Educational Communications and Technology: Issues and Innovations

Vanessa Dennen · Camille Dickson-Deane · Xun Ge · Dirk Ifenthaler · Sahana Murthy · Jennifer C. Richardson *Editors*

Global Perspectives on Educational Innovations for Emergency Situations

AECT ASSOCIATION FOR EDUCATIONAL COMMUNICATIONS & TECHNOLOGY

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ISSN 2625-0004 ISSN 2625-0012 (electronic)
Educational Communications and Technology: Issues and Innovations
ISBN 978-3-030-99633-8 ISBN 978-3-030-99634-5 (eBook)
https://doi.org/10.1007/978-3-030-99634-5

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The World Health Organization declared COVID-19 outbreaks as a pandemic and a global health crisis on March 11, 2020. The pandemic has affected society and individuals on many levels and throughout various aspects of life, including education. All over the world, schools and universities were mandatorily closed, moved online, or delivered in other alternative formats. COVID-19 has forced educators to adapt to emergency situations and seek innovative solutions to continue to provide education to students in all kinds of settings, from PK-12 education to higher education. Such emergency situations have presented unprecedented challenges to educators, students, administrators, parents, and policymakers, and many other stakeholders. The urgency of the situation has called for a system-wide response to make a transition from in-person, classroom education to other feasible modes of education. It has forced educators to explore various opportunities and possibilities for alternative forms to deliver education. All of this has compelled us to seek alternative ways and solutions to education. Such a global and unprecedented situation has led us to many questions and inquiries. Research questions involve, but not limited to, the following: pedagogical issues, technological and infrastructure challenges, teacher professional development, issues of disparity, access and equity, and impact of government policies on education.

The pandemic is far from the first emergency to disrupt education, and surely will not be the last. Educators have adapted to address needs during the emergency response to natural disasters and health epidemics as they arise. However, the scope and nature of the pandemic means that educators and students everywhere are having a common experience, albeit with varying contexts and responses. It also provides a unique opportunity for generating scholarship that helps us understand the varied educational needs, perspectives and solutions that arise during an emergency and the different roles educational institutions and educators may play during this time.

Such a global and unprecedented situation led to many questions and inquiries for educational researchers. Two presidential panel discussions were organized during the 2020 AECT (Association for Educational Communications and Technology; https://www.aect.org) Virtual International Convention to address adaptive

education and innovative solutions to emergencies and crisis during the COVID-19 pandemic. Educational researchers committed to pre-tertiary and higher education from all parts of the world, including the USA, Australia, China, India, Japan, Korea, Germany, the Netherlands, Egypt, and South Africa, were brought together to (1) share their current practice and experiences in response to education during the COVID-19 pandemic, (2) reflect on and develop solutions for emergency education for the future, (3) engage in dialogues on strengthening teacher professional development with adaptive learning and instruction in response to emergency education, and (4) discuss the needs for educators and researchers to constantly update their repertoire of knowledge, pedagogy, and technology and their intersection and be sensitive and responsive to the educational needs, locally, regionally, and globally. The two panel discussions stimulated exciting and interesting intellectual conversations and academic exchanges on multiple issues and dimensions, which reflected varied contextualized practices and international perspectives.

Given the rich content produced during the two presidential panel discussions and the ongoing global situation caused by the COVID-19 pandemic, an initial team of panelists decided to develop an edited volume documenting the outcomes of the panel discussions and capturing innovative practices and solutions throughout the world. The open-access format of this edited volume will enable a global outreach to researchers, practitioners (who often do not have access to resources due to limited library access, etc.), administrators, and policy makers. The edited volume presents AECT and its membership as a globally leading organization focusing on educational communications and technology. In addition, it will function as a contemporary document of this global crisis. Further, this work will present a rich resource for possible future emergency scenarios in the educational arena.

An open call was made to solicit contributions from all over the world in February 2021. As a result, we received 57 proposals from different continents of the world: Asia, Australia, Europe, Africa, South America, and North America. After going through two rounds of rigorous reviews and revisions by our reviewers and editors, 31 chapters were accepted to be included in this open-access edited volume.

The contributions in this open-access edited volume were pooled following the six regions the World Health Organization (WHO) uses for their reporting, analysis, and administration: African Region, Region of the Americas, South-East Asian Region, European Region, Eastern Mediterranean Region, and Western Pacific Region. Given the representation of contributions in the abovementioned WHO regions, the edited volume comprises four parts as follows: Part I—African Region, Part II—Region of the Americas, Part III—European Region and Eastern Mediterranean Region, and Part IV—South-East Asian Region and Western Pacific Region.

The included chapters address a range of issues and challenges in pre-tertiary education, vocational education, and higher education and describe a variety of innovative solutions developed to tackle these issues. The chapters draw from various theoretical perspectives and conceptual frameworks and apply different methodologies. Some chapters include authors from different countries who collaborated in exploring new approaches during the emergency situation. Given this richness

and diversity, an attempt is made below to identify the themes emerging from the chapters and provide a thematic classification of the chapters. It should be noted that the country mentioned next to the chapter is that from which the issues and solutions were reported.

Several chapters highlight the challenges in specific contexts and discuss various solutions that were implemented. These include the use of tools, artifacts, strategies, and community initiatives in response to the needs and culture of local schools, institutions, or regions at various educational levels.

- Chapter 3 from South Africa. *Creating Sustainable Early Childhood Learning Environments for Emergency Situations.* (Sechaba M.G. Mahlomaholo, Makeresemese R. Mahlomaholo)
- Chapter 8 from Guyana. *The Effects of COVID-19 on Rural School Communities in Guyana: New Directions or Old Methods Retooled.* (Charmaine Bissessar)
- Chapter 9 from Latin America. *Mobile Learning for Emergency Situations: Four Design Cases from Latin America.* (Daniela Castellanos-Reyes, Enilda Romero-Hall, Lucas Vasconcelos, Belen García)
- Chapter 13 from the USA. *A Family of K-12 Educators' Innovative Responses to Overcome COVID-19 Challenges.* (Hui-Chen Durley, Xun Ge)
- Chapter 24 from Germany. *Distance Learning and the Influence of Schools' Organizational Characteristics on The Students' Perceived Learning Success.* (Jan Delcker, Dirk Ifenthaler)

A number of chapters are concerned about using innovative approaches to promote professional development in specific disciplines.

- Chapter 6 from the USA. *Simulated Teaching: An Exploration of Virtual Classroom Simulation for Pre-service Teachers During the COVID-19 Pandemic.* (M. Elizabeth Azukas, Jason R. Kluk)
- Chapter 16 from the USA. *Virtual Making: Transforming Maker Education in a Teacher Education Program During the COVID-19 Pandemic.* (Yi Jin, Jason Harron, Helen Maddox)
- Chapter 20 from the USA. *Implementation of a Digital Live-Action Gaming Experience for Interprofessional Learning and Training.* (Andre Thomas, Yun Li, Christine L. Kaunas, Marty Newcomb, Gerard E. Carrino, Lori D. Greenwood, Patrick D. St. Louis, Leroy A. Marklund, Nephy G. Samuel, Hector O. Chapa)
- Chapter 23 from Austria. *Moving Volleyball Coaches Education Online: A Case Study.* (Josef Buchner, Martin Plessl)
- Chapter 31 from Hong Kong. *Evolution of Clinical Education Under COVID-19 Pandemic.* (Alexander Woo, Shirley Ngai)

Some chapters focused on teacher and faculty professional development at various educational levels, using different strategies, tools, and approaches.

- Chapter 1 from Egypt. *Providing Agile Faculty Development in Times of Uncertainty: Case of the American University in Cairo.* (Maha Bali)

- Chapter 4 from Tanzania. *Teachers Co-creating with and for Teachers: Design and Implementation of an Online Teacher Professional Development Course in Sub-Saharan Africa.* (Lucian Vumilia Ngeze and Sridhar Iyer)
- Chapter 7 from the USA. *Utilizing Rapid Needs Assessment to Strengthen PK-12 Teaching and Learning Affordances in Emergency Remote Teaching.* (Lauren M. Bagdy, Jill E. Stefaniak)
- Chapter 26 from India. *From Emergency Remote Teaching to Effective Online Learning. A Teacher Professional Development Case Study from Higher Education in India.* (Ashutosh Raina, Archana Rane, Lucian Ngeze, Sahana Murthy, Sridhar Iyer)

The chapters below discuss innovations in course design and resources to support instructors in the design and implementation processes during the pandemic.

- Chapter 10 from the USA. *Back to Design Basics: Reflections, Challenges and Essentials of a Designer's Survival Kit During a Pandemic.* (Ritushree Chatterjee, Darshana Juvale, Long He, Lynn Lundy Evans
- Chapter 11 from the USA. *Open, Flexible, and Serving Others: Meeting Needs During a Pandemic and Beyond.* (Vanessa Dennen, Jiyae Bong)
- Chapter 15 from the USA. *All Hands on Deck: Faculty Collaboration in Transforming to Remote Teaching.* (Wanju Huang, Jennifer Richardson)
- Chapter 17 from the USA. *Reflecting on a Year of Emergency Remote Teaching.* (Jeonghyun Lee, Farahnaz Soleimani, Stephen W Harmon)
- Chapter 29 from Australia. *Responsive Online Course Design: Microcredentials and Non-linear Pathways in Higher Education* (Keith Heggart)
- Chapter 21 from the USA. *Transforming Emergency into Opportunity.* (Emily York, Diane Wilcox, Jonathan Stewart, Sean Mccarthy, Kenneth Barron)
- Chapter 30 from South Korea. *Emerging Reform of Higher Education in Post Pandemic.* (Insook Lee, Yoonil Auh, Hee Cyber, Eunbae Lee)

Some of the chapters examine different theories that can be used to understand or guide online instruction, as well as support students' online learning experience during the COVID-19 pandemic.

- Chapter 5 from the USA. *Reopening Campuses: Visualizing the Structure of a System Problem.* (Hadi Ali, Ann Mckenna)
- Chapter 14 from the Caribbean. *Translating Distance Education Theory into Practice.* (Leroy Hill)
- Chapter 18 from the USA. *A Reflection on Online Teaching and Learning Through the Pandemic: Revisiting Creativity*. (Jin Mao)
- Chapter 22 from Pakistan. *Online Higher Education in the Wake of COVID-19: A System Thinking Perspective.* (Fawad Sadiq, Muhammad Sadiq Malik)
- Chapter 25 from Vietnam. *Online Learning Environments and Student Engagement: Meeting the Psychological Needs of Learners During the COVID-19 Pandemic.* (Vo Ngoc Hoi)

Certain chapters discuss the impact of government policies and country-wide initiatives, and discuss the role of institutions and professional organizations in implementing the policies during the COVID-19 pandemic.

- Chapter 2 from Namibia. *Exploring Namibia's Educational Emergency Response Teaching: A Policy and Practice Perspective.* (Perien Joniell Boer, Tutaleni I. Asino)
- Chapter 12 from the Caribbean. *Intersectionality and Compromise: Enacting Government Policies in the Caribbean.* (Camille Dickson-Deane, Laurette Bristol, Dauran Mcneil, Talia Esnard, Lorraine Leacock)
- Chapter 19 from Chile. *Chilean Perspectives on Educational Experiences and Innovations in Emergency Contexts.* (Jaime Sánchez, José Reyes-Rojas)
- Chapter 27 from Japan. *Impact of the COVID-19 Pandemic on Education in Japan and the Role of the Japan Society for Educational Technology.* (Yoshiko Goda, Tomomi Takabayashi, Katsuaki Suzuki)
- Chapter 28 from China. *China's Experience of Online Education During the COVID-19 Pandemic.* (Xiaoqing Gu, Ling Li)

We invite readers to get inspired by the rich collection of chapters and their comprehensive global perspectives on educational innovations for emergency situations. Without the assistance of experts in the field, the editors would have been unable to prepare this volume for publication. We wish to thank all authors for sharing their knowledge as well as our board of reviewers for their tremendous help with both reviewing the chapters and linguistic editing. In addition, we would like to thank the Series Editors of "Educational Communications and Technology: Issues and Innovations" (https://www.springer.com/series/11824) for guiding the publication process and including our work into the book series.

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Acknowledgments

The coeditors of this edited volume "Global Perspectives on Educational Innovations for Emergency Situations" would like to express their gratitude towards Association for Educational Communications and Technology (AECT; https://www.aect.org) for their kind support in making this open-access project a success. In order to publish this open-access edited volume, the financial support of the following organizations has been vital.

- Association for Educational Communications and Technology (https://www.aect.org)
- University of Mannheim, Germany (https://www.uni-mannheim.de)
- Purdue University, College of Education, USA (https://www.education.purdue.edu/graduate-students/prospective-students/graduate-programs/learning-design-technology)
- Florida State University, USA (https://www.fsu.edu)

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Part I
African Region

Chapter 1
Providing Agile Faculty Development in Times of Uncertainty: Case of the American University in Cairo

Maha Bali

Abstract The move toward emergency remote teaching meant educational development centers suddenly had to train and support all who teach at their institutions simultaneously. This article will focus on the agile, responsive and value-centric faculty development done locally via the American University in Cairo's Center for Learning & Teaching, the "glocal" opportunities offered via DigPINS (see Bali and Caines, Int J Educ Technol High Educ 15(46):1–24, 2018), and the curation of openly available community-building resources available to educators worldwide. Central to all of these initiatives is that centering equity and care in how we support faculty (Czerniewicz, Agherdien, Badenhorst, Postdigit Sci Educ 2:946–967, 2020) will trickle down to the ways faculty treat their students during the trauma of the pandemic. We conclude that the pandemic has taught us the importance of centering values of equity and care while supporting faculty during a time of uncertainty and trauma (Imad, TIA 39, 2021), that fostering agency and imagination is more valuable than offering one-size-fits all standard solutions, and that faculty developers need to model adaptability and good pedagogy. Moreover, it is important to nurture and leverage learning communities, take advantage of "glocal" and "open" learning opportunities, and to build capability long-term via developing digital literacies and creativity.

1 Introduction: The Difference with Emergency Remote Teaching

When the COVID-19 pandemic forced educational institutions worldwide to move teaching to online mode, the term "emergency remote teaching" (ERT) (Hodges et al., 2020) was coined to differentiate this approach from previous instances of fully online or distance education. For one thing, in the past, online teaching was a

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_1

choice teachers and students made among other options, whereas in this case, it was the only option. This meant that neither teachers nor students had a personal motive to choose online education - beyond the general imperative for "continuity" during imposed lockdowns. Also, most teachers did not have the training or experience of teaching online and the opportunity to design their courses thoughtfully with the help of instructional designers and instructional technologists over several months - everyone had to make the shift almost overnight, or at least within a very short period of time. It would be unreasonable to assume that people teaching online for the first time, and without time to prepare, would suddenly be able to offer good quality online education (Hodges et al., 2020). Faculty development and IT centers that had to support this shift had a sudden exponential increase in the number of educators they needed to support in a short amount of time, and so solutions varied.

Another important consideration with emergency remote teaching was the amount of trauma experienced by educators and students alike, from three main sources (as listed by Imad, 2021): (1) the uncertainty of living through a health pandemic, not knowing how to protect one's loved ones, not knowing how long the situation would last, not knowing about economic impact, etc.; (2) the isolation caused by the government-imposed "physical distancing" in many countries, the stress of being unable to socialize freely with family, friends and colleagues; (3) the loss of meaning, as most people's long-term plans were put on hold in order to deal with the emergency situation which changed the context of our everyday lives. In order to help educators through this traumatic stress, Imad (2021) proposes the following in order to offer trauma-sensitive educational development: help faculty feel they are in control in the face of uncertainty; use communication to help build trust; reestablish or reaffirm goals to create meaning; nurture community; and emphasize care and wellbeing. As a faculty developer in the Center for Learning and Teaching at the American University in Cairo, and one who has a role in public scholarship beyond my own institution, I felt compelled to ensure equity and care for students during this time, and to also offer that kind of equity and care while supporting faculty, and at the same time meet the requirements coming top-down from administrators. How do you give faculty a feeling of control in the midst of uncertainty, while also ensuring a minimal standard of quality as required by administrators?

It is also important to recognize the ways in which the pandemic situation exacerbated inequalities (Czerniewicz et al., 2020), and that educational institutions had a moral obligation to try not to reproduce inequalities in their educational offerings. In Egypt, internet infrastructure varies by location and not just by socioeconomic status. The majority of students are privileged at my private American Liberal-Arts style institution, and AUC ensured that scholarship students had access to their own devices and high-speed internet. Faculty who did not have good internet at home were allowed to connect from their offices on campus. However, there are other less visible inequalities. Not everyone had access to a quiet, private space at home, some students and faculty members had additional care responsibilities at home, and people suffered from mental health challenges to varying degrees, and the pandemic situation surfaced new mental health challenges and exacerbated existing ones.

In all of this, it is important to recognize the role of faculty development centers not just as the main source of support for educators at universities, but also their role in modeling good practices for educators to emulate (Bali & Caines, 2018). The ERT situation required agility from faculty developers, as "best practices" in previous online teaching for the past 20 years before did not always apply in this case. Faculty developers needed to perform with agility but also to model agility in responding to this uncertain situation; they needed to model trauma-sensitive educational development in order to foster trauma-informed pedagogical approaches that would support and care for students. They also needed to do so while promoting equity and offering educators as much agency and ownership as possible, while trying to help maintain quality education for students. Moreover, in a situation where educators needed to provide so much more care to students than usual, faculty development centers became spaces for community support. As Noddings says, "when… the cared-for is unable to respond in a way that completes the relation, the work of the carer becomes more and more difficult. Carers in this position need the support of a caring community to sustain them" (Noddings, 2012, p. 54). As Brenna Clark Gray writes, as faculty developers, "we must do [the work] in a way that centres care, that acknowledges the stress and strain of our moment, that makes the digital humane: no one specifies those things, but they become central to my institutional purpose. The gulf between what the institution prioritizes and what I know is right expands" (Gray, 2018, p. 51).

This article shares my experience as a faculty developer at the American University in Cairo's (AUC) Center for Learning and Teaching (CLT), as a key member working in a team tasked with supporting all faculty members through this shift to remote teaching. Specifically, I will highlight the agility and responsiveness of the different approaches followed at different times during the pandemic, and how they fare in terms of promoting ownership, agency and equity (Bali & Caines, 2018), and how they were influenced by trauma-informed approaches (Imad, 2021). Most of the actions were local, centered on my university's context and in response to administrative recommendations and faculty and student feedback and requests; some of it was of a global nature, responding to what the global community of faculty developers and educators needed, and taking advantage of the possibilities for trans-national and glocal faculty development opportunities because so many worldwide were teaching fully online.

2 Overview of the Agile Faculty Development Approach

Two major elements of the emergency situation that require agility are that faculty are diverse in terms of their digital literacies and attitude towards learning new technologies, as well as diverse in terms of who their students are and what their pedagogical approaches are. This meant that there was no-size-fits-all (Gachago, Pallitt & Bali, 2020). Agility was also needed because of the uncertainty of the situation. What was needed, how long it would be needed, how faculty and students would

respond, were all unknown and constantly moving targets. The university administration was accountable to the board of directors, to the US accreditation agency, Middle States, to Egyptian government decrees, to Egyptian accreditation, and of course to the needs and demands of students, parents and faculty. As a Center for Learning and Teaching, we needed to listen to all of these, synthesize, and recommend based on what we know from our experience in digital education, what we know of how other universities worldwide are responding, and what we observed and heard from our own local faculty and students.

In order to provide agile faculty development (as I describe it), the Center for Learning and Teaching instinctively and continually went through four phases, all while maintaining an underlying ethic of care and equity:

First: Anticipating and imagining what may occur and what kind of faculty development support might be needed in the near and medium-term future, and planning ahead for it. This aligns with Dunn (2018) model for technical intuition.

Second: Implementing while offering agency, ensuring that what is needed by the majority of educators is available, but that faculty members have agency to choose something other than one-size-fits-all solutions (see Bali & Caines, 2018; Gachago, et al., 2020; Longstreet et al., 2020).

Third: Listening, observing, researching, such that members of the Center are not only offering a service to faculty, but also listening to their reactions and concerns, observing how they respond to it, and performing more formal research such as surveys to gather feedback more formally and make decisions based on this feedback. Where possible, we also listened to students and collected feedback formally from them. Of course, there were some strategic decisions taken at the institutional level and not by the center itself (similar to Dunn 2018 Inquiry step).

Fourth: Adapting, based on a combination of institutional top-down decisions, faculty and student feedback and needs, and our own expertise as faculty developers following our past experience, what other centers worldwide were doing and our own innovative local solutions to fit our context.

This was a cycle repeated multiple times, as we iterated on what we offered and how we offered it. The pandemic situation was first predicted to last 2 weeks, then a few months, then over summer, then over the fall semester, and then over the spring 2021 semester, with small adjustments for "dual delivery" and "partial face-to-face" mode. Plans were adjusted multiple times, due to the statistics on COVID cases and some government decrees for shutting down educational institutions completely during months of high infection rates in Egypt.

3 Practicing Agile Faculty Development at AUC March 2020-December 2020

3.1 Phase 1: Pre-Closure

Before the government of Egypt announced that all schools and universities would move fully online, AUC administration anticipated that this may occur and the Center was tasked with preparing all faculty for this move. The Center collaborated with the Learning Management System (LMS) team to offer basic training on the institution's LMS (Blackboard) and lecture-capture system (Panopto) by offering training timeslots for small groups to work closely with a member of either team, and to rotate across different "stations" focusing on different functionalities. By separating the different functions, this allowed faculty members agency in choosing which "stations" to visit according to their needs. For example, if someone was already familiar with the discussion board of Blackboard, they did not have to sit into that session; if someone did not plan to use Lecture Capture, they did not have to attend that session. This was the "foundation" announced and offered to all. People who were very familiar with the tools could apply for an exemption approved by their department chair.

Importantly, I recognized this "mass" foundation offering as insufficient for meeting all faculty members' needs. With approval, I created supporting documentation that recognized that faculty who taught seminar-style courses needed more support for moving their teaching online. They were offered three additional documents: one for how to design and facilitate good online discussions (beyond the technical training offered in the foundation); one with alternative approaches to online interaction, such as collaborative annotation and Google docs; and one with guidelines for creating good synchronous online experiences such as Bb Collaborate and Zoom, even though AUC did not have a license for Zoom at the time. During our in-person training, we offered one-on-one consultations on the spot, and many faculty asked about synchronous video conferencing options, and we consulted with them on possibilities including Google Meet, Bb Collaborate and Zoom. Once the institution listened to faculty reiterate the need for using a synchronous video conferencing tool such as Zoom, and a large number of them asking for this particular tool as some had been familiar with it, the institution eventually bought an institutional Zoom license. Although the Center was not responsible for technical training on using Zoom, our future offerings once closure occurred used Zoom for online workshops, and faculty emphasized how important it was for them that our workshops modeled good synchronous video pedagogy to faculty.

On top of all of these offerings, our members were available for individual consultations, whether during these initial face-to-face training sessions, or via email or phone. As the pandemic situation progressed and everything became fully online, including training, we offered a one-stop-shop online form for requesting technical or pedagogical consultations.

3.2 Phase 2: Early Phases of Closure

As closure loomed imminent, administration asked us to write guidelines for faculty on how to convert various activities and assessments to online mode. We decided to make these guidelines in Google documents, as we recognized that guidelines could change every few days, depending on the situation. For example, at first, the university was planning to close for 2 weeks, and faculty were asked to postpone exams; later, the closure was extended for a longer period, and faculty were asked to convert in-person exams to alternative assessments; later, as closure went on, faculty were encouraged to convert exams to take-home or open book versions, and eventually, the institution started offering online proctoring software and guidelines shifted to when and how to use this software if deemed necessary. As the situation stabilized, these Google Documents started to have web versions that did not require constant updating. All of the material eventually became available publicly at https://www.aucegypt.edu/online-instruction

Agility involved also observing the situation and listening to faculty closely, as well as monitoring the worldwide situation. After initially promoting and recommending mostly asynchronous learning in order to promote equity, we recognized that the pandemic situation might require more synchronous teaching, for several reasons: the internet in Egypt improved, and synchronous learning seemed possible - and the institution was able to provide internet support for scholarship students who needed it; the socioemotional isolation from the pandemic needed educational environments to promote community and social connection, and not all educators or students knew how to do this via text in an asynchronous manner, especially in an oral culture such as Egypt's; and synchronous learning offered a lower cognitive load for both educators and students than asynchronous learning, which would require more time management and preparation time - two things that trauma of the pandemic made more difficult (Imad, 2021). Equity and care looked different in this pandemic. As Farmer (2020) suggests, asynchronous learning becomes appropriate the more autonomous a learner is. Many learners during the pandemic were not prepared for this autonomy, and the trauma of the pandemic made it more difficult to make this shift.

