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EdTech and Emergency Remote Learning: A Systematic Review

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Contents

1. Overview and key findings

This document presents the results of a systematic review of the academic literature in relation to online and remote learning in K–12 education during emergencies. One hundred and twelve studies were identified and included in the analysis.

The key findings were:

Emergency online and remote learning is distinct from educational models intended to be delivered at a distance from the outset. Emergency remote learning is rapidly implemented and relies on the current skills, knowledge, and resources available to both students and teachers.

The research included multiple types of emergencies, but Covid-19 was most prevalent. During the past decade (January 2010 to November 2020) emergencies in the research included biological (pandemics, Covid-19), human-caused (poverty, refugee, political unrest, and threats), and natural disasters (climate / environmental, and natural weather and geological disasters). Ninety per cent of studies focused on Covid-19.

There is a paucity of formal research in low- and lower-middle-income countries. Emergencies are far more common and deadly in low- and middle-income countries (⬆Razzak et al., 2019). However, findings show that there is less formal research conducted in these countries, where it could also make a substantial difference to learners.

A variety of strategies were used to ensure that learning continued. Strategies include an examination of delivery systems, an investigation of student readiness to learn online, the development of communication and partnerships strategies, ways to improve students' learning and engagement and an assessment of availability and quality of resources.
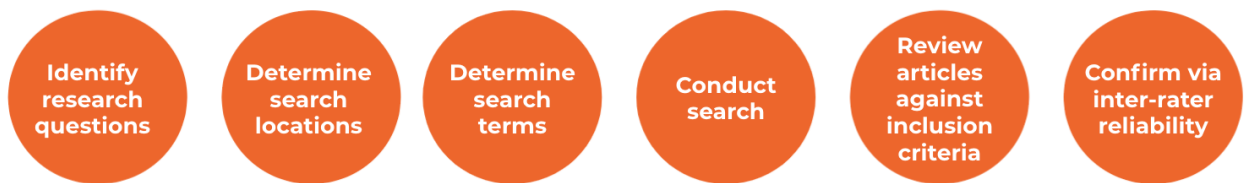
A variety of approaches were used to train teachers to conduct emergency remote learning. These approaches include the need for training before the emergency and for facilitating knowledge on multiple pedagogical approaches related to remote learning. They also include enabling K–12 teachers to consider issues related to digital equity and mental health when conducting emergency remote learning.

A range of technologies was used to support learning, online and offline. Offline technologies included radio, telephone, and television. Online technologies were split into six categories: Communication / Conferencing Tools, Free Distance Learning Resources, Learning Management Systems, Online Workspace Management Tools, Social Media, and Specific Applications.

2. Study aim and methodology

The Covid-19 pandemic has highlighted how emergency situations can disrupt face-to-face education. This research explored the lessons learned for the provision of emergency remote education in a range of crises, in order to enable policymakers, funders, educational leaders, and teachers to better prepare for current and future emergencies.

A systematic review methodology was used for this study. The study involved an examination of 112 formal research articles published from 2010 to 2020, from across 70 countries to provide a summary of emergency remote learning and strategies to support learning and ways to support teachers to teach during emergencies. The research process was as follows:

Identify research questions | Determine search locations | Determine search terms | Conduct search | Review articles against inclusion criteria | Confirm via inter-rater reliability

3. Main findings

3.1. Emergency online and remote learning is distinct from educational models intended to be delivered at a distance from the outset

From the collated studies, it was clear that learning using technologies during emergency situations was very different to planned remote learning. When planned, teachers and students are organised ahead of time in understanding the activities that will take place, the resources they need, and the skills they have to operate the technologies. In an emergency, the learning experience is reliant on a variety of factors, such as:

1. **Teachers having remote teaching pedagogical knowledge to conduct remote learning**. The research shows that many teachers may not possess those critical skills and knowledge (⬆Christensen & Alexander, 2020).
2. **Students should have remote learning organisational skills** in ensuring they log into online sessions at the correct time, understanding how to effectively learn and behave online.
3. **Teachers and students must have knowledge and skills in how to use technologies.**
4. **Teachers and students often need access to technology tools and robust infrastructure** e.g., Wi-Fi access and electricity. In locations where this infrastructure is not available, examining other resources available is important.
5. **Teachers and students need to be able to manage their lives during the emergency, while also teaching and learning.** For example, teachers may need to care for their own young children while teaching, and students may be distressed due to illness or even the death of a family member due to the emergency.

