structure and normalcy, although Peters et al., 2020 found that the use of live-lectures had mixed-results with student engagement and synchronous lecture attendance. Student engagement was often related (positively and negatively) to adjustments made to course expectations and evaluation policies.

Evaluation Policies and Course Workloads

Various studies highlighted both the importance and necessity of adjusting evaluation policies and workloads given the sudden switch to ERT alongside the added pressures of the pandemic

(Quezada et al., 2020; Van Heuvelen et al., 2020). This could take the form of implementing pass/fail grading policies (Perets et al., 2020), although the outcomes of such a change could have both positive and negative effects. For example, Perets et al. (2020) reported that the pass/fail grading resulted in less student engagement, less attendance at synchronous lectures, and even less viewing of asynchronous lectures. By contrast, Gillis and Krull (2020) reported more favorable reactions to the implementation of pass/fail grading policies though less motivation was prevalent nonetheless. Wilcox and Vignal (2020) described how student workloads were reduced to accommodate the extra work involved in learning remotely though teachers did not necessarily perceive the change being successful, and students still felt ERT had a negative impact on their learning.

Discussion and Conclusion

While distance education has been a consistent and growing component of education for more than 200 years (Bower & Hardy, 2004; Seaman et al., 2018), it has never been a global phenomenon in the way that ERT has been due to COVID-19 (Hodges et al., 2020). For most institutions, instructors, and students, their experiences with ERT are their first experiences with distance education. While these two practices are distinct from one another (Hodges et al., 2020; Williamson et al., 2020), it is likely that experiences with ERT will, rightly or wrongly, influence perceptions of teaching and learning online for generations to come.

This review of empirical studies in 2020 synthesizes global experiences of ERT, often highlighting difficulties, challenges, and large-scale socio economic disparity. However, the potential for paradigmatic change exists in education moving forward (Alqurshi, 2020; Crick et al., 2020; Jandrić et al., 2020). In terms of educational technology, ERT has forced educators en masse to embrace and/or experiment in novel teaching methods, using different tools and technology, in ways that no policy directive has ever been able to accomplish (Jandrić et al., 2020). Similarly, while distance education has often not been included in traditional teacher-training programs or professional development, the pandemic has shown just how vital a skill it is in emergencies, and one that has numerous positive outcomes in general when properly implemented (Abdulrahim & Mabrouk, 2020). Distance education may become more mainstream and seamlessly blended into education if included in future education programs and ongoing professional development.

Many of the suggestions from these studies (e.g., equivalent learning experiences, lowest-common technology, alignment of digital tools and curricular objectives, institutional support, social presence, teaching presence) are not new in distance education, and neither is the socio economic and digital divide (see Jaggars, 2014; Stoessel et al., 2015; Xu & Jaggars, 2013). In fact, the knowledge base on teaching and learning at a distance has existed for decades (Bower & Hardy, 2004; Means et al., 2014) yet it is new to the vast majority of educators worldwide. A few of these best practices (equivalency theory, multimodal presentation of information, accessibility) in distance education have taken on a new significance.

These studies also show the immediate, short-term impacts of ERT; what remains to be investigated and understood are the long-term and likely less obvious effects that ERT has had on education. The synthesis in this review has also pointed out numerous avenues for future research, especially on the longitudinal effects of ERT. Future studies should investigate ERT and educational attainment, in addition to retention/attrition rates. Attrition rates in distance education are both complex and high, and what the attrition/retention rates and trends are in ERT are unknown at this point in time, and vital to both understanding where we are in terms of the effects of the pandemic and ERT. In short, there is no shortage of avenues for future investigation. Furthermore, how we collectively move forward to

post-pandemic times is a question that remains to be answered. We have witnessed the transition from education to ERT, and now we must transition from ERT to various post-pandemic educational norms; empirical research will be instrumental in getting us there.

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