In the early phases of closure, the Center offered several webinars to faculty on various topics of interest to them, such as how to balance synchronous and asynchronous learning, how to offer seminar-style classes online, and how to design alternative assessments. These offerings were provided via Zoom and faculty told us that they attended not only for the content, but also to watch us model how to use Zoom in pedagogically sound ways. For example, the first session on seminar-style teaching was by request of the newer faculty of the yearlong Faculty Institute of Learning and Teaching, where members shared their own experiences and concerns, modeling a seminar-style class.

Moreover, we had two types of "open-ended" offerings on Zoom. One was "morning coffee" and "afternoon check-in", available most days, where anyone could drop in and chat, an open community space for socialization or quick

trouble-shooting. The other was "Ask Us Anything" drop-in sessions twice a week, where people could come without registering and ask any questions they had, and a group of educational developers would be available to help respond. These sessions provided agile support and also gave CLT opportunities to listen to faculty concerns and feedback.

In order to guide further support, the institution gathered survey feedback from students and teachers on a weekly basis at the beginning of the pandemic, and faculty development offerings were adapted, based on this feedback.

The one-on-one consultations continued and occasional department-wide consultations as well, especially to support faculty with implementing alternative assessments, which we felt would provide more care and equity for students in a time where online timed exams, particularly proctored ones, increased student anxiety and stress, particularly those with less stable internet and less private home environments. The affective labor involved in all of this was significant. Faculty were under a lot of stress, as were students, and as faculty developers we needed to offer care and support for faculty to help them offer that kind of care and support for their students. As a center that initially supported a fraction of the faculty body who chose to ask for our support, we were suddenly supporting the entire faculty body, whether or not they wanted it. I remember personally receiving panicked phone calls and text messages from faculty members all day long, from 8 am to 10 pm the first few weeks.

3.3 Phase 3: Preparing for Summer

When it became clear that our summer semester (and later the fall semester) would also be online, it became important to ensure that faculty were better prepared for teaching fully online from day one. We recognized that these could not possibly be online courses of the same quality as ones we had previously developed over months with teams of instructional designers and instructional technologists, and that not all instructors would require the same type and degree of support. Therefore, we offered four differentiated options for summer PD, imagining what faculty would need based on past experience, and offering agency for them to choose what they would benefit from the most:

First: A self-paced course on Blackboard where faculty could both learn about all the elements of the process of designing an online course, and also see a model self-paced course on Blackboard.

Second: A 3-hour synchronous "summer institute" (later "fall institute") where faculty could work together on developing their lesson plans, syllabi, and offer advice to each other in small groups. This session modeled good use of Zoom (which many of them were planning to use), particularly good use of Liberating Structures (see description in #4 below) for structuring equitable and engaging discussions in large and small groups, and good use of breakout rooms and Google docs for small group collaboration. This session relied heavily on faculty members

learning from each other in small groups, modeling the kind of reciprocity and peer support they could continue to do within their own departments and in their courses as well.

Third: Optional technology hands-on sessions on designing their courses on Blackboard and using Zoom breakout rooms. The Zoom breakout room sessions became very popular after people attended the institute, because they experienced good use of breakout rooms and decided to use them in their classes. These sessions were conducted in such a way that every faculty member worked in a small group and was able to practice being the host and creating the breakout rooms themselves, in order to build their confidence to use it in class on their own.

Fourth: Glocal PD: Aside from the local PD offered, we also offered some "Glocal Educational Development" opportunities in late spring and early summer. At first, as part of the AMICAL consortium (a consortium of American-style Liberal Arts institutions outside the US), I co-facilitated several workshops using Liberating Structures. Liberating Structures are microstructures that offer "novel and practical how-to methods to help you include and unleash everyone in shaping [decisions]. LS distribute control so that participants can shape direction themselves as the action unfolds." (Liberating Structures, n.d.). Moreover, AUC joined four US institutions in offering a more advanced exploration of digital literacies via DigPINS (Digital Pedagogy, Identity, Networks and Scholarship, as described in Bali & Caines, 2018), which allowed faculty who were already comfortable with digital teaching and digital literacies who wanted to reflect more deeply with others all over the world undergoing similar changes. We used a combination of asynchronous activities such as Slack, Twitter, blogging and collaborative annotation, and synchronous sessions using LS, and faculty could choose which elements to engage with at their own discretion.

The above options offered faculty agency, and also offered "care" to faculty and modeled how this care could be reciprocal amongst themselves and how they could encourage a caring environment within their classes, among their students. We received positive feedback on the value faculty members gained from these various PD options, including their success in using breakout rooms (and also feedback from students on enjoying this), the value of interaction with faculty peers in the synchronous workshops, and the value of hands-on technical workshops such as on Zoom breakouts.

3.4 Phase 4: Preparing for Fully Online Semesters

Given the success of the summer preparation PD, we offered similar PD in preparation for the fall semester, in addition to New Chalk Talk newsletters that included curations of faculty experiences, and a synchronous workshop towards the end of Spring 2020 in which faculty panelists from various disciplines shared their good practices in teaching online during the Spring 2020 semester. One of the most

successful newsletters curated the input of 17 faculty members and was published towards the end of Fall 2020 (Addas et al., 2020).

We noticed that many faculty members (locally and globally) were saying they were not sure that it was possible to build community in a fully online course—some were able to establish intimacy one-on-one with students but not between learners themselves. While our offerings tried to offer options for doing so, such as creating breakout rooms and modeling Liberating Structures, they did not seem to be enough. People needed more diverse ideas that would suit their teaching philosophy, and more modeling of concrete practices.

Outside of my role at the Center, I collaborated with OneHE (an organization focused on quality of education globally) via my role as co-facilitator of Equity Unbound (an equity-focused, open, intercultural, connected learning curriculum) to create a website with Community-building Resources, a site that contained demo videos and templates and adaptations for activities educators could use in online class introductions, warm-ups, setting the tone for their courses and maintaining community via ongoing engagement and published here: https://onehe.org/equity-unbound. Our approach centered Intentionally Equitable Hospitality (Bali et al., 2019), where the teacher would view themselves as a host responsible for making sure everyone felt welcome, and ensuring this hospitality was equitable; as such, the site offered adaptations for each activity, knowing that some teachers would need to teach synchronously and others asynchronously; some had access to breakout room functionality and others did not, etc. This site included contributions from educators from all over the world and continues to receive contributions.

This site addresses the systemic challenges of the pandemic: not all educators worldwide had access to a faculty development center, and faculty developers were overloaded and burnt out from offering support non-stop for months (Bessette & McGowan, 2020). Moreover, previous good practices in online learning did not necessarily apply, especially with the mostly-synchronous approaches applied. This site offered demos and adaptations for activities that could be done synchronously or asynchronously. We received feedback from educators and faculty developers locally and worldwide that these resources were helpful and made it easier for others to imagine how to build community online (see a curation of some of the feedback in Bali & Zamora, 2021/2020).

4 Conclusion

The success of PD for online education is not only dependent on support for teaching via workshops and such, but also through fostering community support and institutional systems for rewards (Baran & Correia, 2014). CLT was able to imaginatively anticipate the types of teaching PD needed, and to foster communities locally and internationally to support faculty through their journey, but we are not able to offer substantive institutional rewards. However, by bringing faculty together to learn from each other, we were also recognizing what they had learned and their good

practices, and inviting them to offer it to each other via newsletters and online workshops.

In the times of the trauma of a pandemic, where many of people's choices were stripped away from them, we tried as much as possible to offer faculty members agency in which type of PD they wanted: in terms of modality (synchronous or asynchronous), in terms of focus area (basic technology hands-on, more pedagogical or more reflective such as DigPINS) and at the same time offer one-on-one support to those who need it. We also attempted to build community and foster imagination via the various options and approaches.

Listening to feedback and continually adapting, to continue being responsive to faculty members' needs was key: we did not stick to previous good practices in online teaching (e.g. more asynchronous learning) when we saw faculty needed more; we continued ourselves to learn via our own PD opportunities and bring this back to campus. Moreover, as a faculty developer myself with many online networks, I was able to co-curate and develop community-building resources as an Open Educational Resource (OER) for all, resources that center care and equity, because I could see they were necessary even though my own institutions did not have resources to develop these: when something is needed and resources are scarce, but something is needed, we need to find other ways. When workshops and self-paced courses are not enough, we need to consider other approaches to PD, such as the video demos and templates and adaptations we used in the OneHE/Equity Unbound site. Community-building online was difficult for educators to imagine and they needed to see various approaches in action and know how to apply them.

Agility is necessary for faculty developers at times of uncertainty, and modeling this agility for faculty members is also necessary, but most importantly is that what guides our decisions is our underlying values, which in our case were equity and care for faculty and for students, and not neoliberal dimensions of efficiency and measurability that do not center the humanity of the pedagogical process.

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Chapter 2
Exploring Namibia's Educational Emergency Response Teaching: A Policy and Practice Perspective

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Abstract The COVID-19 pandemic challenged educators and education systems globally to rethink education. Using the Context, Input, Process, Product (CIPP) evaluation model we argue that the sudden shift to emergency remote teaching highlighted the importance of (1) understanding the goals and objectives for emergency remote teaching and how they were communicated to and internalized by stakeholders (context); (2) considering the existing internal resources necessary for supporting the transition to another form of learning delivery (input); (3) asking which aspects of the education system affected the feasibility and effectiveness of the transition (process), and (4) reflecting on the interactions and responses of stakeholders regarding their experiences with the sudden move to fully online learning (product). In this chapter, we use the CIPP to explore the educational response during emergency teaching in Namibia. We aim to unpack the decisions, and processes, employed during the COVID-19 lockdown in the country.

1 Introduction

The SARS CoV-2 outbreak in January of 2020 caused significant interruptions in the schooling and academic spheres. The lack of continuance of education during the pandemic was a considerable challenge globally, as the pandemic revealed disparities in economies and society (Bozkurt et al., 2020). The continual disruption is markedly affecting learning, the drop-out and return rates of learners, particularly the girl-children (Giannini & Albrectsen, 2020). Disruption in education days leads to loss of educational gains and lowers the performance of learners. Moreover, it has

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_2

lasting impacts on future careers and financial income. In the context of Namibia, when the COVID-19 numbers increased in the country, necessitating limitations of in-person contact, the Ministry of Education initially issued a directive to schools to engage in e-learning during the first lockdown period (Government of the Republic of Namibia, 2004). However, the Ministry soon realized that it was not possible. The focus of this chapter is to reflect on the decision made by the Ministry on Emergency Responsive Teaching (ERT). We argue that the COVID-19 outbreak presents countries with a glaring reality of an implementation gap that must be addressed. In Namibia's case, there is a disconnect between a clear understanding of the policy implementation and the reality of implementation preparedness when the directive was given for schools to go online. Furthermore, the events of COVID-19 present a larger question of whether a change is needed in the manner we do school and if the pandemic is sufficiently disruptive to initiate innovation in schooling. In keeping these questions in mind, this chapter reflects on the last year and 8 months, evaluates the Namibian Education Emergency Response Teaching (ERT) strategies, and identifies what needs to take place in Namibia to be prepared for future pandemics.

2 Background

To place the Namibian ICT of schools in context and given the need to shift to remote instruction, we need to unpack the internal and external resources necessary for supporting this transition. We need to understand what aspects of the context (institutional, social, and governmental) affected the feasibility and effectiveness of the transition.

Namibia embarked on an aggressive plan nearly 20 years ago to fully integrate information and communication technologies (ICT) into its education systems as part of the government's effort to become a knowledge-based economy by 2030 (Vision 2030, 2004). This process included the creation of the Namibian ICT Education policy that the Namibian Cabinet formally accepted in 2004. Accompanying the ICT Education policy was an implementation plan guide, called "Tech/Na!" (Translates into "Technology is 'good' or 'nice'), which was officially launched in September 2006.

Crucial in the reflective or evaluative process is asking how the grades 0–12 interactions with learners, families, personnel, and local and government stakeholders impact perceived responsiveness to the shift to ERT. To start the conversation, we need to understand the expectations for families, learners, school personnel, local and government stakeholder roles in the implementation of the ICT in Education Policy, the Tech/Na! Implementation plan and related policy documents. The Namibian ICT Policy for Education proposes to prepare all Namibians to participate in a global economy by being computer literate. It also intends to leverage change in the education system through education professionals using technology practices to bring about quality, equity, and excellence.

The Namibian ICT Policy for Education lists six broad objectives (Fig. 2.1), of which the researcher assumes basic understandings.

The policy document concretizes the expectations by listing examples of what they hope the technology integration will achieve. In the case of teachers, the policy states that they should become confident in using a computer and other ICTs for educational practices. Moreover, they must prioritize their "knowledge and skills on how to use technology as a tool to support learner-centered teaching, continuous assessment, and other forms of interactive learning are imperative" (MOE, 2006, p. 13).

The ICT policy objectives resulted in ICT standards and indicators for Namibian teachers in the ICTs in Education (ICTED) standards and new professional standards for teachers. A significant focus on teacher skills and a minimal emphasis on providing teachers with hands-on ICT-based experiences for their learners. Teachers are to integrate technology into the curriculum and to develop cross-curricular activities that involve technology. The policy puts forward the idea that technology is an appropriate vehicle to achieve goals of knowledge, equity, quality, and access for all.

In setting the stage and the expectation from the government as laid out above, it is essential to know how the grades 0–12 interactions with students, families, personnel, and local and government stakeholders' impact perceived responsiveness to the shift to ERT. The lack of the Tech/Na! Implementation plan is only one of the primary reasons for the failure in continuing education during a crisis. Fuhrman et al. (2020) state that it is commonly assumed that more money would buy more

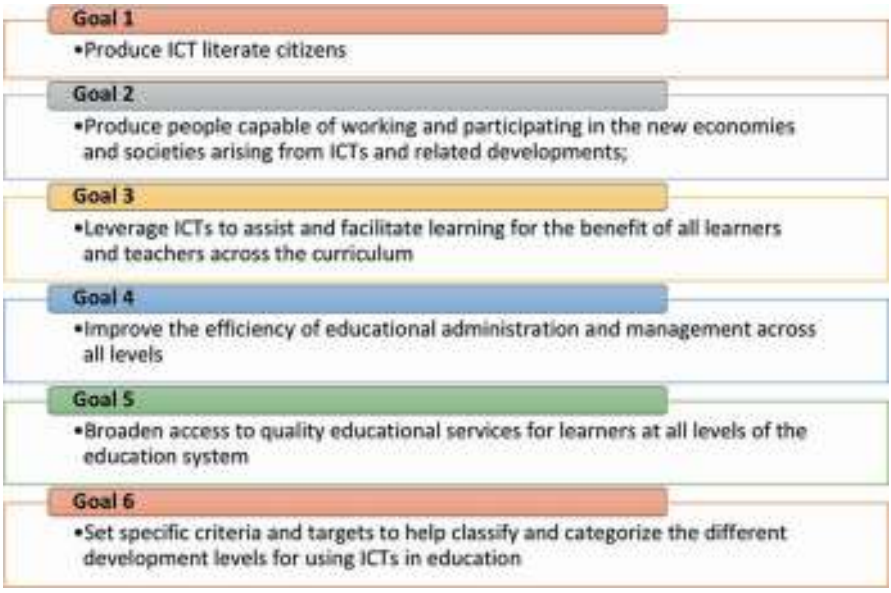

Fig. 2.1 The Namibian ICT Policy for Education Goals (MoE, 2006)

educational resources and create better education, which results in better and quality education. However, what is often overlooked is that educational policies are a continuous process and cannot be separated from their execution. As such, communities of practice are crucial in pursuing a shared understanding and sharing practices or common perspectives while implementing policy (Honig, 2006).

3 Evaluation Approach Using CIPP Evaluation Model

The CIPP Evaluation Model guides the evaluative discussion from a policy and practice perspective focusing on Context, Input, Processes, and Product (CIPP) (Stufflebeam & Zhang, 2017). A desktop analysis informs this evaluation where the relevant policies, official communication from the government (especially the COVID-19 briefings), and Ministry of Education communication circulated to the public, schools, and community to parents and community is used to assess the actions of decisions and future planning. The documentation was analyzed, measuring the directives to teachers and schools against the Tech/Na! Framework for implementation indicating the holistic "end-to-end" solution as developed by the Ministry of Education. The areas of the Tech/Na! framework is the educational objectives and expectations, Technology Infrastructure and readiness at school; The technical capacity for maintenance, training and user support, content availability, and educational management. Applying the CIPP questions to the available resources lead to the findings. Additional documentation used were past evaluation reports from external stakeholders and recent data reports collected about the ERT at Namibian schools in the past 20 months.

4 Findings

The evaluation of findings is discussed in light of three categories related to infrastructure, support, and professional development.

4.1 Technology Infrastructure

The first part of assessing the feasibility of the directive is to ask whether the technology infrastructureis sufficient to handle the needs of ERT. Starting by examining the technology infrastructure is important because they are what is needed for successful implementation. The implementation of the Namibian ICT in Education Policy has mainly been a failure since its inception in 2005. Despite sizeable financial allocation in the Ministry of Education budget, the results have not been satisfactory. For example, little of the procured computers found their way to schools

and instead, they languished in a warehouse for years (Isaacs, 2008). The bulk of the N$nine million consignment of computer equipment was meant to be distributed to 40 schools but has not reached the intended schools to date. The government proposed the creation of "Namibia's National Education Technology Service and Support Centre (NETSS) in the capital city of Windhoek. This central technology nexus provides the distribution point as well as the maintenance and technical support for all education technology in Namibia" (Jackson et al., 2011, p. 86). This centre was supposed to aid in the distribution; however, the Ministry had issues in creating the Namibian Education Technology Service Support Centre (NETSS). When they eventually resolved the centre, it was ineffective and lacked the budgetary funding dedicated to repairs and support to the schools. The lack of success was captured in the Global e-Schools and Communities Initiative (GeSci) evaluation report in 2009 concerning the implementation process, which was not positive.

4.2 Technical Capacity

Secondly, we needed to know whether the Ministry support staff has sufficient technical capacity to handle the needs of ERT. In the technical implementation of providing connectivity to the Schools, the Ministry of Education partnered with the country's Telecommunications provider and established an agency called XNET, whose mandate was to serve as a connectivity provider for schools and educational institutions. XNet was successful in connecting schools to have WIFI, albeit mainly in the administrative block of schools. Many schools still do not know of the discounted pricing provided by XNET for school connectivity to the Internet.

In the beginning phases of the Tech/Na! Implementation external funding was provided for the manager to assist in the implementation process. The manager position was to be integrated into the organizational structure of the Ministry, which did not happen, and this lack of leadership tragedy may have primarily attributed to the lack of implementation of ICTs in the schools.

Further capacity was to be built to develop a database of e-content lesson plans for teachers to use. Initiatives in this regard were individually attempted with Namibia College of Open Learning (NAMCOL), creating content in NOTESMASTER as an open-access learning management system (LMS). NAMCOL is a State Owned Educational institution created to provide learning opportunities for adults and out-of-school youth. The Notesmaster's initiative in Namibia is one of the winners of the United Nations World Summit Awards 2015, so it seemed logical to expect that it would play a role in the pandemic era education system. Hence, the Ministry expected that the teachers would recommend the NotesMasters as the eLearning delivery of content during the first pandemic lockdown in March of 2020. However, this did not occur mainly because of additional concerns, such as the curriculum not being updated to the newly introduced curriculum.

4.3 Sufficiency of Teacher Professional Development

The third aspect that we needed to know was how to assess the success of the directive and whether the ongoing teacher professional development was sufficient to enable ERT before the pandemic. The National Institute for Educational Development (NIED) has offered various training to teachers in designing learning content and online assessments. Despite budgetary constraints, the training continued despite no local e-content online. The training not only focuses on online material creation but also ICT use and integration in the classroom. The unfortunate situation is that very few teachers are being trained, and it is entirely insufficient to respond to the directive of the Ministry during the lockdown. Many teachers used ICTs during their teacher training, but that does not mean that ICT for personal use translates to teachers being able to create content online and facilitate teaching and learning online (Kacelo et al., 2019).

In the in-service professional development programs, the Ministry has made efforts to empower older teachers to receive ICT literacy training through the International Computers Driver's License (ICDL) training. ICDL consists of several components to be completed and to write an exam or test to get the certification. Unfortunately, this training initiative has been infrequent and interrupted, and as such, most teachers still need to be trained. It is important to note that ICT use or Technical proficiency (i.e. ICDL training) does not necessarily equate to the cognitive proficiency of teachers to provide e-learning teaching support to learners (Kacelo et al., 2019).

4.4 Experiences of Stakeholders

Fourth, it is most important to find out the experiences of teachers, learners, support personnel, and administrators and what they struggled the most with ERT? Evidence from teachers reveals that the lack of access and connectivity was the biggest challenge amongst teachers and community, learners, and parents. Teachers complained that learners had no self-regulated learning (SRL) and lacked the internal motivation to learn independently (Boer et al., 2021). Teachers recognized that their lack and confidence in using ICTs were highlighted/exposed during the pandemic. The lack of confidence to use ICT and the fear of the CoV-SARS-2 virus infections lead to an inability to teach. Many teachers used their commodities as excuses due to fear. After the failure of the eLearning directive, the Emergency Remote Teaching (ERT) strategy resulted in printed workbooks being collected by parents. Additionally, the social media platform, **WhatsApp**, was used to communicate with the parents when they could not collect learning materials and to send audio recordings to explain the material and give instructions.

5 Conclusions and Evaluation Impacts

When evaluating and reflecting on the events and experiences of the education system during ERTs, we need to ask how we can adapt our processes to respond to such operational challenges in the future. For teachers to be flexible and pliable and still deliver quality education in a crisis is challenging. Investment should be placed in the training of teachers and specifically for teachers to understand systems thinking and develop a more sustainable and uninterrupted approach to education. Schools, principals, and teachers understand their role and function in a larger system that can address the issues of change and adapt fast. Focus on proper ICT literacy training for learners and teachers. The MoEAC can provide ICT equipment, resources, and technical support to teachers and learners, positively increasing the perceived readiness of teachers to teach online.

One way to address the challenges is to create an educational technology/learning design coordinator at schools. This can be a leadership function like the heads of departments but focusing on the school's instructional leadership. Most importantly, is also asking how feedback from learners, teachers, and school support teams inform ERT needs in the future.

A clear plan to train ICT integration in teaching needs to take top priority. This plan needs to include learning design on creating online materials and online facilitation tools. Teachers also were aware that their traditional teaching style and role would change significantly when they moved to an online platform (Boer et al., 2021). They admitted that they did not have the required IT equipment to teach online. Teachers said that e-learning is helpful to improve teaching and learning but raised concerns about students' ability to study on their own or to be self-directed in their learning. Concerns were also raised about the learners' time management skills. Most importantly, teachers believed that community engagement is key to the continuance of education.

Moreover, the integration of technology in schools is a complex process that, if pursued correctly, can yield benefits that can be harvested in emergencies. However, many view technology integration merely through the lens of finances, forgetting that "throwing money at schools" is not always an effective method of solving problems (Fuhrman et al., 2020). Among the approaches that could be employed is more cohesiveness in policies and legislation that would strengthen teacher qualification, regulations for preparation in a pandemic to reduce disruption in education for learners.