In a planned environment, points one to four would be well organised prior to the start of remote learning. In an emergency, it is hoped that these aspects are in place and if not, school leaders and educators have to quickly seek out the skills, knowledge, and resources needed.

3.2. The research included multiple types of emergencies, but Covid-19 was most prevalent

While emergency situations across 2010 to 2020 were examined, 90% of the emergencies were focused on Covid-19. See Figure 1 for the types of emergencies highlighted in the research. Note that Figure 1 shows 117

emergencies from 112 research articles as some included more than one emergency.

Figure 1. *Types of emergencies.*
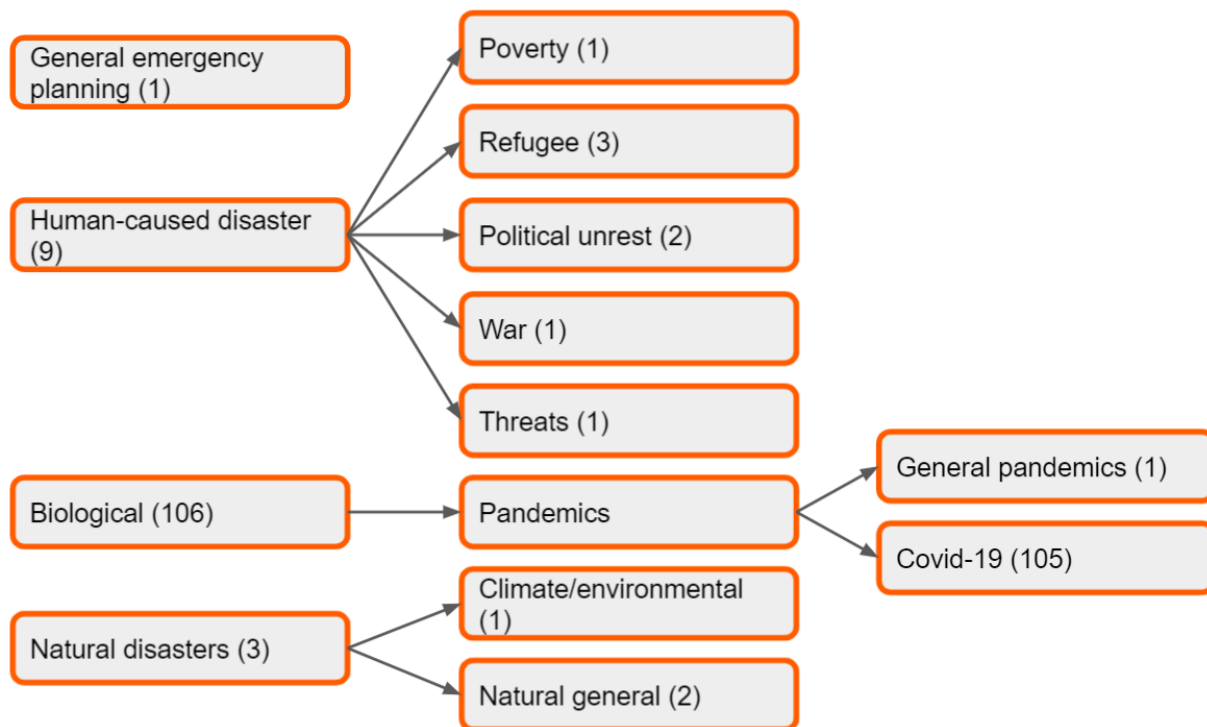
This disproportionate focus on Covid-19 may be due to the scale and duration of the crisis (impacting 94%–95% of learners worldwide; ⇡UNESCO, 2020). In some cases, there are emergencies (e.g., refugee crises) that are both global and long-lasting. It would be relevant to examine emergency remote learning for these populations while a more permanent solution is found.