Many parents in a higher socio-economic level have taken their children out of "regular" schooling systems and enrolled them into a homeschooling system primarily offered online and web-based. It is crucial in the research of policies and legislation. Deficits of resources and knowledge help partly explain the problems that policies experience in their implementation and resulting in poor performance of learners and a poor educational system. This, however, does not diminish the importance of causal research in what happens in the teaching and learning interaction in the classroom or any other learning environment (Fuhrman et al., 2020). We have very little direct evidence about what teachers do and how their actions affect

students' learning. Such knowledge is essential to develop the right policies, training, and interventions when national and international crises such as the CoV-SARS-2 pandemic occur. Educational policies that marginalize the use of technology in schools fail to take advantage of the tremendous range of skills, experience, and resources that learners bring with them to school (Kozma, 2011). Such educational policies must consider informal learning and the value it brings into a formal learning environment. If governments prioritize educational transformational policies, they need to consider the economic rationale and respond thereto (Kozma, 2011).

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Chapter 3
Creating Sustainable Early Childhood Learning Environments for Emergency Situations: The Case of Sweden, Kenya and South Africa

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Abstract Early Childhood Education (ECE) is understood to take place between birth and the age of 9 including preschool as well as primary school years. It is also at this stage that the greatest damage can be inflicted on the vulnerable growing child. This chapter through literature and data from one country internationally, one on the African continent and South Africa explores challenges of teaching and learning, at early childhood environments during the pandemic. These serve as bases for mapping out how these nations continue to survive and lay foundation for the future productive citizenry in their respective contexts. Issues of race and social class are laid bare so as to come up with plausible strategies to create sustainable early childhood learning environments. These are understood to be contexts where economic development of all in an environmentally sustainable manner for the social inclusion of all are emphasized. The chapter over and above the research literature also examines strategies as well as theories of sustainable early childhood learning environments by way of making recommendations for South Africa in its search for solutions under such emergency situations.

1 Introduction and Background

This chapter explores the challenges and the corresponding responses in teaching and learning at early childhood learning environments during the pandemic. International, continental and national priorities such as the Sustainable Development

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_3

Goals (SDGs), the Africa Agenda 2063 and the National Development Plan in South Africa are considered for guidance in response to the challenges of the pandemic especially among the ECE contexts. These priorities facilitate the creation of sustainable early childhood education both directly and indirectly. Sustainable early childhood learning environments therefore are contexts that foster optimum and quality growth and development of children from birth, at least until third Grade in a Primary school (Ardoin & Bowers, 2020). These contexts as shall be demonstrated in this chapter, include the use of *community classrooms* for effective mediation by able others, be they parents, siblings, friends and/or teachers (educators), etc. (Marcus, 2020). The above places huge premium on effective facilitation through appropriate curriculum and learning content, as well as good management through supportive structures of governance.

When the pandemic struck, almost all economies experienced a huge shock as a result of the lockdown that became necessary as a measure to respond to the spread of the virus. Factories and businesses were shut down, and so were schools, including ECE centres (Barua, 2020; Cunliffe et al., 2019). People had to observe social distance to avoid droplets falling on and being inhaled by others in their immediate environment. To date a few of the schools and centres for ECE across the world have reopened. However, most people across the globe are compelled by their respective governments to wear masks when they are in public spaces (Buheji et al., 2020).

For purposes of this chapter, this exploration is conducted in Sweden, Kenya and South Africa. The three countries represent some of the best practices in early childhood education across the globe (Al-Samarrai et al., 2020; OECD, 2020). In Sweden—with a total population of ten million inhabitants—almost all children (about 98%), between the ages of 4- and 9-years old attend creches, nursery, kindergarten and/or formal primary schools (Naumann et al., 2013; Smidt & Lehrl, 2020). The levels of unemployed are around the 10.2% mark. Before the pandemic, children were cared for at these creches, kindergartens and primary schools during the working day to enable the parents to attend to the demands of their employments and/or businesses (Hort et al., 2019).

1.1 Challenges of ECE in Sweden

During the pandemic to date, one of the main challenges was to ensure that Swedish children continued to learn effectively. Caregivers and teachers of these children were still not adequately trained to mount effective teaching using remote technologies as was necessary during the lockdown (Kavaliunas et al., 2020). They required training in transferring their whole curriculum content online and to make it attractive and interactive for the young early childhood learners (Valeriani et al., 2020). Even parents did not have sufficient teaching and learning skills to support their children in these new learning contexts. They were required to know the content of the curriculum and to manipulate remote learning software in a manner that enriched their children's learning experiences (Gustavsson & Beckman, 2020). The greatest

challenge was the tender age of the children. They still required optimum parental support. Their levels of self-regulation that would enable them to learn on their own and progress successfully therein, were still at the rudimentary stage (Valeriani et al., 2020). Even in Sweden which could be considered to be relatively homogenous in terms of language groups, there were still 'foreign and underclass' language minorities who came from the Romani, Yiddish, Sami, Tornedalian and Finish groups (Sundberg, 2013). The Swedish education system promised equity to all in the provision of resources and opportunities, but the immigrants and some of the minority groups still experienced levels of exclusion due to their socio-economic status and language (Sundqvist, 2019).

1.2 Challenges of ECE in Kenya

Some of the challenges mentioned above, faced early childhood education (ECE) provision in Kenya as well (Ngwacho, 2020). While Kenya's population stands at 54 million, it is five times the size of Sweden. Its Gross Domestic Product is USD 98.84 billion compared to Sweden's USD 534.61 billion (Okyere, 2020). This explains the differentials in terms of ECE resources provisioning. In spite the limited wealth, the good performance of the Kenyan's ECE provisioning up until the advent of COVID—19, is attributed to the support and pioneering work of the Netherlands based Bernard van Leer Foundation—BvLF which secured more funding from the World Bank and partnered with the Kenya Institute of Education—KIE (Burns et al., 2021). The latter organisation, closely linked to the Kenyan Ministry of Education, worked together with the BvLF to ensure that ECE reached many of the rural children in Kenya who would otherwise be left out due to the relatively low levels of the economic output of the country (Burns et al., 2021; Makokoro, 2021).

The pandemic seems to have reversed the gains that Kenya had made on the ECE front as many children stayed out of schools during the lockdown (Schwettmann, 2020). Catering for 13 language groups also compounded the problem. The government was extremely cautious to protect lives of learners, but the provision of ECE was dealt a huge blow as the country did not have sufficient resources to sustain remote teaching and learning (Gikandi, 2020). The provision of hand sanitizers and big-enough teaching and learning spaces for socially distanced in-person interaction were limited (Cunliffe et al., 2019). Kenyan population has 100% access to radio broadcast, and about 65% to TV programmes. This means that although ECE learners could be reached through radio programmes, the same could not be said about TV broadcasts. On the other hand, Kenya has 85% internet penetration which is a little less than in Sweden (UNICEF, 2020). This implies that many do make use thereof, however the poorer households suffered more during the lockdown due to limited access to these resources. The greatest challenge in Kenya is still the training of caregivers and teachers of ECE as advanced skills are required to design and upload relevant, effective and interactive materials for learners to access ubiquitously (Roy, 2021). Parents in Kenya left their children without sufficient support

when the lockdown eased as they had to go to work and/or give attention to the management of their businesses. In spite of the relatively small size of the Kenyan economy, the level of unemployment is very low at around 7.2% (UNICEF, 2020).

1.3 Challenges of ECE in South Africa

The South African situation seems to be in the middle between that of Sweden and Kenya. It aptly captures the challenges of ECE experienced across the globe. This also highlights the extremities of South Africa, inherited from its apartheid past. Its population of 60 million is close to that of Kenya while its GDP of USD 302.61 billion approaches that of Sweden. Its unemployment rate of 32.6% which is higher than that of both Sweden and Kenya, was exacerbated by the pandemic. The pandemic found South Africa deeply divided between, and further exacerbated the class distinction between the affluent and the poorest communities. The levels of unemployment among the mainly African and poor were very high and continue to rise as a result of the lockdown (Ebrahim et al., 2019).

The above anomalies occurred in the provision of the ECE. Inequalities on the basis of race were thus reproduced, as learners from mainly African communities lagged behind educationally, economically and otherwise. They are afflicted by poverty, malnutrition, high mortality rates and antisocial behaviours (Ebrahim et al., 2019). During the pandemic children from these communities did not learn as their homes did not have internet connectivity or electricity (Hanson, 2021). The mainly white communities with a sprinkling of African middle-class, could continue with some kind of learning offered via remote learning technologies. The Black people's homes were not conducive to any kind of learning. Learners did not have own bedrooms to study quietly in. Their entire homes are crowded and noisy and lacking any form of support (Ebrahim et al., 2019). Parents are themselves poor and not educated. Caregivers at their informal creches have no formal teacher training, qualifications or expertise (Ebrahim et al., 2019). Curriculum for ECE in these communities is still under construction, thus nothing was or could be uploaded for use by learners during the lockdown (Ebrahim et al., 2019). The challenges of violence and abuse are prevalent in these communities making remote learning almost impossible (Ebrahim et al., 2019). In the more affluent communities, the situation is more or less similar to what obtains in Sweden. ECE provisioning is well entrenched, internet connectivity and provision of remote learning is widespread.

The challenges to teaching and learning at ECE during the crisis of the pandemic in the countries described above, made this chapter urgent and necessary as we attempt to formulate responses and solutions to this huge problem that threatens whole communities across generations.

2 Framing the Responses: Sustainable Development Goals, Africa Agenda 2063 and the National Development Plan

To guide the responses to the challenges highlighted above, this chapter assumes that, if early childhood learning environments are sustainable, then they can withstand and survive the deleterious effects of the pandemic (Ardoin & Bowers, 2020). This assumption is based on the 17 United Nations' Sustainable Development Goals -SDGs which the entire humanity bound itself to and agreed to operationalise (Munro & Arli, 2020). This notion focuses on fostering economic development of all individuals in all countries. It also advocates that economic development should be environmentally sustainable (Daher-Nashif & Bawadi, 2020). The SDGs also aim at ensuring social inclusion of all, irrespective of ability, gender, race, socio-economic status, religion or any marker (Craig & Ruhl, 2020). The point we are making is that sustainability in early childhood education ensures that there is unending economic development of all, in an environmentally respectful manner towards social inclusion of all (Marcus, 2020).

The notion of sustainability is important for this study because it has been cascaded into the powerful priorities of the Africa Agenda 2063 (Neuman & Okeng'o, 2019). These emphasise the crafting of a prosperous continent, with a strong education as its basis (Nhamo, 2017). The SDGs and the Africa Agenda 2063 found further expression in South Africa's National Development Plan - NDP (National Planning Commission of South Africa, 2011). Its Chap. 9 stipulates very specifically the targets and the outcomes for educational practice starting with early childhood learning environments - ECE (Batala, 2021). Furthermore, the idea of learning environments is adapted from De Corte and Barry Fraser who recognise the important influence of the learning individual's contexts in the development of academic performance (Boekaerts et al., 2002; Humphrey et al., 2020). Provision of quality early childhood education during and beyond the pandemic is thus the focus of this paper. This argument is mounted and guided by these international and national considerations to ensure adequate response during and after the pandemic.

3 Responses to the Challenges

The three countries constituting the focus of this chapter, seem to present a coherent and logical continuum of responses to the challenges discussed above, as well as the principles of the international and national ideals referred to in response. This continuum describes a multipronged approach that can be adopted and adapted accordingly for countries experiencing neglect of ECE, especially during the pandemic. For example, Kenya's approach of organising households and neighbourhoods into what is theoretically known as *community classrooms* seems to lay the basis for this multipronged strategy. Even though the leaders and communities in this country did not use this concept, the similarities between how they responded to the challenges

of teaching and learning during the lockdown and how the notion of the community classrooms is described and operationalised, are very striking. The case in point is that of BvLF in Kenya that brought together and engaged many stakeholders in neighbourhoods and communities to establish and extend the reach of the ECE (Burns et al., 2021; Makokoro, 2021; Ngwacho, 2020). These included local, traditional, municipalities, provincial and national governments, and ministries, as well as faith-based, non-governmental including community-based organisations. Individuals and collectives from these community classrooms provided safe spaces where ECE children who had challenges from their homes and could not attend school due to the lockdown could learn (Burns et al., 2021; Makokoro, 2021).

Individuals and families in the community who have internet connectivity, computing gadgets, conducive learning spaces, and other learning support resources made these available to those children who come from the households deprived of such (Makokoro, 2021; Ngwacho, 2020). Teachers, professors, parents, university students and other community members who have expertise in teaching, curriculum design and skills to use remote teaching and learning resources volunteered them to these collectives in their neighbourhoods. In this way children, especially those who come from deprived homes, continued to learn effectively (Burns et al., 2021; Makokoro, 2021; Ngwacho, 2020). Parents and other members of the communities provided support like, basic hygiene and caring, feeding, mentoring and coaching as well as looking after the general well-being of these children. Thus, closed formal classrooms of 30 or so, were replaced for a while by a number of smaller 'distributed' community classrooms of say 5 to 10 learners per each of the 5 sites, who continued to be taught and cared for remotely. This approach still requires the observance of the Covid- 19 protocols, such as masking, social distancing, sanitising, regular washing of hands as well as compliance with high standards of hygiene (Makokoro, 2021; Ngwacho, 2020). Elements of this approach while particularly relevant in poor and deprived contexts were also found practised in relevant affluent neighbourhoods of Sweden.

For this approach to succeed, a well organised structure has to be in place to initiate, maintain, organise, lead and evaluate. The Bernard van Leer Foundation in Kenya served as such a structure until the local community leaders in conjunction with the Ministry of Education took over the responsibility (Burns et al., 2021; Makokoro, 2021). Such a structure needs to be guided by democratic principles so as to ensure inclusion of all and protection of each and every child's right to learn, including remotely. Advocacy to the national leaders to ensure that principles of equity, social justice, freedom, peace and hope are enshrined in the policies and legislative directives are thus made and assured through such structures. Furthermore, such a structure requires funding in order to support the community classrooms in the form of Covid- 19 protocol compliant supplies (e.g., sanitisers, masks, etc.), remote teaching and learning resources, continuing professional development of care givers and teachers, consumables, and personnel recruitment and payment costs, to mention a few (Burns et al., 2021; Makokoro, 2021; Ngwacho, 2020). This therefore means that the government through its relevant ministries, business and

any other funding agencies have to be involved in order to ensure the sustainability of these *community classrooms* as learning environments.

Through such structures professional development initiatives took place in Sweden, Kenya and South Africa (Croese et al., 2020). What differed among these initiatives were the levels of sophistication dependent on the levels at which ECE care givers and teachers entered the projects. South Africa provided a good example of response at this stage where universities came together to provide their expertise in terms of mounting professional development programmes for the teachers so that they could be able to design curriculum relevant to remote teaching and learning contexts (Ebrahim et al., 2019). South African universities provided excellent examples of how care givers and nurses are trained in designing curriculum and teaching and learning materials.

In Sweden it has been demonstrated that for teachers and care givers to be competent and to function effectively in remote teaching and learning contexts they need to be empowered in, and be able to cultivate particular skills for themselves, as well as among their learners (Pellegrino & Hilton, 2012, pp.731–734). These are skills that will sustain them when their 'more able others' are not with them to provide in-person support in their remote teaching and learning contexts. These include critical thinking skills "for processing and cognitive strategies" such as those for "problem solving, analysis, logical reasoning, interpretation, decision making, executive functioning" (Pellegrino & Hilton, 2012, p. 731). Interactions between ECE facilitators like caregivers and teachers on the one hand, and their charges on the other require these skills for them to be effective. Remote contexts according to the Swedish ECE researchers and practitioners put a lot of emphasis on care givers and teachers as well as learners to lay bases for the cultivation of these skills as early as possible. Content and facilitation strategies have these as the targeted outcomes. Learners through remote teaching technologies are taught the content as exemplified from South Africa. This is coupled with training in skills to facilitate remote teaching as well as the mentioned critical thinking skills. Collaborative group skills that promote communication are also included in the curriculum for teacher development programmes as well as for the ECE learners (Pellegrino & Hilton, 2012, p. 734). Both teachers/caregivers and learner are taught ways of collaboration among themselves and with other stakeholders in their respective community classrooms. Teamwork and cooperation through internet coordination as well as skills to show "empathy, perspective taking, cultivation of trust, service orientation, conflict resolution and negotiation" (Pellegrino & Hilton, 2012, p. 732) constitute another set of skills being emphasised in remote teaching and learning contexts as argued and demonstrated through research. Intellectual openness that includes the following is at the centre of remote teaching and learning, namely,

> flexibility**,** adaptability, artistic and cultural appreciation, personal and social responsibility, intercultural competency, appreciation for diversity, capacity for lifelong learning and Intellectual interest and curiosity (Pellegrino & Hilton, 2012, pp. 731–734).

Electronic and freely accessible materials that facilitators of teacher development programmes as well as teachers and caregivers can use are placed on the websites.

Even ways of accessing these are disseminated in the distributed community classrooms for use by all during the crisis situations and beyond, for the creation of sustainable ECE learning environments.

4 Conclusion

The chapter has demonstrated that there are lessons to be learned from countries that practice good ECE strategies during the pandemic. However, if their strategies are integrated logically to cater for all contexts, even better results can be achieved. These can then lead to the creation of sustainable early childhood learning environments through remote platforms. Central to the argument being pursued is the value and importance of community classrooms that engenders networking across contexts to include even non-conventional partners. The chapter proposes that community classrooms could be the centre piece of ensuring learning continues during crisis situations, in all contexts. Universities, or any duly responsible agency can take the responsibility of putting together such a structure that depends mainly of volunteers to initiate but is fostered by circumstances on the ground. University seems to be best placed to initiate due its community engagement offices.

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Chapter 4
Teachers Co-creating for Teachers: Design and Implementation of an Online Teacher Professional Development Course in Sub-Saharan Africa

Lucian Vumilia Ngeze and Sridhar Iyer

Abstract As schools closed during the Covid-19 pandemic, different digital platforms were available for remote teaching. However, the majority of the school teachers were not trained on how to use different digital technologies to continue their teaching. Rather than waiting for technology experts to provide such training, one approach is co-creation, that is, to identify teachers who are adept at using technology in their teaching and mentor them to create materials for training other teachers. Co-creation is collaborative and is created by peers and hence easier for adoption. This chapter reports on a four-week online course developed by co-creators (teachers mentored by a trainer) for school teachers (course participants). The course aimed at introducing participants to different electronic and digital technology tools to engage students remotely. Selected teachers co-created the lessons, activities and resources, including guidelines, tips and procedures that participants could use while preparing their own lessons. Participants reflected on how the course changed their mindset in using different technology tools and how they were able to engage students during and beyond the course duration. A model to engage teachers as co-creators and co-facilitators of such training programs evolved.

1 Introduction

The closure of schools due to Covid-19 affected approximately 1.7 billion students who then had to keep learning even from their homes (Organisation for Economic Co-operation and Development, 2020). Ministries of Education in different Sub-Saharan African countries tried different approaches to continue remote teaching (Association for the Development of Education in Africa Report, 2020). These

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_4

approaches helped to engage students whose families could afford tools and equipment with support from their parents/guardians (Belay, 2020). However, many schools did not manage to engage students because of reasons such as poor Internet connectivity and lack of teacher training to use technology (Dube, 2020). While some teachers managed to engage students using technologies, mostly mobile apps and other tools (Dzinamarira & Musuka, 2021), many teachers were left behind as they did not have knowledge of the available technologies to engage students (Association for the Development of Education in Africa Report, 2020).

In order to address this gap, the authors who are also the mentors decided to use their expertise as faculty members. As teachers with training abilities in technology integration in education from the region, they both engaged school teachers to design, develop and implement a professional development online course. They aimed to respond to two evaluative questions: (1) What are the teachers' experiences when learning from a co-created online course for teacher professional development?; and (2) What are the experiences of the co-creators of an online course for teacher professional development?

The course was carried out in two phases, each phase focusing on different aspects of the course. In the end, a proposed model for designing such training programs evolved.

2 Phase 1: Creation of the Course

2.1 Teachers' Experiences and Needs Assessment

The first step in the first phase of this course was to identify activities that teachers were engaged in during the pandemic and determine the topics on which there was a need for training. Teachers were surveyed by asking "What are you doing during this Covid-19 pandemic when schools are closed?" A total of 735 (502 males and 233 females) teachers from different Sub-Saharan African countries responded to the survey. It was found out that 99.3% of the total participants possessed mobile devices (smartphones, or tablets) which made it easier to access the online resources. Some of these respondents engaged students using electronic broadcasting systems, while other teachers started using mobile apps to share learning resources with their students and others mentored other teachers. Some teachers said that:

"*I am working at home and I tried to help children by using online, radio and TV programs for teaching*", Rwanda English primary school teacher.

"I am preparing questions and answer to send to my pupils and they answer and send back to me to mark them through WhatsApp", Tanzania primary school Mathematics and ICT teacher.

"*I am mentoring teachers remotely and calling in and students to the progress of their assignments*", Liberia school teacher.

These respondents acknowledged where help was needed and knowledge of technology tools in these times would help.

Having known what teachers were engaged in, the next activity was to complete a needs assessment. The responses produced five topics to be offered over 4 weeks (1) the use of radios and television at home showed a need to develop a topic on distance education technologies and effective ways they can be used; (2) the possession of smartphones by most teachers meant that there was a need to include a topic on how to use smartphones in teaching and for professional development; (3) the sharing of resources using mobile apps such as WhatsApp implied including a topic on mobile apps in teaching and learning; (4) a topic on emotional intelligence was introduced as a way for teachers to address the well-being of their students, and (5) a need to learn how to create activities that engage students on the content led to the final topic on techniques to engage students. Table 4.1. shows the weekly topics and the goal of each topic.

2.2 Course Co-creators

The second step was to identify teachers who had the requisite expertise to deliver the topics. For this purpose, an online Google form was shared among teachers to identify names of volunteering teachers to develop resources and activities for 1 week. Questions asked about teaching experience, experiences with online courses, experience in recording video lessons, their experience of using mobile apps (Edpuzzle, Padlet and Google form) in teaching their classes, and their availability to engage participants in the course. Each teacher was allowed to select only one topic from Table 4.1.

Twenty two teachers responded to the survey and they were selected against the following criteria.

1. At least 5 years of teaching experience;
2. Completed at least 2 online courses and

Table 4.1. Weekly topics and goals

Week	Topics of the week	Goal
Week 1	Distance educational technologies To engage students remotely	To introduce teachers to distance education technologies commonly found in households
Week 2	Smartphones in teaching and Professional development	To find ways to effectively use mobile devices in class and for their professional development
Week 3	Mobile apps for teaching and Learning	To use the differently available mobile educational apps in teaching and learning
Week 4A	Emotional intelligence for Educators	To use emotional intelligence in controlling emotions and promoting Well-being
Week 4B	Techniques to engage students	To use active learning strategies while teaching

3. Experience in recording videos using mobile phones.

Moreover, motivation to volunteer and availability to engage participants online for the duration of the course was determined through close-ended questions on the Google form. Three teachers from Tanzania were selected as the course co-creators.

- Teacher A, Geography and ICT secondary school teacher who developed content for the topic Smartphones in Teaching and Professional Development (offered in Week 2) and Mobile Apps for Teaching and Learning (offered in Week 3).
- Teacher B, Geography tutor who taught the topic Emotional Intelligence for Educators for Week 4A.
- Teacher C, History and English secondary school teacher who developed and taught the topic Techniques to Engage Students (for Week 4B).

2.3 Course Design and Development

The third step was to mentor the co-creators to produce the online course. Table 4.2 shows the activities performed in 2020 by both the mentor and co-creators at different stages.

The mentor carried out multiple online orientation meetings to help the co-creators develop their topics. An introduction to online courses, their components and topic selection were discussed in the first orientation meeting. This meeting helped the co-creators understand the different components of an online course and why each topic was selected. After the orientation, the co-creators recorded their video lessons with video editing being completed by two multimedia experts.

Table 4.2 Activities and duration of the co-creation process

Activity	March	April	May	June
Phase 1 – Co-creation Process				
Needs Assessment - Gather details from expected participants, requirements and expectations				
Identifying co-creators from the shared online survey				
First orientation meeting – mentor action				
Lesson content design and sequencing				
Lesson video recording and editing				
Second orientation meeting – mentor action				
Creating activities and assessment by co-creators				
Phase 2 – Online Course Implementation				
Moodle Customization and Course Setup				
Third orientation meeting – mentor action				
Course Start				
Course orchestration – both mentor and co-creators				
End of the course				

Each grey-shaded box indicated the time (month) in which that activity took place

The second orientation meeting aimed at equipping co-creators with skills to design learning activities. These included video lessons followed by practice questions on how to use specific mobile apps in teaching. Others lessons were on how to effectively engage participants in discussion forum and setting up weekly graded quizzes. The third orientation meeting focused on how to engage participants in the course activities, initiating and extending discussions in the discussion forum, responding to questions from participants in the course WhatsApp groups.

To engage participants in the course, the learner-centric MOOC (LCM) model was used in the design (Murthy et al., 2018). The learner-centric MOOC (LCM) model guides MOOC developers through the process of conceptualizing, creating and conducting online courses. The model consists of structural elements: video lessons, practice questions, discussion forums, additional external learning resources and course orchestration dynamics. It provides a set of guidelines, activity formats and actions that developers can apply during various stages of the MOOC design process to create different elements for their courses.

As recommended by the LCM model, each video lesson was followed by three ungraded multiple-choice questions for immediate practice; one discussion forum thread was set for each week followed by a reflection quiz with questions from the discussion forum; and two external resources (videos, research articles, web pages) per week followed by an assimilation quiz with questions from the given resources. The knowledge quiz consisted of questions from all of the weekly lessons.

At the end of Week 4, a collaborative group activity was given to participants. 183 participants divided into 27 groups, each with six to seven participants in the activity. Participants were required to develop a lesson plan highlighting the use of different technology tools to reach their students; select mobile apps to engage students and to register for a relevant MOOC course.

Using co-created guidelines for a lesson plan, 80% of the groups worked on the activity by collaborating online and each submitted a group report and a video summary of how the activity was completed. Some video submissions from participants were uploaded on a YouTube channel named Teachers Learning Hub (2021).

2.4 Resources Generated During Co-creation

The three co-creators collaborated online to develop guidelines, tips and procedures. The co-creators conducted collaborative meetings to discuss the resources. When a resource was ready it was shared with the participants as an activity for them to work on and submit. Table 4.3 highlights the questions involved in each meeting and the subsequent resources generated.

Table 4.3 Questions used during co-creation

Question	Owner	Resource
How best can Edpuzzle app be used by teachers to create quizzes?	Teacher A	Guidelines
How can knowledge of emotional intelligence help teachers to instill a growth mindset	Teacher B	Tips
How can teachers increase student engagement using strategies such as Quick Write and Polling?	Teacher C	Procedures

Fig. 4.1 Countries where participants come from

3 Phase 2: Implementation of the Course

3.1 Course Participants

The course was configured in Gnomio, a free hosting service for Moodle users. A total of 270 teachers were enrolled into the course. Tanzania had a highest enrollment (78.02%) followed by Ghana (8.38%), Rwanda (6.56%), Nigeria (2.13%) with the rest occupying 4.93%. Fig. 4.1 shows the locations of the participants in this course. Participants were enrolled in the course based on the emails they submitted during registration. They went through the video lessons, did questions and quizzes. They also completed assignments and activities that were part of the assessment of what they learned. As the course was running and participants were doing activities, the co-creators changed their roles to become co-facilitators. Facilitators provided responses to their questions in the discussion forums and in the various WhatsApp groups.

3.2 Participants and Co-creators Experiences

In total, 218 participants submitted at least one assessment activity. Certificates of Completion were given to the 107 participants who participated in the discussion forum more than twice and with at least 50% of the total course score. Certificates of Participation were awarded to the 51 participants who participated in at least two discussion forums and scored between 25%–49% of the total course score.

Course completion rate (the number of participants who passed the course divided by the total number of registered participants in that course) is 58.5% while persistence rate (the number of participants who passed the course divided by the number of active participants) is 72.5%. Compared to the 5–10% completion rate of major massive open online courses (Gillani & Eynon, 2014), the high completion rate from this course implies that participants of this course found it useful and may have engaged more in the course.

Understanding the participants' experiences as demonstrated by their achievement, readiness to co-create and level of application of their learnings was determined by end-of-module survey. A total of 118 participants responded and were analysed using thematic analysis (Braun & Clarke, 2006).

A Linguistics and Literature in English secondary school teacher in Tanzania explained the change as he said: "*Now I can prepare and teach the lesson via television, radio, and other educational apps like Edpuzzle, Google classroom, Padlet and to create quizzes via Google form*".

The response of a kindergarten teacher in Ghana who says, "*I never knew I could even download an app until I joined this course and I have gained a level of understanding when it comes to using the smartphone*" shows that, teachers have realized teaching-related uses of smartphones, apart from using them for communication and socialization.

One teacher reported that "*After learning this course, I started to engage my students through padlet. I instructed them how to use it and we started to use it*".

When asked how they had engaged students after the course, it was found out that 66.7% of the course participants made immediate application of knowledge and skills to their students. 12.8% did not have a chance to apply their learning as schools were still closed. Despite the challenges such as the closure of schools, lack of devices and network challenges, 20.5% of the participants planned to start using some technology tools in engaging students when schools open. The work done by the co-creators, through their guidelines, tips and procedures for different activities helped participants continue learning.

Co-creators reflected on their experiences of creating resources. One co-creator said: "*Becoming a content creator and an online facilitator needs one to have a passion and good mentor to encourage him*". Another co-creator stated: "*I learned a lot how to create videos, questions, and group work activities. I also learned how to share experience and knowledge with others. Use of various digital tools such as Padlet, Edpuzzle in teaching and learning*". It implies that the experience from co-creation created opportunities for the co-creators to learn and share with others. The

last co-creator expressed commitment and tolerance as key to becoming a co-creator, by saying "*This process needs consistence and tolerance. Someone must dedicate his/her time to make sure the mission is successful*. These reflections imply that the mentorship sessions were helpful to make them grow in creating resources.

4 A Model to Engage Teachers as Co-creators

The design, development and implementation of the online course led to a model on how teachers can become co-creators and eventually facilitators of an online course. The model is called *Teacher Co-creator Facilitator (TCCF) model (see* Fig. 4.2). Each of the nine stages is explained below:

Stage 1—Mentor identification: The mentor guides the completion of the activities in the model.

Stage 2—Needs Assessment: A needs assessment survey is completed to identify what resources are available with teachers and the knowledge and skills gap that needs to be addressed.

Stage 3—Topic Formation: The relevant needs from the survey responses and forms the topics that will be developed into a course.

*Stage 4—Co-creators Identification: T*eachers with the desired criteria are identified to develop the topics.

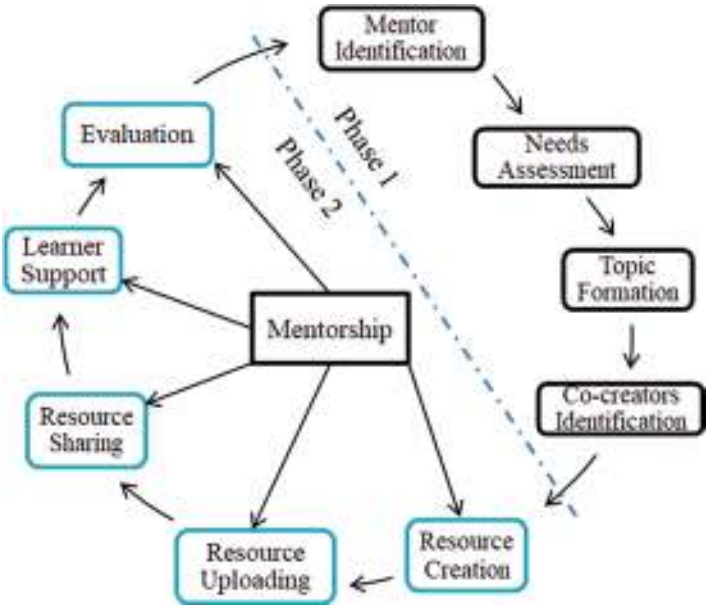

Fig. 4.2 TCCF model

Stage 5—Resource Creation: The mentor helps the identified teachers in creating content, resources and activities for the course participants.

Stage 6—Resource Upload: The mentor guides the co-creators in setting up the learning platform and uploading the content.

Stage 7—Resource Sharing: The co-creators make the course available to the learners.

Stage 8—Learner Support: The mentor guides the co-creators on how to engage learners in the course by participating in the discussion forums and responding to questions in the WhatsApp groups.

Stage 9—Evaluation: Evaluation is done at the end of the course to get feedback on learning, experiences and challenges. Fig. 4.2 shows the developed model.

Successful completion of this course and the effort from each of the co-creators evolved to produce the TCCF model. The model has several advantages, such as reducing dependence on external technology experts for training, scalability of implementation and empowering teachers to take charge of their own professional development needs. Reflections from participants of the course, based on knowledge and skills gained, showed that the TCCF model contributed to the participants professional development. The course has brought about a change in the ways teachers become co-creators in Sub-Saharan Africa and engage their students.

A key recommendation for regions that are struggling with sourcing the appropriate expertise in teacher professional development can be achieved among teachers who are knowledgeable and experienced in specific areas of interest. TCCF model can be used to identify and engage teachers who can create context-related resources for the professional development of other teachers. Through this co-creation process, empowering skilled teachers by becoming course facilitators to mentor their peers not only enhanced the skills needed for emergency remote teaching but also encouraged newfound growth through a facilitated-mentorship model.

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Part II
Region of the Americas

Chapter 5
Reopening Campuses: Visualizing the Structure of a System Problem

Hadi Ali and Ann McKenna

Abstract The process of reopening of college campuses in response to the impact of the COVID-19 pandemic sheds light on underlying features of the educational system. Understanding the various models of reopening gives us insight into how the education system is structured through the responses of the various college campuses—a unique opportunity to capturing issues of inertial momentum against change in the past, and projecting into the future. We propose visualizing the structure of a system problem as a way to allow the problem to become visible through mental models. We illustrate our approach through causal loops—the core tool for systems thinking. We discuss the construction of one visual model, based on publicly available resources, to be used as a starting point for a discussion. The model points to the importance of making informed, high-level early decisions, in the case of a crisis, as this shows to be a highly dependent variable in the model. This finding is shown to be supported by ongoing research on faculty adaptability in different contexts. Visualizing mental models in systems thinking does not seek to unnecessarily capture all the details of the complexity of the educational system; rather, it aims to externalize deep problems, which, in turn, demonstrate opportunities for transformation in the future.

1 Introduction: The Pandemic Outbreak as a Systems Problem

The COVID-19 pandemic outbreak caused an unprecedented disruption to the ways our lives are organized and the ways the systems of our society function. The interconnectivity between and among elements became explicit, and elements that

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_5

seemed unrelated became central. A *system* can broadly be defined as a group of interdependent elements that interact to achieve a common goal (see, for example, Kauffman (1980) and https://thesystemsthinker.com/). There are five key characteristics of a collection of entities to act as system (King et al., 2020): interdependence; collective behavior to achieve a common function; long-term consequences; a behavior that is dependent on the system's structure; and multiple views of the system based on the beliefs and values of the stakeholders. In this chapter, we attempt to explore some of these underlying aspects of the higher education system as it responded to the COVID-19 pandemic.

2 Visualizing Systems Thinking

2.1 Systems Thinking: Framing the Problem

The process of framing the system problem usually starts by asking the following questions: *Who are the stakeholders? What are the behaviors of the problem that stakeholders agree on their existence? What contributes to the problem? And what are the consequences of the problem?* Asking these questions serves the purpose of clarifying key features of the problem as well as setting the system's boundaries (King et al., 2020). Because different stakeholders have different mental models of how the components of a systems are connected and interacting, there is no single visual representation of the system (Meadows, 2008). Furthermore, there is no single representation that captures the entirety of the system (Senge, 2006). Therefore, visualizing systems thinking becomes necessary to bring together different viewpoints (see, for example, https://waterscenterst.org/). The practice of systems thinking visualization does not seek to find the ultimate representation of the system (Fortmann-Roe & Bellinger, 2013); rather, the result is a fruitful discourse about the system, its elements, and the way they are connected, which will enable the identification of leverage points that can change the behavior of the system by changing its underlying structure (Zhou, 2016).

2.2 Problem Statement: Visualizing the System Using Mental Models

In this chapter, we seek to visualize the structure of the system, as conceived by stakeholder, by identifying the elements of the system and their relationships using *causal loops*. Here, mental models are defined as factors that influence "how people understand and act in the world" (King et al., 2020, p. 5). As a core tool in systems thinking (King et al., 2020), causal loops enable the identification of leverage points; i.e., places to intervene within a system (Meadows, 1999). In the visual

representation of a system, the *variables of the system* (i.e., its components that can change over time) are connected with *causal links* (i.e., arrows that represent directional cause-effect relationship between variables). The advantage of causal loops is that they focus the problem analysis on the interacting variables in play, without giving unnecessary attention to merely relevant factors in the problem. An example of a causal loop is illustrated in Fig. 5.1, where a positive sign on an arrow indicates similar directionality of change in variables (e.g., a decrease in one variable causes a decrease in the other connected variable) and a negative sign indicates the opposite (an increase in one variable causes a decrease in the other connected variable). Different archetypes of systems structures based on how the variables are connected and interacting have been identified (Acaroglu, 2017).

3 Visualizing System Structure in Response to the Pandemic

In this section, a visualization of the system structure of campus reopening models during the pandemic is introduced, Fig. 5.2. The rationale behind the construction of this visualization is provided in the following section. In order to identify the structure of the system, we need to identify the variables that contribute to the problem. Our method is based on systematically documenting the sequence of events that took place when discussing reopening, starting in July 2020 through July 2021, and as reported in publicly available news media outlets. No single effort can capture the entire complexity of the problem of reopening campuses. Furthermore, stakeholders may not benefit from highly detailed relationships that seek to capture high-resolution interactions between variables. Instead, stakeholders can benefit from characterization of focused differences in the perspective of a system. Table 5.1 provides a potential list of variables of the system. The list is provided as variables, backed up with evidence of their existence and interactions with other variables. The list is provided as a starting point to generate causal loops. The publicly shared decisions by different campuses on how to proceed with reopening highlight what has been important in making the decisions, what influenced the decisions and how the decisions have changed over time.

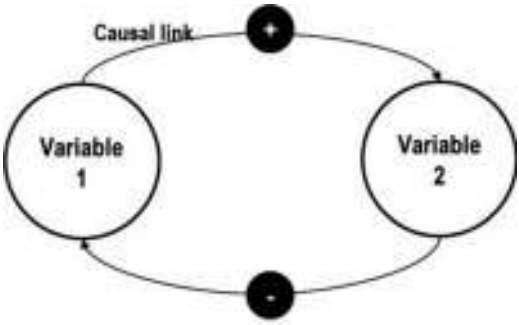

Fig. 5.1 Illustration of a simple system visualization using a causal loop

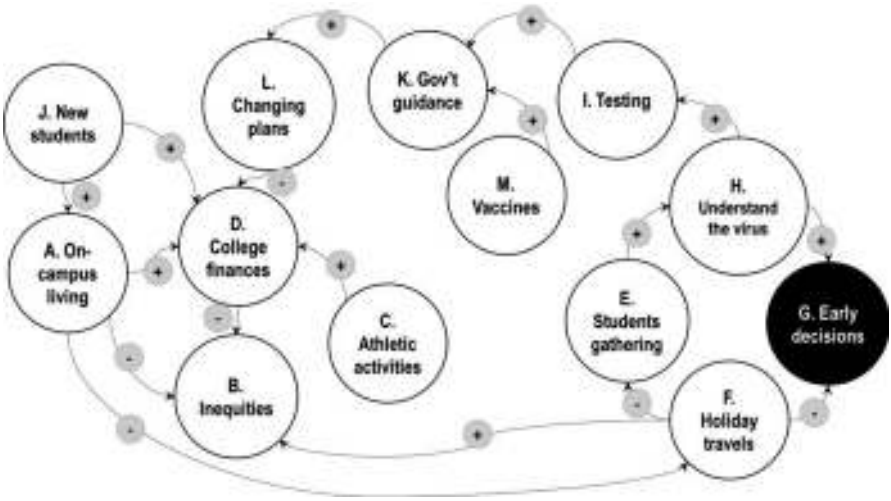

Fig. 5.2 Visualizing the system structure of campus reopening models during the pandemic

4 Discussion: Reopening Models

The discussion below focuses on the early phases of responding to the pandemic and is divided into two timeframes: July 2020—December 2020 and January 2021—July 2021. The early phases are particularly unique to study as they were characterized by both emergent and uncertainty in responding to the crisis. As more knowledge about the pandemic was gained, more formal processes started to be put in place. For this reason, the chronological analysis provided here gains its value from the understanding that different institutions followed similar or different processes to varying degrees. It is not the goal here to capture this variation at a minute level; instead, the goal here is having a high-level visualization with both illustrative and substantial examples.

4.1 Timeframe: July 2020—December 2020

To illustrate the "*(A) Availability of on-campus living*" variable, consider the reopening plans issued by both Harvard University (2020) and Rutgers. (2020) in July 2020. The plans indicated intentions to allow students to live on campus in the Fall, with few courses offered in-person. In the same month, four higher education institutions leaders testified before the U.S. House of Representatives' Higher Education Subcommittee on how the pandemic has exposed the "*(B) levels of inequities*": "The suspension of on-campus activities is also threatening many students' access to basic essentials like food and housing. For these students, going to school had been their primary way of meeting these needs" (Davis, 2020). As to the impact on

Table 5.1 Variable explanations

	Variable	Explanation
(A)	Availability of on-campus living	The number of on-campus residence rooms that meet social distancing requirements to accommodate students during in-person learning
(B)	Level of inequities	The impact of suspending on-campus activities and switching to online learning on low-income students
(C)	Athletic activities	The impact on pandemic regulations on limiting or eliminating athletic activities
(D)	Impact on colleges finances	The impact on pandemic regulations on colleges not meeting in-person promises and loosing students
(E)	Gatherings of students	The rise of positive cases due to students not meeting pandemic regulations
(F)	Travels during holidays	The rise of positive cases due to travel during the holidays and increasing chances to being exposed to the virus
(G)	Making early decisions	The level of clarity resulting in colleges making decisions about their reopening plans well before the beginning of the semester
(H)	Understanding of the pandemic	The increasing understanding of the virus and its spread dynamics due to research studies and findings
(I)	Levels of testing and screening	The availability and utilization of virus testing and screening protocols to control the spread of the virus
(J)	Level of new students' enrollment	The number of high-school graduates who decided to enroll in college despite the pandemic conditions
(K)	Degree of government guidance, recommendations	The degree to which the government is providing regulations and recommendations regarding testing, vaccinations, and overall centralized guidance regarding reopening
(L)	Changing of reopening plans	The impact of colleges inconsistent decisions of reopening, especially after intimal announcement of different plans
(M)	Availability of vaccines	The availability and utilization of vaccines and associated protocols to stop or limit the spread of the virus

Variables are listed chronologically, as they became an important factor in decision making and as reported in public resources

"*(C) Athletic activities*," heads of preeminent conferences have indicated concerns for the upcoming season (Adelson, 2020). The compounded effect of various factors on "*(D) College finances*" was illustrated in an analysis in *The New York Times* in August 2020: "Many college administrators rightly fear they will lose students to their competitors" (Dynarski, 2020). Lack of on-campus activities called for layoffs. In December, George Washington University reported layoffs of 339 positions, saving $32 million (Schonfeld, 2020).

Throughout the pandemic, a constant concern has been "*(E) Students gathering*." In August 2020, Pennsylvania State University president, Eric Barron, described how the students were flouting pandemic measures (Penn State, 2020). In the same month, the chancellor of the University of Kansas, Douglas Girod, said the "large majority" of students who had tested positive were members of fraternities and sororities (Girod, 2020). As Labor Day weekend approached in September 2020,

The White House's coronavirus-response coordinator, Deborah Birx, urged college students to be tested (Johnson, 2020). The issue of "*(F) Holiday travels*" was a concern again in November 2020. Three New York colleges shifted to remote offerings as the state experienced a surge with the Thanksgiving holiday approach: Syracuse University (Weaver, 2020), the University at Albany (NBC, 2020), and Niagara University (Watson & McNeil, 2020). By the end of the 2020, some colleges made the "*(G) Early decision*" to continue remote learning in Spring 2020. In North Carolina, the three campuses that were among the first to pursue remote instruction in Fall 2020 (The University of North Carolina at Chapel Hill, North Carolina State University, and East Carolina University), were also among the first to announce resuming in-person instruction in Spring 2020 (Thomason, 2020). The chancellor of California State University, one of the U.S. largest public-university systems, Timothy White, made this decision early in September 2020: "This decision is the only responsible one available to us at this time" (White, 2020). On other campuses, however, decisions to resume in-person instruction were not received without tension. Early decision in September 2020 by the University of Wisconsin at Madison to resume in-person instruction was received by the Dane County Executive Office with condemnation, calling all instruction to be moved online (Blank, 2020; Vruwink, 2020).

The issue of making early decisions, of whether to pursue remote or in-person learning, was very crucial. Making early decisions was connected with "*(H) increased understanding of the virus*." In October 2020, a report from the Centers for Disease Control and Prevention (CDC) found evidence that cases among 18- to 24-year-olds had regularly preceded spikes in infection among older people (Oster et al., 2020). In the same month, Boston University started to require digital virus-status badges on campus (Sweeney, 2020). Boston University, in November 2020, threatened discipline for students who did not get tested after being notified that they were overdue for a test (Elmore, 2020), "*(I) Testing*." In November 2020, Princeton announced its reopening plans to undergraduates in Spring 2021, requiring regular testing (Eisgruber, 2020). Despite the pandemic, some colleges, e.g., Georgia Colleges (Stirgus, 2020), witnessed an increase in enrollment of fresh high school "*(J) new students*," at the time when the pandemic has depressed enrollment nationwide (June, 2020).

The increased availability of testing by the end of 2020 prompted the U.S. government to start providing more "*(K) Government guidance*." With the transition to the new administration in the US in the same time frame, Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, noted to college leaders to expect more central coordination of COVID-19 policies under the new administration (Burns, 2020). In December 2020, the National Academies released two sets of recommendations: one on campus coronavirus testing (2020a), and another encouraging safe student behavior (2020b).

4.2 Timeframe: January 2021—July 2021

In January 2021, the UC-San Diego installed vending machines for COVID-19 tests (UC-San Diego, 2021). The beginning of Spring witnessed announcements of "*(L) Changing of plans*" from some campuses. For example, Stanford University, canceled plans to bring students back for the Winter Quarter (Tessier-Lavigne & Drell, 2021). As "*(M) Vaccines*" became available in January 2021, plans to reopen campuses became clearer (NYC Health, 2021), allowing administrators to make decisions early (Thomason, 2021). However, a report published on the Social Science Research Network observed that sociopolitical factors, stronger than public health factors, influenced the reopening decision (Collier et al., 2021).

Closing the loop in Fig. 5.2, by early 2021, the impact of the pandemic on "*(D) College finances*" became clearer. Iowa public universities lost millions in room and board revenue (Miller, 2021). In community colleges, enrollment dropped 18% from graduates of low-income schools, and 8.8% from graduates of higher-income schools (National Student Clearinghouse Research Center, 2021). Some colleges started to face lawsuits for not offering in-person instruction during the pandemic (Gluckman, 2021). By March 2021, administrators appreciated the importance of "*(G) Making early decisions*." For example, The University of Alabama system (2021), Ohio University (2021a), Temple University (Englert, 2021), and many others (Mangan, 2021) announced plans to offer in-person instruction in the Fall. By April 2021, some colleges, e.g., Cornell University (Pollack, 2021) and Rutgers University (Devlin, 2021), made "*(M) Vaccination*" a requirement to be enrolled in-person in Fall 2021. Some universities, e.g., Siena College in New York (Siena, 2021), Ohio University (2021b), and University of Tennessee at Knoxville (2021), offered an incentive for students to get vaccinated. However, some groups challenged making vaccination as a requirement, e.g., the Informed Consent Action Network (https://www.icandecide.org/).

By Summer, more efforts to "*(H) Understand the virus*" continued, despite struggles in recruiting participants to understand transmission in higher education (Cirruzzo, 2021; Ellis, 2021). In June, the CDC (2021) released new ("*(K) guidance*") on how colleges can operate safely given the condition that everyone has been fully ("*(M) vaccinated*"). By the end of June 2021, some colleges have started to relax preventive measure, e.g., masking mandates, with reports of continued drop in positive cases ("*(I) Testing*") (Mull, 2021).