3.3. There is a paucity of formal research in low- and lower-middle-income countries

A finding of the study revealed a great bias distribution towards countries with high to upper-middle-income represented in the literature. Of the 112 studies, only three (3% of the total) were focused on low-income countries. There was a larger representation of lower-middle-income countries with 27 studies (24%). Low and lower-middle-income countries accounted for 27% of the overall studies. Figure 2 is a visual representation of the spread of the countries with the numbers representing the studies conducted in that country.

Figure 2. *Countries Represented in the Studies.*
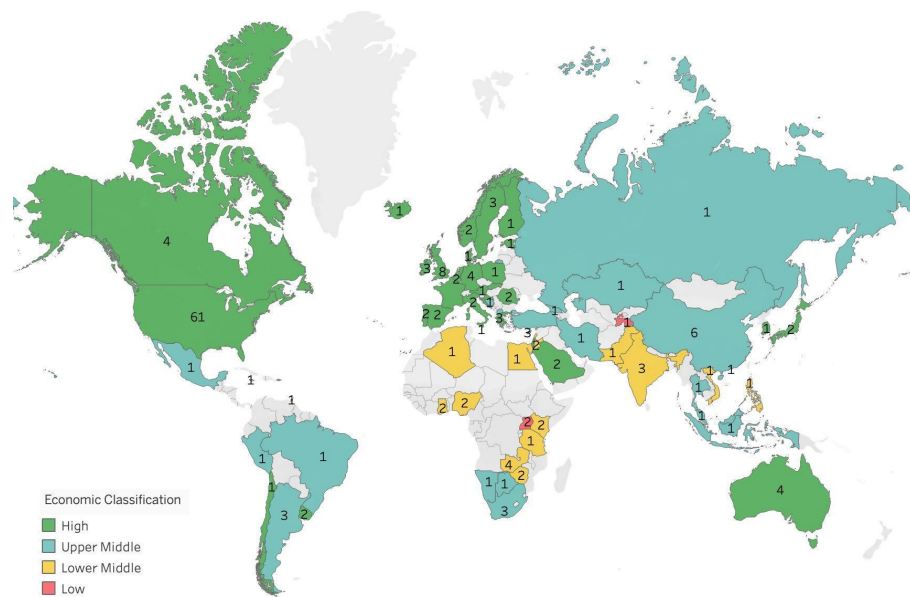
3.4. A variety of strategies were used to ensure that learning continued

In the best of times, educating students involves the use of multiple strategies to ensure that successful learning occurs. During an emergency, it is even more important to examine a variety of strategies to have options to meet the needs of students' learning without the typical resources at hand. The research revealed the following six important strategies that were used during emergency situations to ensure that learning continued.

Communication

Communication was a critical component in emergency situations and required the use of multiple modalities to ensure that the varied audiences were kept informed. These included students, parents, teachers, and members of the community. Email, personal phone calls, facetime, texts, blogs, and online surveys were some of the methods of communication that surfaced in the research.

Delivery systems

Examination of delivery systems revealed that the majority of delivery of instruction happened online via the internet, using a variety of systems such as Zoom, Skype, and Google Suite. However, not all students had access to the

internet or the devices to connect online. In these situations, radio and television were used to ensure that students were learning.

Student readiness

Student readiness was investigated to determine what students needed to learn remotely. This involved analysing students' access to personal e-devices, internet connection, personal study space, hardware facility, and e-storage, their level of digital literacy and e-readiness to study remotely with technology, students' responses towards learning remotely, and the nature of remote technology load on students.

Partnerships

Partnerships were identified as an important strategy during emergency remote learning. The research uncovered how individuals or groups worked as partners with educators during emergency remote learning. For example, ↑Burgess & Anderson (2020) partnered with Spectrum Internet to provide free Wi-Fi hotspots for students who did not have access to the internet. Having other constituents in the community support learning made the emergency a shared responsibility with the entire community invested in the outcome.