5 Conclusion: Implications for Emergency Situations

Visualizing systems thinking using causal loops provides insights into the interdependence of variables. The visual structure reveals, through discussions amongst stakeholders, deep problems within the system, as well as opportunities for transformation. In the model we constructed here, variable (G), "*Making early decisions*,"

was found to be the most consequential variable in the system (i.e., the ultimate sink in the causal loop). In an ongoing study of faculty adaptability (Ali et al., 2021), participating faculty alluded to the same point. One participant commented on the issue as follows: "I found last summer [2020] to be really frustrating because I wanted some certainty about what was going to happen, and the university was unable to provide any certainty." Another faculty commented that the, "biggest barrier was probably the fact that my university couldn't see that the train that was coming in the sense that we're going to be virtual." Overall, the benefit of visualizing systems structures is that they provide goal orientation, act as indicators of variables that affect response time and clarify variations of mental models of how stakeholders perceive of a problem. A promising area of research is identifying differences between mental models of administrators (those who make high-level decisions) and mental models of faculty members (those who are at the front line of action during an emergency). Such differences in mental models point to leverage points to create effective change.

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Chapter 6
Simulated Teaching: An Exploration of Virtual Classroom Simulation for Pre-service Teachers During the COVID-19 Pandemic

M. Elizabeth Azukas and Jason R. Kluk

Abstract The COVID-19 pandemic complicated the field experience component of teacher preparation because of K-12 school closures. To address these challenges, South Mountain University adopted a virtual classroom simulation, simSchool, in which students take on the role of teachers and interact with virtual students. The purpose of this self-study was to explore both the teacher and student perspectives in the initial implementation of simSchool in a secondary education methods course. Data collected for the study include simSchool performance reports, professor and student journals, student reflections, and student focus groups. Findings indicated that students required a more comprehensive introduction to and rationale for the use of the virtual simulation, more chunking of the training materials, and additional debriefing time after each of the modules. Students needed perseverance and resilience to make the sim work meaningful and had to be open to receiving feedback. Technology was initially a barrier but became less so as students spent more time in the sim. Ultimately the students perceived the sim as beneficial to their growth and development as teachers.

1 Problem Statement

The COVID-19 pandemic caused the largest education system disruption in history, impacting 1.6 billion learners in more than 200 countries (Pokhrel & Chhetri, 2021) resulting in school closures or shifts to remote learning. This complicated the traditional face-to-face (f2f) field experience components of teacher preparation. Many K-12 schools refused to accept pre-service teachers due to the increased risk of exposure to COVID-19. Other schools rejected requests to accept student teachers

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_6

because their faculty did not feel comfortable coaching new teachers in an environment that they themselves were still learning. Schools also raised concerns about K-12 student privacy and security as well as the supervision of pre-service teachers in the online environment. This left the university unable to provide student teachers with traditional field experience placements.

This problem was compounded by the current teacher shortage (Sutcher et al., 2016) which made delaying students' graduation an undesirable and unrealistic option. Sutcher et al. (2016) have linked the shortage to a decline in teacher preparation enrollments, increasing K-12 student enrollment, and, most influentially, high rates of teacher attrition. Teachers are exiting the field at an unsustainable rate with 40–50% leaving the profession within the first 5 years. (Ingersoll et al., 2018). Greiner and Smith (2019) found that teacher attrition is often tied to a lack of self-efficacy. Increases in pre-service teacher self-efficacy have been tied to effective field experiences (Brown et al., 2015). Therefore, it is imperative that teacher education programs adequately prepare pre-service teachers to develop instructional strategies to guide and direct student behavior and learning through effective field experiences. (Darling-Hammond, 2008). Field experiences are also required by the state for certification. Therefore, it was imperative that we find an alternative to the traditional f2f field experiences that would adequately support pre-service teacher growth and self-efficacy while keeping them on track toward graduation and certification.

2 Elaboration of Context

This study was conducted at a regional state university in the Northeastern United States. The university serves approximately 5000 undergraduate students and 1000 graduate students. Participants included 18 students who were enrolled in the secondary education methods course in the fall of 2020. Four were graduate students and 14 were undergraduates. Ten of the students were male and 8 were female. Content areas included English, math, science, and social studies. Course outcomes were focused on meeting the needs of diverse learners and classroom management. This course required 40 h of field work which is typically done in a f2f placement.

3 Systematic Approach

There were few options available for alternative field experiences. The most widely used alternatives to traditional field experience, such as working with Upward Bound or summer camps, were also not viable options because of the pandemic. We thought about having the students create videos of their teaching, teaching one another, and we investigated teaching simulations. Ultimately, we decided to use a virtual classroom simulation called simSchool.

simSchool is a virtual classroom program with simulated students that uses an intricate computational model based on the learning sciences and teacher education literature to represent the dynamic aspects of real students in a live classroom setting (Gibson, 2011). Sessions within the simulation offer the teacher the chance to teach a lesson and the opportunity to practice and develop important elements of teaching such as reading student profiles, developing individualized instruction strategies, and understanding classroom management. Interactions with the simulated students provide immediate feedback from the students themselves in the form of shifting posture, raised hands, or speech bubbles. These interfaces change depending on the approach taken by the teacher which allows the teacher to see in real time how their chosen approach is received by the students. Multiple data points are collected while the sim is in progress such as *regularly assesses individual and group performance* and *uses information of differing student strengths and needs to further each learner's development*, and are available after every lesson for review by the student. Additionally, teachers are provided with the academic and emotional gains made by the simulated students after each lesson. Teachers teach the same lesson 4 times per module and have the ability to replay modules multiple times providing the opportunity to try out various methods for teaching the same lesson and class with immediate results to compare with previous attempts.

Several factors influenced our decision to move forward with simSchool. The first was the extensive body of literature on the successful use of simulations in education. Virtual simulations provide pre-service teachers with opportunities for skill-building (Hopper, 2018; Sawchuk, 2011) which they can then apply to the face-to-face classroom (Office of Postsecondary Education, 2005). Computer simulations provide students the opportunity to (a) practice decision-making; (b) engage in repetition for mastery; (c) receive feedback and make improvements; (d) increase self-efficacy; and (e) promote peer collaboration and social interaction (Badiee & Kaufman, 2014). Research conducted on simSchool, specifically, found a variety of benefits including a positive correlation between the use of simSchool and teacher self-efficacy (Christensen et al., 2011; Deale & Pastore, 2014; McPherson et al., 2011) and an increase in their locus of control (Christensen et al., 2011), both of which have been linked to effective teaching. (Brophy & Evertson, 1976; Rose & Medway, 1981; Tshannan-Moran et al., 1998). Additionally, both self-efficacy and locus of control have been linked to increased teacher retention (Ingersoll et al., 2018).

Other considerations included a tight timeline, the responsiveness of the simSchool organization, their willingness to provide training to our students at no additional cost, and the reasonable price point ($25.00 per student per year). Also, a variety of modules specifically aligned to our course and program outcomes such as *Cultural Intelligence, Inclusion* and *Classroom Management*. simSchool also provided a faculty dashboard to view student progress and performance as well as an equity index that tracked pre-service teacher interactions with students of different genders and skin colors. Students completed each lesson four times, receiving feedback for improvement after each teaching session. Faculty viewed the focus on continuous improvement as consistent with our philosophy.

There were some downsides associated with the use of simSchool that we viewed as trade-offs. The virtual simulation was not a true replacement of the f2f field experience. Additionally, students did not create the lessons delivered in the simulation. Students focused on implementing pre-designed lessons.[1] Finally, there was an awkwardness to implementing action in the simulation. Rather than speak directly to the class, for example, you had to choose from a drop-down menu of choices or type in your own response.

The purpose of this self-study (Loughran & Northfield, 1998) was to explore both the teacher and student perspectives in the initial implementation of simSchool in a secondary education methods course. The aim of self-study research, also known as self-study of teacher education, or S-STEP, is to "understand teaching from the inside out rather than the outside in and to simultaneously put what we learn into practice" (Bullough Jr. & Pinnegar, 2004, p. 314). S-STEP methodology is self-initiated and self-oriented, improvement aimed, uses multiple data sources, and is interactive (LaBoskey, 2004). The interactivity is crucial (Bullough Jr. & Pinnegar, 2001; Pinnegar & Hamilton, 2009) because it allows for the incorporation of multiple perspectives on our practice and "helps to challenge our assumptions and bias, reveal our inconsistencies, expand our potential interpretations, and triangulate our findings" (LaBoskey, 2004, p. 849).

Frequently in S-STEP designs, this interactivity is operationalized as a two-way process that involves the voice of a teacher educator whose practice is the focus of the inquiry and one "other" type of voice. Fletcher et al. (2016) argued that the "other" voice is often a critical friend who is another teacher educator and, while these types of studies have added to the knowledge base of teacher education, their scope may be limited because the problem of teacher education practice is framed only through the lens of teacher educators. Fletcher et al. (2016) recommended that when S-STEP research is related to the enactment of pedagogical practices, the research questions might be more comprehensively answered by including students as critical voices in the process. "The richness that student perspectives can add to our understandings of teacher education practices may assist us in becoming co-inquirers of practice with our students" (Fletcher et al., 2016, p. 20). Teaching students S-STEP processes and engaging them as co-inquirers of practice also supports their ability to use self-study as a means of promoting their own professional practice as educators.

This study employed a multi-dimensional approach to interactivity in which the teacher educator consulted with another departmental faculty member and a student bi-weekly during the process of simSchool implementation. These discussions helped to understand the complexity of the teaching and learning environment and to improve practice because they promoted a dialectic encounter about the work that afforded insights about the work while doing it and reflecting upon it. Teacher

[1] (Note: simSchool did indicate that they can create modules in which students do design and deliver their own lessons, but this was not an option given our time and budget constraints).

knowledge generation depends on teachers finding ways to share critical experiences (Loughran & Northfield, 1998).

4 Findings

This section presents the results of the simSchool implementation. The summation represents the analysis of a multitude of thick data including journals, discussion notes, student reflections, and simSchool data and reports. These data were analyzed using an inductive "ground up" approach (Charmaz, 2000). Three themes emerged from the data analysis including preparation, classroom management, and feedback and re-teaching. Each theme is presented from two different perspectives: the perspectives of the teacher educator and the student who participated in the S-STEP process in order to capture two distinct voices.

4.1 Preparation: Professor

One of the biggest challenges I had as the faculty member responsible for implementing the simulation was a lack of preparation time as a result of the crisis situation. I was learning along with the students which prevented me from framing the experience effectively. Focus groups revealed that some of the students envisioned a 3-D virtual immersive experience and were disappointed. One student wrote in their reflection, "At first, I thought I would get to talk to the students and that they would talk back. I didn't realize everything would have to be typed." In focus groups students noted frustration with some of the functionality and the limitations of the simulation, such as not being able to reassign students' seats or walk around the room. These frustrations may have been lessened by providing a better introduction to the simulation. I also learned that it required a certain amount of grit and perseverance to master the simulation. In the beginning, students reported via focus groups and written reflections that the simulation was "tedious, monotonous and frustrating." Once I reframed this for the students and explained that there are lots of things that require this type of grit in teaching, several of them rededicated themselves to the task.

4.2 Preparation: Student

I felt overwhelmed when initially navigating simSchool, not knowing exactly what to expect. A review of my journal indicated that the sim did not align with my preconceived notions. I initially tried to dive right into teaching the modules but then found I needed more information. I then learned that each student had a profile that

detailed their characteristics and performance in various academic areas. This information was very helpful to me in determining which accommodations to make when trying to create a plan for the class, as well as to assist diverse learners. The feedback from the sim and lessons learned in the methods course encouraged me to change my approach. Utilizing the student information allowed me to plan ahead for which accommodations would be best utilized for each student. As I spent more time with simSchool, I realized that preparation prior to teaching was important to student success in the simulation.

4.3 Classroom Management: Professor

The focus group data and student reflections indicated that students learned the most about classroom management practices. One student commented, "One thing I feel I improved the most on and may now be considered a strength is classroom management and responding to disruptive behavior." As a faculty member, I was able to teach classroom management philosophies and strategies and know that students could apply them in situations in the simulation where I knew some students would misbehave. Students appreciated the opportunity they had to try out different things without fear of failure or harming students. They also had the unique opportunity to press "rewind" on a class and teach it differently the second time through after receiving feedback. This process of repetition combined with the feedback loop, moved them toward mastery of these skills and allowed them to apply course learnings in a structured and safe environment.

4.4 Classroom Management: Student

Classroom management is one of the things I worry about most as a future teacher. My skills were tested in the first simSchool lesson when all of the students put their hands up at one time, which was very stressful. At first, I tried to call on each student individually to determine how best to help them. The most common response I got from the sim students included "Why are we doing this?" and "This is stupid." Eventually, I came to realize that the specific comments of the students were not explicitly helpful, instead, they were indicators that I needed to assess my teaching style and try new methods for reaching the students. Also, I began to notice that if my focus was too much on individuals or the class as a whole, the feedback suggested improving classroom management skills. One realization was that it would be helpful to regroup students to different locations about the room, which is not a current option in the sim. Ultimately, this experience within simSchool was valuable to push me to try and consider different techniques which will be helpful in f2f teaching.

4.5 Feedback and Reteaching: Professor

I received more comprehensive and specific data on student performance than I had ever received from f2f Recommendations for future research include a more formal investigation of the impact of simSchool on pre-service teachers' self-efficacy using pre and post tests with a validated instrument, comparing the student teaching evaluations of students who used simSchool with those who did not, and further examination of the extent to which the simulated environment in simSchool replicates the face to face teaching environment.

teacher mentors. For example, the following are some of the behaviors that were evaluated: designing, adapting, and delivering instructions to address each students' diverse learning strengths and needs, making appropriate and timely provisions for individual students with particular learning differences and needs, and pacing to maintain student involvement and engagement. Student effectiveness on all of these elements was rated by the sim. This allowed me to individually coach students, to adjust some of my lessons to try to address areas where there were weaknesses across the board, and to provide more specific information about their strengths and weaknesses to prospective employers.

4.6 Feedback and Reteaching: Student

When I first began using simSchool, the feedback made me feel as though I was doing a poor job of being a teacher because it seemed to be mostly negative. However, as I gained more experience with simSchool, I began to try new approaches based on the feedback. Some of the feedback I received included suggestions to move around the classroom, to try different instructional strategies, and to give breaks in between tasks. When I implemented these suggestions, students showed increased academic and emotional gains. Additionally, the positive feedback generated increased personal confidence with future attempts. As I gained more confidence, I made more changes, further improving student performance. Using feedback for reteaching was an important lesson to learn as a preservice teacher, and is a skill I know will benefit me throughout my teaching career.

5 Conclusion

While simSchool is not a complete replacement for f2f field experiences, it did offer several benefits. The simulation provided students and faculty unbiased feedback based on student teaching behaviors and the algorithm. This resulted in students being better able to identify their strengths and challenges as pre-service teachers and to set reasonable goals for their continued professional learning and growth. Additionally, the simulation provided students with opportunities to engage with a

class of students through a scripted lesson, reflect on the feedback received, and repeat the lesson, adjusting strategies to enhance success (Badiee & Kaufman, 2014). Consequently, students could try unfamiliar strategies in a risk-free environment and, through repetition of the lesson, gaining mastery in classroom competencies and routinization of classroom management strategies. Students perceived an increase in self-efficacy, with classroom management perceived as the greatest area of growth.

The simulation feedback and reports also allowed the faculty member to more specifically identify pre-service teachers' strengths and challenges in their teaching development resulting in individualized coaching, a more tailored instructional experience, and more detailed letters of recommendation for prospective employers. Additionally, the faculty member was able to structure discussions around the specific modules being taught, which was not possible in the f2f field experiences in the same way since they were all doing different things at different times. The simulation afforded the ability to work on reflection on practice and model the metacognitive processes with respect to reflecting on a particular module.

Therefore, we recommend continued use of the simulation in conjunction with f2f field experience opportunities. We acknowledge the importance of training for both faculty and students as well as the appropriate framing of the simulation. Rather than completing the intensity of 8 modules in one course, we suggest starting the simulation early in the teacher education program and completing 2–3 modules per course so that students have time to develop their skills and reflective practices prior to their culminating field experience. Recommendations for future research include a more formal investigation of the impact of simSchool on pre-service teachers' self-efficacy using pre and posttests with a validated instrument, comparing the student teaching evaluations of students who used simSchool with those who did not, and further examination of the extent to which the simulated environment in simSchool replicates the face to face teaching environment.

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Chapter 7
Utilizing Rapid Needs Assessment to Strengthen PK-12 Teaching and Learning Affordances in Emergency Remote Teaching

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Abstract The purpose of this chapter is to explore how PK-12 teachers can use rapid needs assessment strategies to support their students during emergency remote teaching. Using the contextual lens of the emergency remote teaching during the COVID-19 pandemic, this chapter provides a review of challenges faced by teachers and students. In response to similar future emergency remote teaching situations, we recommend the use of rapid needs assessment to mitigate similar challenges. This chapter provides an overview of needs assessment and outlines applicable rapid needs assessment strategies that can be used by PK-12 teachers if they are faced with emergency remote teaching in the future.

1 Introduction

As a result of the COVID-19 pandemic, PK-12 schools around the globe were quickly forced out of physical classroom spaces and into distance learning. Hodges et al. (2020) refer to this temporary shift in delivery modality as emergency remote teaching (ERT). While the shift to ERT had a global impact during the COVID-19 pandemic, similar occurrences have happened in response to crises like natural disasters (Rush et al., 2016; Schwartz et al., 2020). During ERT, PK-12 teachers and students experience various challenges ranging from inadequate technology access to distracting home learning environments. It is crucial for PK-12 teachers to identify and address these challenges before introducing new content in an ERT environment.

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Factors that may contribute to or inhibit the ERT environment can be identified through a needs analysis. A needs assessment is the process of identifying discrepancies that may exist between a current state and a desired state (Altschuld & Kumar, 2010). During a needs analysis, factors contributing to the discrepancies are explored in detail. A needs analysis can also be beneficial to a PK-12 ERT environment by identifying teaching, learning, and environmental affordances.

A challenge with identifying the needs existing within an ERT environment is time. During emergency circumstances like the COVID-19 pandemic, teachers may not be provided with sufficient time to transition to an ERT environment. Oftentimes, teachers need to quickly prioritize what needs should be addressed immediately. Stefaniak (2021a) suggests that needs analysis must acknowledge the degree of entropy that exists within a system to determine the extent that the environment can self-regulate and implement change. Emergency situations often present a significant amount of inevitable entropy. We recommend that teachers conduct a rapid needs assessment to determine the immediate needs that can be addressed quickly within the learning environment. A rapid approach involves the teacher gathering as much information as possible within a relatively short amount of time. Oftentimes, these types of assessments may be completed within a matter of hours or a few days compared to more large-scale needs assessments that may take weeks or months to complete. Not only can a rapid needs assessment identify any challenges related to teaching, learning, and environmental affordances, it can also identify limitations to infrastructural support needed for ERT environments.

The purpose of this chapter is to explore how PK-12 teachers can use rapid needs assessment strategies to support their students during ERT. Sections 2 and 3 of this chapter will present the context of PK-12 ERT through the lens of the COVID-19 pandemic, highlighting some of the challenges faced by PK-12 teachers and students as documented in empirical literature. Sections 4 and 5 of this chapter will provide information about typical processes for needs assessments, as well as expedited, proactive, practical rapid needs assessment strategies to support teaching and learning affordances in ERT environments.

2 The Current Context-ERT during the COVID-19 Pandemic

During spring 2020, the COVID-19 pandemic disrupted PK-12 education systems globally. Although many industries shut-down completely, PK-12 schools were expected to continue operating in an ERT format. This impacted approximately 1.6 billion PK-12 learners in 190 countries around the world in the peak of the COVID-19 pandemic in April 2020 (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020). However, not all learners were impacted equally. As a result of the COVID-19 pandemic, PK-12 students around the world may face anywhere from 0.3 to 1.1 years of learning loss (Azevedo et al., 2020),

substantially impacting students already facing achievement gaps (Dorn et al., 2020). In the subsequent sections, we provide empirical evidence of the challenges faced by PK-12 teachers and students during the shift to ERT and provide rapid needs assessment strategies to support teaching and learning for future emergencies.

3 ERT Challenges Faced by PK-12 Teachers and Students during ERT

We conducted a scoping review of empirical, peer-reviewed articles published in 2020 and early 2021 to determine the challenges faced by PK-12 teachers and students during the shift to ERT. The rationale for conducting a scoping review is that these reviews are helpful to quickly, yet systematically, identify key factors related to a particular concept (Munn et al., 2018). Based on the scoping review, we found that the most substantial challenges faced by PK-12 teachers and students are categorized as technology challenges, pedagogy challenges, environmental challenges, and social/emotional challenges.

3.1 Technology Challenges

Both PK-12 teachers and students faced technology-related challenges in the ERT environment during COVID-19. When schools shifted to an online learning format during ERT, teachers and students experienced issues with access to devices and reliable Internet (Antee, 2021). Many social inequities such as accessibility, parents' and guardians' abilities to assist students, and time allocated for learning tasks impeded the shift to ERT (Stefaniak, 2021b). Some school districts provided devices and/or Wi-Fi access during ERT; however, some teachers and students reported discomfort with using these new tools (Leech et al., 2020). This coincides with Moore et al.'s (2018) findings that 1 in 5 high school students in the United States were underserved in regard to technological support at home.

3.2 Pedagogy Challenges

PK-12 teachers experienced various pedagogical challenges as a result of the shift to ERT during COVID-19. Teachers indicated that they struggled to teach with technology in a remote format (Trust & Whalen, 2021). This is a result of many teachers being inadequately prepared to teach online during their pre-service teacher training. Kaden (2020) argues that online teaching preparation is limited to implementing multimedia and digital resources in teaching strategies, rather than online

teaching pedagogy. Therefore, PK-12 teachers found it difficult to shift their teaching practices online. In a survey of over 600 teachers in the United States, over half of the respondents reported that their course lessons and activities were not as successful in a remote environment (Leech et al., 2020). Additional pedagogical challenges teachers faced during ERT were access to resources and learning materials (Kaden, 2020; Middleton, 2020).

3.3 Environmental Challenges

The environmental challenges faced by teachers and students during the shift to ERT impacted teaching and learning during the COVID-19 pandemic. Parents struggled to support their PK-12 children at home, which particularly impacted families with limited resources available to them (Bansak & Starr, 2021). Some PK-12 teachers reported spending substantial time responding to parents' questions about supporting their child(ren) at home (Trust & Whalen, 2021). Additionally, PK-12 teachers and students sometimes experienced inadequate working and learning environments while at home. For example, in some scenarios, siblings were forced to work in shared spaces at home, making it difficult to participate in synchronous learning activities (Kaden, 2020).

3.4 Social/Emotional Challenges

The social and emotional well-being of teachers and students was also a challenge to teaching and learning during the shift to ERT during the COVID-19 pandemic. Teachers who experienced COVID-19-related stressors reported difficulty teaching (Baker et al., 2020). Teachers also reported additional stress related to worrying about their students during the pandemic (Kim & Asbury, 2020). Students also faced substantial social and emotional challenges while at home, which include but are not limited to strained family relationships and feelings of isolation (Prime et al., 2020). Such adverse impacts to students' well-being is associated with decreased learning and academic performance (Blodgett & Lanigan, 2018).

4 Processes for Needs Assessment

When conducting a needs assessment, it is important to gather sufficient information to understand the needs of the situation and determine factors contributing to those needs. Every needs assessment, regardless of scale, goes through six phases: identification of problem(s), identification of needs, identification of data sources, data collection, data analysis, and making recommendations and implementing

changes (Altschuld & Kumar, 2010; Stefaniak, 2021a; Watkins et al., 2012). Each of these phases can be tailored to meet the time and resource constraints imposed on a project. Time allocated on data collection and analysis can be tailored to meet the time allocated for a project. Stefaniak (2021a) recommends that individuals take an iterative approach to needs assessment. As they go through each phase, they should be verifying that the needs are the actual needs of the situation.

5 Rapid Needs Assessment Strategies to Support Teaching and Learning Affordances in ERT Environments

When conducting needs assessments, educators must be "able to work within the scope of their design space, rely on the resources they have available to them, and make decisions to the best of their knowledge" (Stefaniak, 2021c, para 2). This is especially important when conducting a rapid needs assessment. Educators must be able to make decisions and implement changes that can be implemented in a timely manner. A big difference between rapid needs assessments for emergency situations and traditional needs assessments is that more emphasis is placed on meeting the needs in a short-term period. Depending on the situation, traditional needs assessments may make recommendations for addressing needs that could span several months or years to address. When conducting a needs assessment for ERT, the teacher should be solely focused on what they can reasonably do within a matter of weeks. A key difference between rapid needs assessment and a needs assessment with an extended timeframe is the consideration of implementation. When an educator is engaged in conducting a rapid needs assessment, the ability to implement solutions that arise from the needs analysis is important. Not only do they need to consider identifying realistic solutions that align with situational needs, but they also need to ensure that these remedies can be enacted immediately.

In this section, we propose strategies for conducting rapid needs assessments for ERT. Table 7.1 provides examples of the types of questions an educator might ask within this context. Recognizing that most educators do not have the time or access to data to engage in a large-scale needs assessment that may span several weeks or months, it is important that they rely on information they already possess to implement change quickly in response to ERT. Like any needs assessment, they should still employ an iterative approach and continue to assess and verify the needs of their learners as changes are implemented in the ERT environment and new information becomes available.

Oftentimes, a problem has already been identified that has resulted in the push for ERT. When this occurs, it is important for teachers to consider what needs to be prioritized and which problems require immediate attention. This is usually influenced by the amount of time their school has imposed for making the shift to ERT and the degree of entropy imposed on the learning environment.

Table 7.1 Examples of questions to ask during a rapid needs assessment for ERT

Phase of needs assessment	Questions to ask
Identification of problem(s)	• Which problem(s) should be prioritized as most important? • Which problem(s) require immediate attention?
Identification of needs	Based on what I know about the problem(s)… • What are my learners' needs? • What are the environmental needs (i.e., instructional environmental and remote learning environment)? • What are the technological needs for supporting ERT? • What resources do I, as the teacher, need to support ERT? • What are the health and safety needs to be considered as it relates to COVID-19? • What is the degree of entropy associated with each need? • What needs do I have the ability (or authority) to address quickly?
Identification of data sources and data collection	• What do I already know about my learning audience that will inform how I shift to ERT? • What new information do I need to address the identified needs? • What data sources do I already have? • What resources are my local and school communities providing me to address concerns pertaining to COVID-19? • What data sources can I access quickly to address the needs where contributing factors are still unknown?
Data analysis	• What factors are contributing to the needs? • What is the degree of entropy associated with these factors? • What factors can be addressed immediately?
Making recommendations and implementing changes	• What changes can I make on my own? • Are there any changes that warrant approval from administration? • What resources are needed to support these changes?

The second phase of a needs assessment involves identifying needs as they pertain to the project. For situations warranting ERT, it is important that the teachers consider the needs of their learners, instructional environment, and technological needs. While some may argue that technological needs would be considered an affordance of the instructional environment, we have intentionally separated them as two distinct categories. In ERT, the instructional environment expands beyond the traditional classroom and includes the students' home environments (i.e., access to resources, support from family and guardians, appropriate assistance for completing online tasks).

The time constraints associated with the decision to shift to ERT pose significant constraints in teachers' abilities to gather data to inform their needs assessment and analysis. When conducting a rapid needs assessment, it is important for teachers to

consider and use information that they already have available. They should consider existing student information and performance metrics to help inform their instructional design changes they may make to shift to ERT. The goal of needs assessment is to identify where gaps may exist. Needs analysis determines what factors are contributing to the gaps (Stefaniak, 2021a). During a rapid needs assessment, emphasis should be placed on identifying factors that are contributing to needs that have been prioritized and need to be addressed within a short timeframe. The degree of entropy should be considered when considering these factors. If there is a high degree of entropy that a teacher cannot control, they may need to delay addressing that need in its entirety until adequate resources are provided.

Individuals involved in conducting rapid needs assessments for ERT may be a teacher preparing their own learning environment or they may be an individual providing recommendations to school administrators. Regardless of their role in the school, it is important that recommendations be focused on what can be accomplished within a short timeframe. During this time, it is important that teachers consider what changes they can make on their own, what changes require approval from administration, and what resources are needed to support the proposed changes.

While all individuals conducting needs assessments should employ an iterative approach, it is imperative that they do so during a rapid needs assessment. This type of assessment involves quick decisions that can be expanded upon in future iterations. All inquiries pertaining to identifying needs, data sources, and analysis should be focused on what can be achieved within a few weeks. Once shifts have been made to ERT, teachers and administrators can then work to verify that they are adequately addressing needs and expanding their data collection and analysis as new information and student performance metrics become available.

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Chapter 8
The Effects of Covid-19 on Rural School Communities in Guyana: New Directions or Old Methods Retooled

Charmaine Bissessar

Abstract The true effect of the pandemic will not be felt for many years. However, the present effect of the pandemic has resulted in a digital canyon between the haves and have nots concerning accessibility to devices and Internet connectivity. Rural school communities are feeling the effects of the pandemic. This qualitative methodology, based on the descriptive phenomenology approach, examined the views of a purposive sampling of 12 secondary school teachers who are teaching in rural Guyana (hinterland) regions, in order to understand some of the issues they and their students are facing. The issues were learning loss, the COVID slide, and digital divide. In order to mitigate these effects the teachers have been using first- and second-generation media (community boards, radio, and supermarket distribution sites). Their resilience and grit are evidenced as they continue the education process. Rural communities have galvanized into action to provide spaces for sharing worksheets and to ensure that no child is left behind.

1 Introduction

The pandemic has altered the teaching and learning processes with schools opting to conduct classes remotely. As emergency remote education (Hodges et al., 2020) takes precedence and the pandemic lingers, rural students have become one of the populations most vulnerable to education attrition. Rural communities are marginalized due to location and lack of resources. In fact, the Inter-American Development Bank (2020) reported that continued closure of educational institutions will result in severe repercussions for "poor, marginalized and vulnerable school-goers as well as indigenous students, migrants, and children with special needs" (p.3).

With this in mind, the purpose of this qualitative phenomenological study was to determine the mechanisms that were implemented successfully to mitigate learning

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_8

loss in rural school communities in Guyana. This study poses the question: "According to Guyanese teachers, what are the mechanisms they are successfully implementing to ensure that students are not experiencing learning loss?" This chapter examines how COVID-19 has affected the educational environment in rural Guyana and shows how old methods of disseminating information are re-tooled to create avenues for connection with students and parents. The response is innovative thinking in the use of first- and second-generation media in meeting rural students' needs.

2 Literature Review

Remote teaching and learning have become the sine quibus non of the education system during the pandemic. In these unprecedented times, educators have the herculean challenge of grappling with the new normal and charting uncharted territories. Many are using first- and second-generation media to mitigate learning loss, the COVID slide, and the digital divide.

2.1 First-and Second-Generation Media

UNICEF LACRO's (2020) report indicated that the emergency remote initiatives being implemented by Latin America and the Caribbean are "characterized by a combination of first-generation (printed material, radio and television) and second-generation media (digital platforms and learning management systems) to deliver content and maintain some degree of interaction between schools and students" (para.3). In rural areas in India, according to Reddy and Ramesh (2020), there is the need for the use of more first- and second-generation media in the form of interactive radio and TV to teach during the pandemic.

2.1.1 Learning Loss

The Glossary of Education Reform (2013) defined learning loss as "any specific or general loss of knowledge and skills or reversals in academic progress, most commonly due to extended gaps or discontinuities in a student's education" (para.1). The Glossary of Education Reform indicated that learning loss could manifest in several ways. However, for the context of this study, learning loss will be considered in terms of "*interrupted formal*" learning (para. 3).

Learning Loss: First- and Second-Generation Media

Developing countries will be hit the hardest economically, socially, and educationally due to the economic and learning losses caused by the pandemic. Therefore, it is critical that such countries ensure that emergency remote teaching, leading, and learning continue. Huong and Jatturas (2020) stated that two-thirds of the world's population continues to experience disruption during the pandemic. They proposed that schools, systems and leaders should provide alternative means of connectivity to constrained students. As if in response, the Inter-American Development Bank (IADB, 2020) loaned the Government of Guyana 30.4 million United States dollars to provide, educational television and radio channels, textbooks, worksheets, and to offer student loans. With this money, the Guyanese Government (as cited by Smith-Thomas, 2021) expanded its provision of teaching via two interactive radio channels to include six new learning channels aimed at the rural (hinterland) population. Education Minister Manickchand (cited by Smith-Thomas, 2021) indicated that there have been changes in the learning channel and delivery of the curriculum via radio to accommodate students in the hinterland.

Globally, other countries have been providing education via TV and radio. For example, the South African government, according to McKane (2020), decreed, "Any web-based educational or health resource which helps to meet challenges created by the pandemic may apply to be zero-rated" (para. 7). Congruently, The New Zealand Government has connected 45,000 students with hard-packed materials. The New Zealand government also created and implemented two TV channels, one in English and one in Maori (Ward, 2020). In Turkey, mobile operators were willing to give students 8 gigabytes of data (Vidal, 2020).

COVID Slide

These initiatives may help ensure that the COVID slide and digital divide are somewhat less disruptive. According to Kuhfeld and Tarasawa (2020), research conducted by the NWEA (North West Evaluation Association) suggested that when students finally return to classes, they would have forgotten 70% of what they had learned in reading and mathematics. The learning losses were predicted to be more pronounced in the lower grades. Indeed, Jaume and Willen (2019) concluded that the earning potential of children who lose 80–90 days of school could be affected negatively far into the future, potentially into their 30s.

2.2 Digital Divide

During the pandemic, according to Fore (as cited by Thompson, 2020), the "lack of internet access is costing the next generation their futures" (para. 5). In fact, Thompson (2020) reported, "Two-thirds of the world's school-age children-or 1.3

billion children aged 3–17 years old-do not have internet connection in their homes" (para. 2). She concluded that it is no longer a "digital gap but a digital canyon" (para.3).

Predictably, the pandemic has exacerbated the inequalities that already exist (Thompson, 2020). In a study conducted in the United States of America, Stelitano et al. (2020) found that students in more affluent areas had more and better access to technology than students in rural areas where poverty is greater. Indeed, in the Guyanese context, there has always been an issue of digital divide between the haves and have-nots and between the rural and urban populace.

Solomon and Clancy (2021) defined the hinterlands in Guyana as the remote areas in which the indigenous populations live. These are along the borders of Brazil, Suriname, and Venezuela. The census taken in 2012 indicated that 10.51% of the Guyanese population live in the hinterland areas (Inter-American Development Bank, 2019). According to the report conducted by the IADB, the hinterland areas "are characterized by few economic opportunities, poor environmental and health conditions, a lack of adequate infrastructure, and access to mostly rudimentary, low-quality social services" (p.4). This is also reflected in the Multidimensional Poverty Index for Guyana's hinterland, which is seen at .017% (Oxford Poverty and Human Development Initiative, 2017). In areas that are considered deep hinterland, the MPI is 0.0095 (Cuyuni Mazaroni), 0.006 (Mahaica Berbice), and 0.145 (Upper Takutu-Upper Essequibo). This suggests that these populations are without access to electricity, proper sanitation, cooking fuel, and proper nutrition. They are also prone to higher levels of child mortality. Additionally, school attendance and years of schooling are less in the hinterland areas. This survey was conducted before the pandemic.

Depicting what is presently taking place with education in the hinterland, Solomon and Clancy (2021) gave anecdotal and empirical evidence of education in Aishalton, an indigenous community in Guyana. They followed one parent as she collected worksheets and information from the teacher. As a parent, Immaculata adopted the role of teacher. She obtained guidance from her daughter's class teacher in English, Mathematics, Science, and Social Studies. Immaculata said, "Parents have to work with their children and try to see how best they can educate their children" (Solomon & Clancy, 2021, para. 3). Here, she underscored the pivotal and critical role parents play in their children's education. She further said, "Well the teachers have been doing a fantastic job in my village especially the primary school teachers, they have been finding ways and means of how to engage children through their parents" (Solomon & Clancy, para. 5).

In order to bridge the digital divide, the Guyana-Jamaica Friendship Association donated 30 laptops and 5 computers to a primary school in rural/hinterland Guyana. Guyana Times (2021) stated that the organization decided to adopt a primary school in Guyana and in Jamaica. Mashabo Primary School was chosen and laptops given. The president of the association stated that they did this in order to "bridge the digital divide between the affluent and not so affluent in society" (Guyana Times, 2021, para. 2). Thus far, emergency remote education for this school consists of dissemination of worksheets, collecting, correcting, and returning them. With these new computers, teachers and students will have access to online teaching.

3 Methodology

This qualitative phenomenological study based on the interpretivist paradigm examined the responses of 12 Guyanese teachers working in rural communities regarding the mechanisms they are successfully implementing to ensure that students are not experiencing learning loss. The sampling method was purposive since the instrument was emailed to teachers who taught in rural (hinterland) communities in Guyana. Two males and ten females, ages 35–50 participated in the study. The University of Guyana's personnel granted permission to conduct this study and respondents were assured anonymity and confidentiality. Participants gave informed consent and were reminded that their participation was voluntary and that they could withdraw at any time. They were also informed that the data would be reported cumulatively and anonymously. The questionnaire was emailed to the participants in February 2021 after they consented to participate. Participants were asked, "What coping mechanisms did you successfully implement in your classroom to cope with disruption? Give an example of this mechanism."

3.1 Data Analysis

Creswell's (2012) six-step data analysis framework was used to analyse the data. These steps entail: become familiar with the data; generate initial codes; search for themes; review the themes; define themes; and wrap up. The researcher used the inductive approach to code and she identified recurring words and phrases both latently and semantically. Based on Saldaña's (2013) list of coding processes specific to exploratory epistemological research questions, the researcher implemented the "theming data approach" where phrases or sentences were used to describe or capture the meaning of an aspect of the data (p. 64).

In order to ensure credibility and consistency of themes, the researcher re-examined the data. The researcher used the code/re-code process in order to ensure dependability. She coded and reduced the data to themes, left it for 2 weeks, and re-coded the data in order to ensure consistency. There were no evident threats to external and internal consistency of the data. Moreover, the researcher conducted an intra-class correlation coefficient (ICC) reliability test after coding and re-coding the data 2 weeks later. The ICC had a reliability of .916, which is a good level according to Cicchetti (1994). Intra-rater reliability was based on Shrout and Fleiss' (1979) convention of the third model of ICC (3.1) where the researcher was the only rater of interest to assess the data. For the purpose of this study, each data set was assessed and the reliability was calculated from a single measurement- the code/recode process. It is always difficult to eliminate subjectivity in qualitative research, especially in this case where the researcher is teaching individuals who are experiencing the pandemic and suffering learning loss.

4 Findings

This section presents themes identified from the data after analysis was conducted manually and using NVIVO. When a frequency word count was conducted with the responses to the question, the following word cloud was obtained. The larger the words the higher the number of times they were mentioned (Fig. 8.1). However, this was semantic coding.

Latent coding entailed coding the data in the context in which they occur (see Table 8.1).

4.1 Learning Loss and First- and Second-Generation Media

The following quotes are taken from some of the participants in the study to illustrate examples of different ways teachers were able to connect with students:

- "Drop boxes were left at the guard booth for drop off and pick up." (Participant 1)
- "We use community bulletin boards to get the message to parents and students." (Participant 2)
- "We have radio stations that broadcast sessions and the students listen to them." (Participant 4)
- "Hard copy of worksheets were also distributed to students so that they can use for those without a device and internet services." (Participant 11)

These responses underscore the importance of finding ways to reach the students and stymie learning loss. Participant 10 explained, "I print worksheets and take them to the parents." In this way, he is going the extra mile to ensure that his

Fig. 8.1 Word frequency

Table 8.1 Frequency count of latent analysis

Ideas	Recurring words and phrases	Frequency count
Learning Loss and First-Generation Tools	"Drop boxes were left at the guard booth for drop off and pick up." "we use community bulletin boards to get the message to parents and students." "we leave worksheets in the village supermarkets and the parents pick them up when they come to shop and return them."	10
Digital Divide	"Nonattendance by learners was basically because of lack of gadgets and internet access." "children who did not have access to the internet were at a tremendous disadvantage."	11

students are not at a disadvantage. These responses exemplify the extra contributions educators are making in ensuring that their students are not marginalized more than they are already. In one instance, Participant 6 indicated that submission of worksheets was not good so they collaborated with the radio station to highlight the top performers and students started submitting their assignments. The quality of their work also improved.

4.1.1 COVID Slide

Participant 11 indicated that she is a head of department and very busy preparing Forms 4 and 5 for the Caribbean Secondary Examination Certificate, which means she is unable to work with her own children. She now has the added fiscal burden of paying a tutor to teach her children. This exemplifies how one parent is fighting the COVID slide. What happens to the other parents who are unable to afford tuition? Where does that leave them? Participant 1 shared: "I gave my parents the option to visit me at the school during the week to clarify anything they do not understand in terms of school work and also they can call or text me privately." Therefore, she ensured that she was accessible to her parents. It also shows that she is providing learning opportunities to the parents as well.

4.2 Digital Divide

Participant 2 explained, "Nonattendance by learners was basically because of lack of gadgets and internet access. However, all of our learners were able to collect worksheets most of the time." She continued, "Children who did not have access to the internet were at a tremendous disadvantage. Approximately 39% of the children were at a disadvantage." Participant 1 shared:

> Students from the Riverine communities X and Y (names withheld) are not in a group what's app. School boats deliver the newspaper but not all students want to cover the cost

> of the newspaper. Staff described feelings of helplessness and hopelessness with regards to students that they have not been able to contact.

This emphasizes the fact that students in rural communities do not have access to basic information found in the newspaper because they are unable to afford the cost. Participant 1 continued:

> I believe 6 out of 20 students which is 30% of my students do not have access to internet. They are disadvantaged because even though they get the worksheets, they are not a part of the group and do not get the voice notes. Some of them are in the mining area with their parents and others simply cannot afford to pay for internet.

Participant 3 shared that, albeit there was no significant decline in attendance, those who did not attend classes were due to "lack of gadgets." However, in order to counteract this, worksheets were disseminated to all students. Participant 4 indicated that 75% of her students were at a disadvantage due to financial issues which resulted in lack of devices and connectivity. Participant 6 shared that 60% of her students were at a disadvantage since they did not have devices and connectivity. On the issue of the digital divide, Participant 10 explained:

> I think students were disadvantaged since the Government has provided EGov internet to all the schools on the coast and exempt us in the lakes and Pomeroon school (hinterland). 100% of students are disadvantaged since there in no internet service in the community. This is so because the Government failed to establish a hub at the school.

This is critical since it shows the distinction between the coast and hinterlands in Guyana where the hinterland communities are at a disadvantage since there is no infrastructure, connectivity, and access to devices. Participant 8 reiterated this point and shared that all her students were disadvantaged because they did not have access to devices and connectivity. Participant 11 highlighted this and opined:

> I strongly believe that students were at a disadvantage solely because of not having a device as well as not having internet service. As explained before, most students attending my school are living in poverty. This is the main reason why they are not owners of a device. These students are also living in squatting areas or schemes, which do not have access to the internet service. Form the statistics at my school over 80% of students do not participate in online classes.

Participants 1 and 11's discussions extend the discussion to not only rural and coastal (urban) communities but also the obvious disparity between different socio-economic groups. This apparent poverty is reflected in the (Oxford Poverty and Human Development Initiative, 2017) where deep hinterland populations do not have access to daily necessities of sanitation, drinking water, and cooking fuel etc.

5 Discussion

Despite the pandemic, teachers are finding innovative and creative ways to get their students to perform. The participants' responses indicate that rural Guyanese teachers are doing the best they can with what they have. In fact, Immaculata views

teachers as the real heroes. She was (Solomon & Clancy, 2021) apt in describing the teachers as heroes for they have shown resilience and grit in ensuring that no child is left behind. Teachers are using first- and second-generation media to reach those students in rural (hinterland areas) in Guyana. There continues to be loss of learning among the marginalized and vulnerable student population. However, teachers in Guyana are preparing worksheets for their students as is presently done in New Zealand (Ward, 2020).

The pandemic has amplified the canyon between the haves and have-nots in Guyana where marginalized and vulnerable students in the rural communities are not being taught because they do not have access to Internet and a device. In one instance, it was indicated that students have no access to information because they are not able to afford the cost of a newspaper. In areas where the necessary infrastructure exists, parents cannot afford the cost of Internet, which places their children at a disadvantage when what's app or any form of technology is used to impart information. They have access to worksheets from their teachers but do not have access to the worksheets provided by the Ministry of Education because they do not have printers. This catch-22 situation does not augur well for rural Guyanese students especially those who will be sitting the National Grade Six exams in early August, 2021.

6 Conclusions

This study sought to determine the mechanisms that were implemented successfully to mitigate learning loss in rural school communities in Guyana. The findings indicate that teachers are resorting to first- and second-generation media to reach as many students as possible. The lack of internet access, devices, access to printers and any form of social media has created a socialization rift. However, COVID-19 has forced rural communities to unite towards ensuring that education persists despite the odds. The pandemic has fostered community resilience. Community resilience is evident in the rural communities, which are uniting and have galvanized into action to provide spaces where worksheets and drop boxes, etc. could be placed for learning loss to be diminished. Indeed, it takes a community to ensure that learning continues.

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Chapter 9
Mobile Learning for Emergency Situations: Four Design Cases from Latin America

Daniela Castellanos-Reyes, Enilda Romero-Hall, Lucas Vasconcelos, and Belen García

Abstract This practitioner-focused chapter addresses mobile learning in the Latin American context during the COVID-19 emergency. To guarantee continuity of education during the COVID-19 pandemic, instructors adopted remote education. Even though much of the remote education relied heavily on computers, millions of learners in Latin America do not have a household computer. Nonetheless, mobile connectivity is very high in Latin America, and therefore, mobile learning has greatly supported institutions during remote education. Mobile learning significantly supports learning at a distance in countries that face infrastructure challenges. Even more in the Latin American context, where mobile devices may be low-cost alternatives to computers. We present four design cases about mobile learning for continuity of education during emergencies. Each design case addresses a different country, audience, and content. The design cases focus on generic technology applications regularly used by practitioners and students. The four design cases are: (1) foreign language learning and social studies to 1st – fourth graders using online blogs in Brazil; (2) teaching STEM to 8th–12th graders through social media (i.e., YouTube/WhatsApp) in Panama; (3) education to 6th–12th graders through social media (i.e., YouTube/WhatsApp/Facebook) in Mexico, and (4) humanities higher

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_9

education using instant messaging and cloud-based platforms (i.e., WhatsApp, Google Drive platform) in Colombia. Recommendations for practitioners and policymakers are provided.

1 Introduction

To guarantee continuity of education during the pandemic, instructors around the globe adopted Emergency Remote Teaching (ERT) relying mainly on computers (Hodges et al., 2020). Yet, around 826 million learners have no computer at home in Latin America (UNESCO, 2020). Nonetheless, mobile connectivity is high (James, 2012) in comparison to home Internet (Alderete, 2019). Thus, UNESCO and IESALC (2020) recommended Latin American institutions to adopt mobile learning (m-learning) during ERT. Mobile and networked learning are crucial to face infrastructure challenges (Castellanos-Reyes et al., 2021). Even more Latin American where "mobile phones are a more accessible and low-cost substitute for computers" (Romero-Hall, 2021, p. 8).

M-learning is "any form of learning that happens when mediated through mobile devices" (Herrington & Herrington, 2007, n.p.). Tablets and smartphones mediate learning when classrooms and computers are not available. Researchers acknowledged the great potential of m-learning to support learning in the Latin American region (Vázquez Cano & Sevillano-García, 2018). Yet, mobile and networked learning approaches are heterogeneous, reflecting the region's diversity (Romero-Hall, 2021). Therefore, geographical proximity should not be used to generalize m-learning interventions.