Promoting learning and engagement

This was the most common focus for researchers. The data from these studies revealed a variety of strategies for learning and engagement, such as virtual nagging, providing intervention sessions for behavioural goals of special education students, and providing phone-based assessments.

Learning resources

Learning resources examined by researchers to identify the types of resources that were relevant and available. Resources identified ranged from Open Educational Resources and practices available online, to non-online resources, such as radio and television. The availability of digital, internet-based resources was not ubiquitous, and educators needed to be aware that examination of non-digital learning resources is important.

3.5. A variety of approaches were used to train teachers to conduct emergency remote learning

The research of this study revealed a variety of ways teachers can be best trained for conducting emergency remote learning, including seven themes:

1. Prior training prepares teachers with skills and knowledge.

2. Needs analysis allowed the researchers to better understand the types of support that educators needed.
3. Digital pedagogical strategies provided understanding of different methods of remote learning.
4. Technology tools focused on the skills to use tools, such as online meeting rooms.
5. Frameworks provided roadmaps to the various things needed in order to be successful in emergency remote learning.
6. Digital equity focused on the resources and skills of both teachers and students.
7. Mental health was an important aspect covered by researchers in how to keep mentally healthy while teaching during an emergency.

3.6. A range of technologies was used to support learning, online and offline

The coding of technologies revealed that the types of technologies used were divided into two major categories: non-internet based and internet-based. Non-internet based technology included radio, telephone, and television. Although only two studies reported the use of non-internet based technologies, it is important to remember that emergency remote learning can be delivered without the use of the internet. This is of particular concern in countries, such as Lebanon, Palestine, and Jordan which have limited and uncertain internet access (⇡Moghli & Shuayb, 2020). Internet-based technologies were split into six categories (Figure 3).

Figure 3. *Categories of internet-based technologies,*

Technologies used for remote learning

Within the six internet-based categories, a large range of technologies was used. The availability and familiarity with technology played a major part in the selection of specific technologies. In addition, different geographic locations

trend towards different technologies, for example, WhatsApp is widely used in Europe and WeChat and DingTalk are used in China.

4. Conclusion and recommendations

The Covid-19 pandemic has raised the need for everyone involved in education to be informed about the challenges of emergency remote learning. This systematic review, looking at research on the use of technology during emergency remote learning within the past decade, helps to provide such information. Drawing from collective findings, systematic reviews play an important role in informing policy, practice, further research and public perception (↑Suri et al., 2020). Emergency remote learning will remain an important area even after the Covid-19 pandemic that has highlighted a lack of understanding on how to conduct emergency remote learning effectively.

In improving learning for all, future researchers should examine learning in various countries, in particular countries that have fewer resources. These countries need the research support to explore solutions that can be scalable and sustainable in many different types of emergencies. Through research collaboration, especially with applying the contextual knowledge of national and local researchers, the specific nuances of the location can be better understood to provide a more accurate and detailed picture.

4.1. Recommendations

- Research needs to be conducted on emergency remote learning during emergencies beyond the Covid-19 crisis.
- Further research is needed in low- and lower-middle-income countries.
- Teachers need to be prepared for the possibility of implementing emergency remote learning.
- Multiple partnerships are important for the success of emergency remote learning.

4.2. Further reading

To find out more, the findings of this systematic review have been published as journal articles and can be found here:

Crompton, H., Burke, D., Jordan, K. & Wilson, S. (2021) Support provided for K-12 teachers teaching remotely with technology during emergencies: A systematic review. *Journal of Research on Technology in Education*, DOI: 10.1080/15391523.2021.1899877

Crompton, H., Burke, D., Jordan, K. & Wilson, S. (2021) Learning with technology during emergencies: A systematic review of K-12 education. *British Journal of Education Technology*, DOI: 10.1111/bjet.13114

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