Although we know the potential of m-learning to support ERT in Latin America, we do not know how implementations of m-learning differ by region. Recognizing how different m-learning approaches in response to ERT across different Latin American countries allows us to adopt initiatives in more culturally sensitive ways. This chapter presents four design cases about using m-learning during ERT in Latin America. We focus on generic technology applications used by practitioners (Kimmons, 2020) rather than paid platforms.

2 Brazil

Most Brazilian schools opted for ERT due to the COVID-19 pandemic. This design case proposes integrating social studies and foreign language learning, and connecting elementary students from a Brazilian public school with American undergraduate students form a U.S. university using educational blogs and Netbooks during a pandemic. This design case is based on two premises. First, American students have some fluency in Portuguese to interact with Brazilian students or vice-versa. Second,

the Brazilian school offers one-to-one computing as part of the program One Computer per Student (Um Computador por Aluno, UCA) (Rosa et al., 2013). Schools in this program have infrastructure for wireless Internet and offer Netbooks to students.

1. Netbooks are lightweight and affordable mobile devices designed for simple tasks such as writing emails and editing documents. Elementary students used Netbooks to write educational blogs and interact with undergraduate students online.
2. Educational blogs are free online tools to write posts that display in reverse chronological order. Users can comment and react to others' blog posts, which facilitates reflection, promotes collaboration, and fosters writing skills (Vasconcelos & Araújo, 2008). Blogs are suitable for global projects because they allow interactions between geographically separated people.

In this design case, students collaboratively wrote blog posts about cultural topics designated by their teacher. For example, elementary students wrote about and posted drawings of June countryside parties (Festas Juninas). These celebrations observe the harvesting of local produce in Northeast Brazil. American undergraduate students wrote and shared videos about Halloween, a festivity on All Hallows Evening that honors those who passed away. This festivity originates from Celtic harvest feasts. Blog posts about these festivities featured garments, food, music, and typical dance. In another example, students wrote about and shared photos of tourist destinations in their respective hometowns. Once a blog post was online, students in both countries received reflection prompts to guide their online interactions. They used the comment feature to react to each other's posts, compare their cultures, and exchange further information about their backgrounds.

Outcomes of this project were beyond social studies and foreign language learning. The blog post assignments provided students with a real sense of authentic learning as they applied knowledge and skills to create content for a target audience. Elementary students developed writing and digital literacy skills as they produced multimodal content to post online. American students developed an understanding of multicultural and culturally-sensitive teaching in elementary grades. Furthermore, younger Brazilian students took older American students as role models, which led to questions and aspirations about going to college. In turn, American students created developmentally-appropriate ways to interact with younger students.

This was a promising initiative to promote m-learning during a pandemic. Yet, challenges arise for large scale implementation. Specifically, most Brazilian public schools lack the infrastructure and resources to allow m-learning. During the pandemic, 48% of elementary schools in the municipal network reported challenges in offering Internet access, leaving five million children and teenagers out of school (UNESCO, 2021). Additional government funding is needed to prepare public schools for technology-driven instruction in emergency situations.

3 Panama

The Ministry of Education canceled all classes in March, 2020 in Panama. Classes resumed virtually in July 2020 in public schools with curricular support from Internet sources, educational radio and television, and paper handouts distributed by the schools. School administrators and teachers strive to (a) establish technology hubs, (b) develop digital guides and assessments, (c) provide professional development for instructors and staff, and (d) establish protocols to incorporate students and parents to ERT. Yet, only 40% of learners in the public school system have access to the Internet (Svenson, 2021). School administrators, teachers, and educational foundations provided m-learning experiences based on student's available resources to reach eighth to 12th graders in public schools during school closures.

1. WhatsApp: For some secondary students, m-learning experiences included communicating with teachers using WhatsApp. WhatsApp is a very popular application for cellphones and tablets users in Panama. Teachers used WhatsApp as a supplement to online school portals or as the main method of communication and document exchange with students and parents when schools lacked online platforms. WhatsApp group chats for learners in a specific course or learners' parents are very common in Panama.
2. YouTube: The non-profit organization Ayudinga! (2021) Taught and posted an online STEM (Science, Technology, Education, and Mathematics) curriculum via the Ayudinga! YouTube channel to support learners, teachers, and parents.
3. Educa Panama: The Ministry of Education created the online portal Educa Panama to aid schools, parents, and teachers providing academic and cultural activities (Ministerio de Educación, 2021). The learning management system Moodle hosts the Educa Panama portal which is free to all learners enrolled in public schools. During the COVID-19 pandemic, the Panamanian government created STEM content for teachers to use in remote and online instruction.
4. SerTV Live Stream: The Panamanian government sponsored educational radio and television programming to support K-12 curriculum. The educational programming is available live on weekdays during school hours via the SerTV live signal. Recordings of each class are available after the live stream. The educational programming is geared towards elementary education; but, some sessions are dedicated to 6th–12th STEM curriculum.

Due to the lack of household computers, online resources have been deployed for access via mobile devices. Internet access via mobile devices is an essential tool for K-12 students. Unfortunately, Internet access via mobile service is available to only 38% of the country (Molina Alarco, 2020). Also, Panamanians access the Internet via mobile devices using "prepaid plans with limited minutes that are insufficient for browsing or using the learning platforms and other channels put in place for educational continuity" (ECLAC-UNESCO, 2020, p. 6). Thus, unequal access to learning during the COVID-19 pandemic has widened pre-existing gaps in

information and knowledge access (ECLAC-UNESCO, 2020). Despite all these disparities, m-learning provides opportunities for those who can afford it.

4 Mexico

After the first COVID19 case was reported in February 2020, K-12 classes were suspended for four weeks to plan how to deliver instruction to all students in Mexico. The Secretary of Public Education (SEP) launched the program "Learn at Home" which delivered video content to millions of K-12 students through television, YouTube, and Facebook live. Lessons were also broadcasted over radio stations to make them accessible to students who did not have Internet or television access at home. Enormous challenges arose when K-12 schools started ERT, such as: lack of student access to technology and educational resources, sometimes lack of parental support, and lack of teacher training on remote learning practices.

The pandemic widened the digital gap among students from different socioeconomic status and between urban and rural communities. About 50% of the population in urban areas have access to an Internet connection at home, but the percentage is much lower in rural areas or among the population living in poverty. Furthermore, there is a high number of students who live in poverty whose parents have limited literacy skills. These students are at a higher risk of falling behind in normal conditions, but when Covid19 started they did not have adequate resources to succeed academically. After schools closed, more than one million rural students were left without teachers, and adequate learning opportunities. In poor communities, neighbors organized open learning communities to share resources and tutor each other.

Between Spring and Summer of 2020, SEP provided emergency training for teachers to acquire remote learning skills through webinars, crash courses, and Massive Open Online Courses (MOOCs). K-12 teachers adopted the following tools that students could access using mobile devices:

1. Zoom: Teachers used Zoom to deliver synchronous lessons to keep continue building a learning community (Joia & Lorenzo, 2021). Zoom was used mostly with students who had reliable internet and to record videos that students could watch asynchronously.
2. YouTube: SEP created the "Learn at Home" channel to deliver video content during school closures. These video lectures were also broadcasted in several television channels to support students without internet (Aprende en Casa, SEP, n.d.). These videos are also available in SEP website.
3. Facebook Groups: Teachers created Facebook groups to communicate with students and parents. Facebook groups were used as repositories of lecture videos and instructional materials. In addition, Facebook allowed teachers to build a community of learners through asynchronous discussions.
4. WhatsApp: Teachers used this app to communicate with students and parents via text. Yet, teachers also answered students' questions through voice or video calls.

Furthermore, WhatsApp was used to collect pictures of student work (Blanchard et al., 2021).

Mexico's educational system could be improved to react to future emergency situations, but also to reach all students in normal conditions. There is a need to continue training teachers to acquire digital skills and digital education pedagogies for optimal utilization of resources.

5 Colombia

ERT instruction in Colombia started in March, 2020 in higher education. Some universities stopped for one week to prepare instructors for the transition (Blu Radio, 2020). Other universities made the change overnight. Yet, instructors received many invitations to webinars about tools available for supporting ERT. These webinars addressed multiple software (e.g., Zoom, Teams, Google Meet) rather than making in-depth demonstrations of only one. Despite institutional efforts to inform instructors about many applications, they preferred to use already familiar platforms. The pressure to support students influenced instructors' decisions to adhere to familiar tools rather than venture to new ones. Mainly because instructors wanted to provide students with some degree of stability to face the uncertainty of ERT. Their decision led them to rediscover tools that they had long used in in-person instruction but did not know how to adapt to ERT. The following are some of m-Learning tools that instructors used:

1. Google Workspace: Colombia instructors and college students already used Google Drive as cloud service. Yet, as a result of the pandemic they discovered that the Google Workspace platform offers other free services from videoconferencing (i.e., Google Meet) to online classroom platforms (i.e., Google Classrooms) that facilitated ERT.
2. Kahoot: Instructors guided course design decisions based on students' suggestions and word of mouth advice. For example, informal conversations about not knowing how to implement quiz-like activities in ERT prompted students to suggest applications like Kahoot.
3. WhatsApp: Like in previous design cases, the become a mobile file repository and a teamwork collaboration tool. Furthermore, WhatsApp became an easier communication tool between instructors and university staff taking a greater role than emails. However, instructors and students experienced technology fatigue due to "constant connectivity" (UNESCO & IESALC, 2021, p. 12). Therefore, minimizing time online and setting communication boundaries is a must.
4. Video Conferencing Platforms: Home Internet access in Colombia is out of reach for many, but that is not the case with mobile phones. Home connectivity issues drove learners to use laptops for screen sharing and video but mobile phones for audio. Furthermore, applications like Teams and Zoom worked smoothly on mobile devices but needed additional passwords and frequent

updates in computers. Adding extra steps to an already stressful situation favored mobile devices for synchronous classroom sessions rather than laptops and desktops.

Instructors recommended asking students about their expectations from ERT before making decisions. Negotiating expectations humanize interactions rather than overfocusing on "must-know" software. Also, instructors should master one platform rather than familiarizing with a handful of them to avoid tech overload. Mastering one platform could reduce technostress and increase confidence with technology (Gañán Moreno et al., 2020). Furthermore, instructors suffered from anxiety about cheating behaviors and students experienced connectivity issues during exams. Therefore, rethinking assessment is crucial to face another crisis, for instance, by adapting project-based assessment (Sambell et al., 2013).

The COVID-19 pandemic aggravated other aspects of higher education. For instance, mother instructors who reported longer working hours during the pandemic, some of them are had their abilities to work limited due to their responsibilities as heads of households and increased workload at home (Gutiérrez et al., 2020). Finally, while surviving the crisis, Colombia faced a historic social upheaval with a national strike lasting over months. ERT allowed education to continue even with the national strike. Those who wanted to engage in demonstrations perceived that having the classroom within hand's reach prevented them from practicing their civic rights. The ubiquity of m-learning forced participants to decide between classroom assignments and political participation.

6 Discussion and Conclusion

The World Bank (2021) reported the Covid-19 pandemic as the most significant shock of the education system. Especially in Latin America, where school closures might increase the number of children who do not reach the minimum proficiency levels in the PISA test scores by 16%. Furthermore, The World Bank (2021) estimated that only 33% of counties are implementing measures to improve access to infrastructure to students at risk of being excluded from ERT. Furthermore, the effects of the pandemic go beyond numbers. College students reported experiencing pedagogical distress due to faculty's lack of digital competencies (UNESCO & IESALC, 2021). Yet, although efforts to implement guidelines for school openings are higher in elementary and secondary education, higher education still requires more significant input from all stakeholders.

Our design cases concur with international reports in that stakeholders must act promptly to protect the future of students in the Latin American region in three main points: (1) increasing budget for infrastructure, (2) creating institutional guidelines and policies, and (3) providing professional development for instructors. Improving the Internet infrastructure and access to m-learning devices to students is crucial, especially for rural or impoverished areas. Furthermore, governmental guidelines

for ERT are scant. Creating policies and action plans is vital to address future crises. These guidelines need input from all stakeholders, primarily the learners. As suggested in the Colombian design case, it is critical to ask learners about their expectations and fears about ERT.

A lack of professionals trained to teach at a distance is not a trend exclusive to Latin America. Instructors and administrators need professional development on technology integration to adequately respond to ERT in the future. The intervention in Brazil included training for both instructors and learners on the basic functions of mobile Netbooks. Furthermore, as stated by Kimmons (2020), institutions should aim to adopt generic technology applications. We observed across cases that WhatsApp and YouTube were widely used across countries. On the one hand, WhatsApp was leveraged as communication system between instructors and students, and instructors and parents. Furthermore, WhatsApp also became a file sharing platform and document repository. However, instructors were at risk of fatigue due to an overload messages and issues at establishing boundaries in communication. On the other hand, YouTube was used largely by governments and non-profit organizations to provide curriculum support for teachers to leverage in class.

In Mexico, educational institutions implemented MOOCs to support teacher education; however, further support is needed for those who lack basic digital literacy skills. Finally, training based on distance education theory was absent. We speculate that the time pressure faced favored an overfocus on software instead of pedagogy. We recommend institutions adopt comprehensive and efficient models like the Community of Inquiry framework which has been widely implemented in the distance and online learning field (Castellanos-Reyes, 2020).

Acknowledgements We want to thank Maria Teresa Vargas and Jose Luis Mondragon whose insights greatly contributed to describe ERT in higher education.

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Chapter 10
Back to Design Basics: Reflections, Challenges and Essentials of a Designer's Survival Kit during a Pandemic

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Abstract Innovation is at its best when we are thrusted into an emergency situation that tests protocols and established norms. In this chapter, authors reflect on the journey of a team of instructional designers in an online learning design unit of a large mid-western university amidst COVID-19. With the influx of a multitude of courses to be transitioned to the online platform, authors describe challenges faced by their unit, coping mechanisms, and lessons learned during this phase. They describe inclusive design thinking and uninterrupted practice in return to robust instructional design models, such as Understanding by Design and Universal Design for Learning. The chapter concludes with examples of tried and tested internal tools and an adaptive workflow catering to a shortened development timeline. These practices and reflections serve as a guiding light as the global world navigates online learning to meet increasing demands of new-age digital accessibility and online course design considerations in higher education beyond COVID-19.

1 Introduction

COVID-19 transformed our everyday paradise into pandemonium (Milton, 2000). Established norms in our day-to-day operations had to be recalibrated to form new protocols. The higher education realm was no different. With the onset of the pandemic, institutions of higher education scrambled to move learning opportunities to the online environment in hopes of offering an uninterrupted experience for learners. Instructors, with or without any online teaching experience, were thrusted with emergency remote teaching (ERT) (UNESCO, 2020). However, ERT courses had a much shorter timeframe for a COVID-19 forced transition, which brought forth various challenges in the quality of design, issues with digital accessibility, course design equity and inclusivity regarding student identities, e.g. culture, race, gender,

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_10

ability, and various socio-economic issues (Jandrić et al., 2020; Beaunoyer et al., 2020).

The new role of online learning post COVID-19 was undeniably inevitable due to flexibility and growth opportunities it presented (Ali, 2020). However, if this modality is to play a more critical role in the years to come, it is paramount to establish a course design infrastructure, based on time-tested evidence-based models and practices, not only to support and enhance student learning but to prove sustainable and accessible. Ultimately, progress in online course design should mean adequately addressing the needs of diverse learners along with adapting to an abbreviated development timeline, if need be.

It is with this perspective that we present this chapter, wherein we showcase the reflections of our team of instructional designers (IDs) of an online learning design unit of a large U.S. Midwestern university during pandemic times. The unit, as it will be referenced moving forward, was entrusted with transitioning over 70 courses to online environment within a span of 10–12 weeks for a fall 2020 offering. This transition would be in addition to the 150 online-by-design courses already planned for the semester. The sudden surge of courses presented the unit with unique challenges related to abbreviated development timeline, optimizing course design workflow, efficient use of resources, and working with novice online instructors.

This chapter offers the context, challenges and a reflection of the lessons learned that proved sustainable and robust to online course design during this transition. It discusses coping mechanisms, recalibrated design processes and workflow guided by established frameworks, i.e., Understanding by Design (UbD) and Universal Design for Learning (UDL). The chapter concludes with a proffer to higher education in the form of a survival toolkit consisting of four tenable artifacts. Course designers, instructors and administrators might benefit from these shared insights, not only during an emergent situation, such as the COVID-19 pandemic, but moving beyond and to new norms.

2 Context

The online learning design unit of this large mid-western university supports online courses for the colleges of engineering and liberal arts and sciences. Historically, the unit provided grants for instructors interested in creating new asynchronous online and blended courses and/or converting from a face-to-face format to online learning. Apart from the monetary incentive, the grant included the support of a skilled Instructional Designer (ID) who collaborated with the instructor on pedagogical, technical, and instructional needs. Such courses are known as ‘online-by-design’ courses.

Course development cycle of 16–18 weeks, for ‘online-by-design’ courses, begins when the instructor collaborates with the assigned ID after receiving the grant. Briefly, the four design phases are: **Planning—**where the front-end analysis

is undertaken along with creating a design blueprint. Guided by the UbD framework and backward-design model, desired outcomes are first identified, then evidences for such outcomes are designed and finally necessary learning experiences are planned (Wiggins & McTighe, 2012). Planning phase is iterative, collaborative and an incremental process between the instructor and designer. **Production—**Learning activities, assessments and interaction strategies are developed along with the course setup in Canvas Learning Management System. **Implementation—**Students are able to access the course and their learning experience begins once the course is published. The course climate relies on communication prompts, feedback and guidance by the instructor. **Continuous Feedback**—Two surveys administered to students, at the start and mid-semester, provide feedback about course navigation and design. Survey responses feed into the continuous evaluation and improvement cycle. Along with the surveys, a semi-structured interview or debrief, is conducted after the first offering of the course to discuss the instructor's experience of designing and teaching the online course.

The year 2020 has been exceptional. The aforementioned typical workflow could not be followed due to an influx of a high volume of additional courses in the queue, waiting to be transitioned online within a short span. The following sections describe the challenges faced by the unit, the adapted workflow and its rationale.

3 Challenges

There were three distinct challenges faced by the unit: (1) an increased workload, (2) a shortened course design timeline and (3) working with novice online instructors. Approximately 70 new online courses were added, in addition to the planned online-by-design courses, totaling 150 multi-section courses for fall 2020. This represented a 20% increase in the volume of courses handled by the unit. The unit was temporarily restructured to cope with the increased workload; based on level of experience, each ID was assigned to particular courses for continuity and consistency. For uninterrupted support, two IDs were assigned per course, one primary and one secondary.

The development time was abbreviated; a typical 16–18-week course design cycle was reduced to 10–12 weeks. Optimizing the design workflow and making efficient use of available resources became integral. In view of the emergent situation and to ensure a learner-centric quality product, the unit inventoried resources and shortlisted four internal tools—a survey, a template and two checklists.

It was equally important for the unit to support novice instructors in this transition endeavor. Each ID met one-on-one with assigned instructors in an effort to understand the needs of both the course and instructor. IDs explained each step of the design process, clarified misconceptions, shared online learning and teaching guidelines and best practices and provided overall guidance.

4 Back to Design Basics

Importance of Design Thinking Design thinking, a strategy woven into the fabric of institutions, embraces the idea of observing user behaviors, including feedback in course creation, and adjusting to user needs. More importantly, design thinking relies on a high level of empathy and care ethics that lead to solutions created out of user experiences (Wiggins & McTighe, 2012).

During the transition effort, some instructors were novices to online learning, and design thinking mindsets were in demand. As a team of IDs, we often pondered on overarching design approaches and strategies both for course design and interactions with instructors. As we prepared to support the influx of courses during COVID-19, our thinking was no different. Design thinking means doing so *with, not for* the instructor and student. The people who make up the unit recognize and acknowledge the importance of partnering with instructors and students in the design of the course. However, during the emergent situation, this partnership also had to be optimized while remaining steadfast in design thinking practices. Doing so entailed:

- Keeping the development phase collaborative and incremental
- Empathizing with instructors' needs, apprehensions, and comfort-level with technology
- Responding promptly to instructor questions and concerns
- Providing immediate support in areas, as needed
- Setting a mutually acceptable channel of communication
- Reviewing prior student-feedback requested from instructors

Because instructors may not always recognize how design thinking is operationalized, it was important for the unit to trust in the instructor-ID partnership to bring design thinking approaches to the forefront.

Incorporating Understanding by Design and Universal Design for Learning Prioritizing Understanding by Design (UbD) and Universal Design for Learning (UDL) and the two non-negotiable factors—course quality and student satisfaction—played a paramount role in optimizing the unit's workflow, design considerations and the efficient use of available resources. Undeniably, efforts were geared towards sustainability versus merely serving the call for ERT. Hence, it was essential to continue to base design thinking practices on established UbD and UDL frameworks.

UbD or Backward Design brings efficiency to the course design process, where desired learning objectives are first determined, followed by assessments or evidences to confirm learning has happened. Finally, course materials and activities necessary to meet the objectives are planned (Wiggins & McTighe, 2012). The UbD framework prioritizes and stresses the intentionality of these course components. Courses based on UbD have a proven positive impact on both student learning and motivation (Hodaeian & Biria, 2015).

IDs helped instructors incorporate UbD into the design process to ensure that course components are well-structured, aligned, and adhere to higher standards of quality and student success. Although, a complete overhaul and redesign of the incoming courses was not feasible given the limited transition timeline, employing UbD entailed:

- Adapting existing course learning objectives
- Revising assessments to align with learning objectives
- Facilitating the creation of new learning activities and materials needed to foster student engagement
- Incorporating prior student feedback to enhance learning assessments, activities, and facilitation and use of the learning platform

Like UbD, the UDL goal-based framework was kept in mind throughout the course design process, and was never an afterthought. Based on three main active learning networks: recognition, strategic, and affective learning (Rose & Meyer, 2002; Meyer et al., 2014), UDL is guided by three principles: Representation which ensures information is inclusive and accessible to all; Action and expression to allow students to demonstrate what they have learned; Engagement which motivates and empowers students by making information relevant to their needs. Prior to UDL, the burden to adapt to course materials was on the student. UDL transfers that burden back to the course, where instructors are expected to be intentional about creating inclusive ways for students to access information and resources, demonstrate their development, and play a lead role in their mastery and success.

IDs modeled these techniques in design collaboration with instructors to communicate the "what," "how," and "why" of implementing UDL for student success. Time constraints pressed IDs to focus on implementing the following essentials of UDL in partnership with instructors:

- Representation: creating inclusive and accessible course materials
  - Utilized built-in style features and functions within word processing tools, i.e., style headings, color contrast, alternate texts and descriptions for images
  - added features for closed captioning to multimedia content
- Action and expression: offered multiple submission options, such as audio, video, and text, e.g., student introduction posts
- Engagement: explicitly outlined course outcomes and expectations, detailing instructions for assessment and deadlines

For designer and instructor, UbD and UDL become best practices and part of the fabric of online course design. For students, UbD and UDL attribute to inclusive design and accessibility to information. Students begin to self-monitor performance and practice in learning, which in turn, can lead to active engagement and increased autonomy.

5 Adapted Course Development during Covid

The goal of providing a high-quality educational engagement to learners continued during the preparation of the courses during COVID-19. The team quickly identified an efficient production phase (Fig. 10.1) to channelize their energies, specifically focusing on four vital aspects during the 10–12 weeks of abbreviated development time: supporting course organization, creating effective online learning materials, identifying and designing engaging interactions, and adapting the assessments. These aspects help make the courses sustainable and have the most impact on student learning success in the following manner:

1. Supporting course organization based on Quality Matters, ease of use and navigation in the Canvas LMS
   - Consistent navigation; modular course structure
   - Consistent home page design with links to course orientation materials
2. Creating effective online learning materials
   - Shorter video lectures of approximately 10-min segments
   - Providing videos with captions/transcripts; Accessible course documents
3. Identifying and promoting methods for student interaction and engagement
   - Regular announcements within Canvas LMS consisting of reminders, course updates, feedback and positive reinforcements
   - Consistent communication guidelines and response times
   - Regular optional/flexible online meeting hours

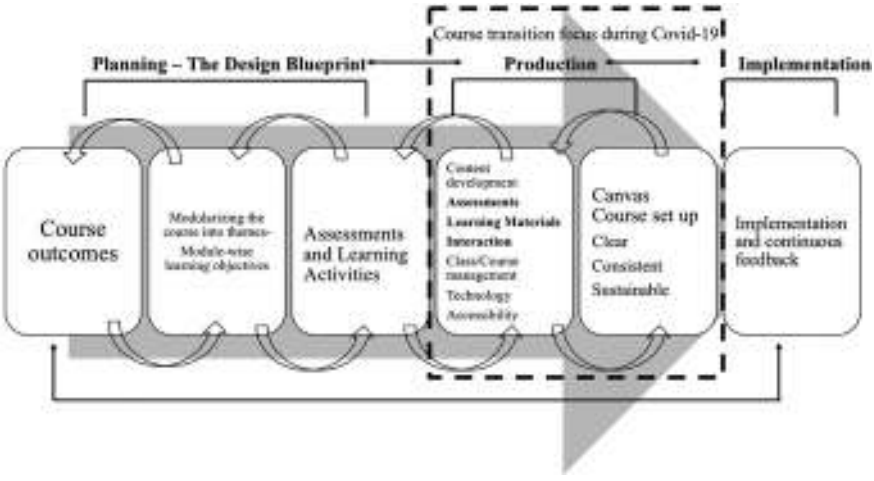

Fig. 10.1 Adapted course development workflow for transitioning of additional courses to the online learning platform

4. Adapting assessments given limited on-campus resources
    - Leveraging of Canvas LMS tools
    - Multiple low-stake formative assessments
    - Communication related to academic dishonesty
    - Grade distribution over multiple assessments

The following assurances helped make the process seamless for novice online instructors:

- Meeting regularly one-on-one with the instructors
- Creating a project timeline and identifying tangible goals
- Providing hands-on training in video production
- Communicating class management strategies
- Adapting the design template to suit the needs of the course
- Educating instructors on online teaching and learning best practices and guidelines

6 Artifacts—Survival Kit

To optimize the workflow as IDs worked with the additional course load, several tools, already available in the unit's arsenal, became artifacts that the unit relied on as part of the online course design process during COVID-19. They include:

1. *Design Support and Services Request Survey*
2. Course Creation Template
3. Digital *Accessibility Quick Guide*
4. *Course Design Checklist*
5. Continuous Feedback — Course Navigation and Design Survey

Due to the abbreviated timeline, the latter of the five tools—continuous feedback from students—was not directly incorporated into the aforementioned COVID-19 transition courses and workflow. However, student feedback, a core component of UDL and integral to continuous course evaluation, remains a critical design practice in our unit. The first four tools, fundamental to the effective and efficient transition, are described below.

For a timely needs-analysis, the first tool in the kit, a Design Support and Services Request Survey, was deployed and linked within an email invite to the initial design meeting. The survey asks about instructors' experiences in online teaching and course design and prompts instructors to include additional information in an open-ended field. An efficient analysis ensured that IDs were better prepared for the initial design meeting.

The Course Creation Template, the second tool optimizing the workflow, is based on Quality Matters principles of online course design and the alignment of learning objectives, assessments, and materials and activities. The template was

designed by the university's central unit in teaching and learning. As an online learning design unit, we were encouraged to adapt, modify and update the original template and its relevant components. For instance, as a unit, we retained the orientation module, which included instructor's contact information, a syllabus and course schedule, course navigation instructions, technology requirements and academic support. Information for COVID-19 support and services was added and language and campus-wide policies in the syllabus were modified. With the tailored Course Creation Template, the unit was to effectively communicate key components of an online course in partnering with instructors. Furthermore, IDs worked with individual instructors to further customize the template to fit student needs. Guidelines and best practices related to lecture recordings, various means and channels of communication with students, and online assessment were shared.

The third and fourth tools, a streamlined Course Design Checklist and Digital Accessibility Quick Guide, were used during the course design process and are based on QM principles and adhere to the WCAG 2.0 (2018) principles. Both checklists were indispensable to the designer-instructor partnership before and during COVID-19.

7 Lessons Learned and Recommendations

Having a holistic view of an emergent situation and re-assessing the parameters effecting the supply-demand cycle to come up with a viable action plan have a much more lasting effect on the end-product. Holding such viewpoints is how the IDs in our online learning design unit persevered.

The unit chose a *back to design basics* method of survival in pandemic times and continues to base design decisions on time-tested and evidence-based UbD and UDL frameworks. This is critical in helping IDs and instructors alike meet overall goals of sustainable, accessible and learner-centric courses. In a period of confusion and uncertainty, IDs assessed the design cycle and promptly identified where in the production phase to direct energy. Doing so resulted in increased instructor buy-in for adapting meaningful and sustainable online course organization, empathy for creating inclusive learning materials, and building upon assessments that foster valuable learner engagement and success. This was evident as the instructors became more receptive to design practices beyond the initial development phase and as the semester progressed.

The design unit relied on its unwavering application of artifacts. These artifacts are part of the unit's survival toolkit, comprised of the two checklists, a course design template and need analysis survey and essential to the designer-instructor partnership. Each tool and ID contributed to and ensured that the unit's limited development time was effectively and efficiently utilized. These tools could be part of any design initiative seeking to create learner-centric engagement and sustainable learning experiences. Understanding instructors' needs, empathizing with their apprehensions and supporting them in all ways possible during this transition or

related endeavor can help alleviate misconceptions about online learning and the role of the instructional designer. The experience described in this chapter fostered open discussion on various aspects of online learning and furthered the goal of an enhanced learning experience for students. The conscious efforts taken by the unit to incorporate and adapt design thinking and empathy at the start of the designer-instructor relationship, are sure to result in building stronger partnerships and, in turn, more robust and learner-centric courses.

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Chapter 11
Open, Flexible, and Serving Others: Meeting Needs during a Pandemic and beyond

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Abstract In the early days of the COVID-19 pandemic when in-person courses were switching to emergency remote learning formats, even students online needed flexibility. This case study describes how a graduate-level online class on open learning and open educational resources (OER) was redesigned to both allow students to apply their course-related knowledge and skills in the service of others and accommodate students whose other life responsibilities had changed. Findings show that these online students experienced great stress during Spring 2020, and many had increased job duties related to the shift to remote learning. These students appreciated the flexible redesign and used it as an opportunity to help integrate OER in their own remote teaching and assist others to do the same. They provided their colleagues and the field at large with educational resources about finding, using, creating, and sharing OER, all while meeting course objectives. Even students who were not employed as educators or instructional designers embraced the opportunity to be helpers and deploy their new knowledge and skills. Student learning outcomes were assessed using reflective portfolios, and course objectives were met whether students followed the original course plan or took advantage of the course redesign.

1 Introduction

At Florida State University, like many other universities around the world, classes swiftly shifted from classrooms to the Internet during Spring 2020 due to the COVID-19 pandemic, and instructors used emergency remote teaching (ERT)

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methods (Hodges et al., 2020) to complete the term. Campus classes moved online, but even classes that were already online were not immune to the effects of the pandemic. Students and instructors alike experienced changes in their lives at this time (e.g., work and family responsibilities), and these changes added stress and new challenges for completing coursework. In this case study, we explore how an asynchronous online course was adapted during the pandemic in a way that capitalized on the course topic and allowed graduate students in instructional design to apply newly learned knowledge and skills in the service of helping other educators and instructional designers adapt to new teaching conditions. Specifically, this feat was accomplished through the creation and sharing of open educational resources (OER) about OER integration in learning and related consulting and assistance for educators seeking to use OER.

Open Educational Resources are learning materials with a copyright license that allows anyone to use them freely according to the 5Rs defined by Wiley (n.d.): retain, reuse, revise, remix, redistribute. Collectively, these 5R activities benefit educators and students alike through the free exchange of resources with the rights to customize them to suit a specific learning need. However, educators experience barriers to OER creation, sharing, and use largely due to lack of knowledge about how to manage copyright and work within institutional policies about curriculum approval and textbook adoption (Ozdemir & Bonk, 2017; Serena & Nathaniel, 2018).

Educators are not the only OER contributors. When students create and share OER, their work is considered a renewable assessment. The renewable assessment, a student-generated artefact that is publicly shared and openly licensed (Wiley & Hilton, 2018), stands in contrast to disposable assessments that are used by teachers for grading and have no further use. Whereas disposable assessments represent substantial student labor that is reviewed relatively briefly by a teacher, when renewable assessments are used an additional audience and lifespan is created (Seraphin et al., 2018). Renewable assessments are not practical for all situations, but when appropriate time is available for students to do the work, students are capable of producing quality resources, and there is a need for the resource students are creating, renewable assessments can be rewarding for students to create and valuable to others.

2 Method

This study uses a case study approach to examine the experiences of instructors and students in an online class at a university in the United States during Spring 2020. Case study is appropriate pragmatic inquiry focused on local instances of a phenomenon (Thomas & Myers, 2015). This graduate-level class focused on open learning and OER and was in its inaugural offering. The class was designed based on an earlier special topics course on Open Learning and MOOCs, with students learning basic concepts during the early weeks, engaging in a collective applied instructional design project during the middle weeks, and then deploying and evaluating their work with an authentic learner audience during the final weeks (see

Dennen & Bong, 2015 for a description of the precursor course). The three research questions that guided this case study are: (1) How was an online course redesigned to accommodate learner needs in response to COVID-19? (2) How did learners respond to the course redesign and use of renewable assessments? (3) What products and outcomes were generated by the students?

This study focuses on an online, graduate-level course in an instructional design program at Florida State University. Told from the perspective of the course instructor and teaching assistant, it reports on the course redesign process and outcomes. There were 26 students enrolled in the course which is required for a graduate certificate in Online Teaching and Learning and an elective for the Master's and Ph.D. Programs. Data sources include course materials, course redesign artifacts, a survey of students conducted at the onset of ERT, the instructor and teaching assistant's teaching notes and correspondence during the redesign process, the instructor's teaching journal, course evaluations, and artifacts documenting learning outcomes. These items were used to reconstruct the design process and describe the learning products and outcomes.

3 Results

3.1 Course Redesign and Learner Needs

The OER Course included a multi-phased project that all students collaborated on. This project required students to create a set of open educational resources for educators and instructional designers on the topic of OER. Through this project, students would be simultaneously applying the course knowledge and skills while building learning materials about the course topic. The end result was collectively decided to be a web site that shared all of the OER. Within the course, the project was broken into phases with activities and deliverables (see Fig. 11.1). Students

Fig. 11.1 Original and revised course project

were nearing the end of the development phase when it became clear that the pandemic would affect the university.

When the university announced that the campus was closing, the instructor created a check-in survey for use with her campus classes (see Dennen et al., 2022 for an example of how the survey was used with a campus class). She then realized that her online students might be affected by the pandemic in ways that could affect course performance even if the course modality was not changing, and surveyed the OER class as well. She was also aware that this moment provided an opportunity for helping others, because instructional design skills and online learning expertise was suddenly in great demand. With that in mind, the survey also polled students to see if they would be interested in alternate paths for assessment in the course, focusing on application in authentic contexts.

Nineteen students completed the survey. Although they all reported stable living situations, 13 students reported that they were experiencing higher stress levels than usual, one to the extent that they felt unable to learn at that moment. Four more students were unsure about their ability to keep learning. Lack of childcare, changed work duties, and stress were common factors mentioned by students. Several students worked as educators or instructional designers, and they reported having to quickly shift their own courses or assist others in that process. Twelve of the 19 who completed the survey specifically detailed work duties that had both increased and changed.

Three options were given for completing the remaining 4 weeks of the course and providing artifacts for assessment. Students were asked to indicate preferred options and could choose more than one. These options were:

1. continue with the existing course syllabus/assignments (9 students)
2. apply relevant knowledge and skills in the workplace (10 students)
3. help others apply OER-related knowledge and skills (9 students)

Regardless of the chosen path, students were expected to document their work in a portfolio with annotations discussing how they met the learning objectives. This portfolio had already been planned as an assessment because students were given choices about how to be involved in the latter phases of the course project and yet everyone was required to provide evidence that they had mastered the course objectives.

The course project was slightly revised as shown in Fig. 11.1. Some students shifted their focus to their workplace before their portion of the class project was fully developed, and others stepped in to help finish them through the quality assurance checks and revisions. We had originally planned a soft launch of our OER materials at a local conference for educators and instructional designers, to include presentations about OER and how they could be created and shared with others or adopted and adapted for local use. That conference was canceled. In its place, we found the opportunity to share our work with an undergraduate class that was transitioning to ERT and coincidentally addressing relevant topics. Essentially, the specific details of the plan changed for the last four weeks of the course, but the activities remained the same. Students who opted to focus on needs at their

workplace or volunteer in other settings were required to engage in similar activities (development, implementation, and evaluation).

3.2 Learner Response to Redesign

Students could have ignored the new options provided to them and completed the original course assignments, but instead they were receptive to the choices offered to them. As anticipated, the students who had authentic opportunities to implement OER at work seized those opportunities. The students who did not have to deviate from the original course plan generally opted to find ways to help others in addition to working on the course project, suggesting that both options were attractive to them. This service orientation was encouraged by the instructional team, who were doing the same.

Student feedback was favourable, with one student stating, "I appreciate the fact that we were able to tweak it so much and make it extremely flexible given the wild circumstances the world is in right now." Another student who was shifting courses to an ERT format commented:

> [The redesign] made it possible for me to be a much-needed resource for my peers. In addition, as I created my own content to share it with my students online, I was able to do it with better awareness of how to share with a wider community. Learning the meaning and potential of "open" made that possible.

No one complained about the redesign, and instead commented on how the flexible course outcomes helped them apply skills and meet goals:

> I really appreciated the modifications to the course to reflect what is going on in the world, when she very easily could have kept everything as is. It allowed me to continue to improve my understanding of the content, while still allowing me to focus much needed energy into other areas. The changes were also great because it allowed me to practically implement some of what I have learned throughout the class.

Other students commented on how the original course design was what they appreciated, starting with traditional content-focused learning and then following up with practical application:

> The way the course begins with more typical coursework (i.e. readings plus discussion) prior to diving into the major renewable assessments is a great way to transition into a project-based class. It gave us a great background in the material before we had to dive into the major work.
>
> I enjoyed the actual practicality of the course in that we collectively designed OER to share with the world. It gave me hands on experience of the entire process.

These comments from course evaluation reaffirm the positive sentiments noted by the instructional team as the course ended.

3.3 Learning Products and Outcomes

As mentioned above, student learning products and outcomes were documented in the final portfolios submitted for assessment. Many students also shared about their work outside of the class project through posts to the class discussion board. Instructor field notes from the end of the class sum up the success of the course at meeting learning objectives and serving others:

> I can't believe how well this has turned out. The class project isn't as polished as I had hoped, but that's okay. Maybe next year's class can continue work on it (a legacy project, that's a nice way to model ongoing improvements and OER). Any worries that students would use the flexibility to evade course requirements were unfounded. On the whole, they've exceeded my expectations, especially when it comes to volunteering to help instructors in need. I can feel the tired, but also the pride. It's much like when the MOOC class ended, but no pandemic. I think next year I could offer options from the start (class project or other) and/or have everyone do a little of both. This idea of more broadly serving our local communities and the field at large is appealing.

3.3.1 The OER Course Project

The OER Course project reflects the work of all course members. Each student contributed to the initial conceptualization of the project during the planning phase and worked in a small group to design OER about OER. The project mission was to "to help instructors and instructional designers LEARN and TEACH OTHERS about how to locate, design, develop, implement, and share OER." Topics covered by the project ranged from conceptual overviews of OER and intellectual property issues to guidance for integrating, sharing, and teaching others about OER. To cover this content, students were given the option of creating new learning materials, but were encouraged to reuse, revise and remix existing OER to the extent possible. Both approaches were used.

Students designed templates to ensure consistency across all materials created by the various teams. The course members developed a collective identity as a design group, the *OER on OER* group, and opted to apply the Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) Creative Commons License to all materials. Additionally, students were mindful to provide their OER in multiple forms to maximize usability. Generally, this meant sharing two or more file formats for each item, a compiled one such as a PDF or video, and editable source files, such as word-processed documents, video scripts, and individual images. By sharing these varied file formats they sought to enable future users of the materials to not only retain and reuse, but also remix, revise, and redistribute these materials.

To implement the project, we offered a soft launch of the "OER on OER" website and materials to an undergraduate class (see Sect. 3.3.2) and shared via workplaces, personal networks, and social media networks. Some of the places students documented sharing the website included Facebook groups for educators, Twitter, Instagram, Reddit, and Line. One student created a social media banner for posting

online, and the students also created a LinkedIn group to serve as a legacy for future OER classes.

Although the initial plan had the class systematically tracking how the OER were being accessed by others (e.g., via social media and website analytics), we shifted away from that in light of the changed course plan. Instead, more effort was placed on meeting needs related to OER wherever they arose. Still, all students were responsible for tracking the individual impact or path of whatever they personally had shared in order to fulfill the course learning objective, and overall website user data was shared with the whole class during the final week. Finally, the instructor and TA presented a webinar on OER and open learning, highlighting how the *OER on OER* website is an example of open pedagogy and renewable assessment (i.e., an item with utility beyond assessment in a single class).

3.3.2 Assisting an Undergraduate Course

An undergraduate educational technology course was covering two related topics, OER and online intellectual property, during the shift to ERT. The *OER on OER* team offered to assist, using the opportunity to serve others and receive formative feedback. Two OER class students developed and presented lessons about OER and intellectual property via Zoom, and another created two videos tailored for the class.

Within the undergraduate class, some of the opportunities to complete extension-oriented assignments evaporated, and thus the undergraduate students were offered the option to freely explore and evaluate the *OER on OER* website to fulfill that course requirement. Seventeen of the approximately 70 undergraduates enrolled in the course chose this option. Their feedback showed that they were engaged in the learning materials and felt motivated to use OER in their future classrooms.

Although intended as a temporary solution, the *OER on OER* resources providing an overview of OER and intellectual property have become a continuing resource used by this undergraduate class, along with the story of their creation which serves as a model of OER use. Additionally, this experience resulted in the creation of a new extension-oriented assignment option for the undergraduate students, in which they could create, revise, or remix and then (re)distribute OER targeted at inservice teachers on a topic related to emerging technologies (a topic taught in their class).

3.3.3 Applying OER in Other Settings

The students found multiple opportunities to apply OER concepts at work and across their educational communities. Current teachers tended to focus on meeting the needs of their own classes. Beyond that, three main approaches were used to help others during the early pandemic response, each of which showcased student knowledge and skills related to OER:

(a) Locate and revise OER to replace prior classroom-based materials.
(b) Convert existing materials into OER with a Creative Commons license to help others.
(c) Create tutorials to help others develop remote teaching skills and share them as OER.

4 Discussion and Conclusion

The OER Course resulted in not only student attainment of learning objectives, but also a collection of services and products offered to the larger education community. Had it not been for the pandemic and the decision to offer students a flexible way to demonstrate their newfound knowledge and skills, a singular product would have been produced and disseminated, mostly as a proof of concept with the hopes that others might find it useful. Applying Seraphin et al.'s (2018) time-space-gravity model, this course pushed students to not only have a meaningful learning experience (gravity), but also ensured that the student-generated OER transcended the course boundaries of time and space. As part of a flexible response to the pandemic, these two dimensions were meaningful to students and enhanced their sense of gravity. Although much of the learning interactions and products were generated and used beyond these boundaries, portfolios provided a useful means of assessing this dispersed work. Portfolios were also useful for assessing individual contributions to group design work, and pushed students to reflect on and articulate how they met the learning objectives.

The OER class students had a positive experience working in the OER context. Like the students in Baran and AlZoubi (2020), they exerted great agency in the process of creating and sharing OER, and took pride in sharing what they had learned and created with colleagues and in online spaces. This finding is aligned with findings from other studies where renewable assessments were used (Zhang et al., 2020). As is the case when renewable assessments are used, their work benefit people beyond themselves and their class. In this sense, the OER class provides an example of how a pipeline of OER creation and support can be set up, with advanced students in an area fulfilling their learning objectives while simultaneously helping educators of students at other levels identify, adapt, and use relevant OER with their own classes. This pipeline was useful during the pandemic and on a small scale addressed the needs of educators within the reach of this class.

During the early pandemic months, many educators became aware of how inflexible their existing learning materials were. Huang et al. (2020) called for the field to go beyond the creation of OER and consider open pedagogy, specifically teacher ability to use OER effectively in their course. Although we did not focus specifically on teacher reactions to OER, we found that OER were attractive to teachers during the period of ERT when they had to swiftly find alternate learning materials in digital format that could be shared with their students without violating copyright. However, echoing the findings of others (Ozdemir & Bonk, 2017; Serena &

Nathaniel, 2018), we noted that teachers need help to understand and navigate this process.

This case study demonstrates how advanced students are capable creators of OER, which can serve as a form of renewable assessment. As a secondary finding, this study found that OER is a helpful tool that can empower teachers in their search for relevant and customizable digital learning materials. This study has implications for service learning, demonstrating some of the options for connecting student-creators and student users as suggested by Stone et al. (2020). Teachers' acute need for OER as prompted by the early portion of the pandemic should not be viewed as an isolated moment, nor should this class's response be viewed as a temporary solution. Instead, this case shows the power of connecting learners and professionals in flexible, open environments where learning outcomes can provide meaningful service to individuals beyond the boundaries of the classroom.

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Chapter 12
Intersectionality and Compromise: Enacting Government Policies in the Caribbean

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Abstract The Caribbean as a region managed the education delivery response to COVID-19 through policy that emphasised a holistic government approach. Though each State maintains its sovereign right, throughout the various phases of the COVID-19 pandemic, locally governed Ministries of Education (Carrington, 1993) created guidance for what and how education was to continue in this region. This approach produced unique ways of continuing primary and secondary school education in the region. It also inevitably had unintended outcomes that many other regions experienced but few could quantify and qualify as to its impact on education as we knew it. Some of the unintended outcomes included how ministerial mandates were translated into actionable activities by teachers, parents and students given the challenges to financial, technological, and teaching resources. This chapter uses the pandemic as the landscape within which the stories of a variety of stakeholders (i.e., teachers, principals, parents) from the pre-tertiary sectors, in select countries outline points of intersectionality and compromise. This thus illustrates how solutions were formalised and actioned, as well as drawing on similarities and differences to extrapolate into a regional and international view.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_12

1 Introduction

In March 2020 the world was brought to a relative halt as borders closed, with limited international travel and the implementation of physical distancing. These measures impacted the education sector with educational imperatives being moved from the school to the home and where teachers developed new forms of juggling abilities to ensure the continuation of education at home; both for their own children, where need be and the students. Technology became the bridge that connected us while *physically-distancing* and the predominant means for communicating the impact of COVID-19 both internationally and regionally. Like hand sanitisers, technology, its software and hardware became precious and limited resources. The lack of access deepened the divide between those who have traditionally been able to fully participate in education and those who tended to operate on the periphery of participation.

Ministries of Education in the Caribbean made public the inter-sectoral government approach to managing COVID-19 disruptions. Taking close lead from Health Ministries and seeking the support of Ministries with responsibility for social welfare to help manage the care and wellbeing of students, managing collaborative efforts to refocus on physiological (e.g., meals) and safety needs were important (Denton et al., 2002; Maslow, 1943). If meals were a challenge, computers, tablets, mobile devices, wi-fi and associated utilities while critical, for these families would not have been thought to be essential.

On the other hand, for the students who did have access to the technology and were able to participate in online instruction, they experienced other challenges such as sharing devices with their parents or siblings, creating scheduling conflicts for all. Teachers who were anxious about using online technologies to deliver face to face pedagogy were in need of structured professional development and, teachers who were parents battling with the need to have their own children access [the family] devices were faced with a confronting conundrum. The COVID-19 pandemic was an experience of dilemmas and compromises where there was no perfect response, just a compromise of actions and resources that were limited.

Given the varying views of stakeholders and the ways in which their own realities governed their ability to act and conceive of alternative possibilities, oftentimes the determinations of decision makers found no easy fit in the context of the homes for children and teachers. Governmental policies and directives were difficult to implement as conceived. Teachers and leaders had to find ways to bridge the divide between policy and practice, requiring extensions and even the blurring of the personal and professional selves. Educational continuity during a public health crisis where teachers, students and their families were equally at risk was a problem of match, fit and suitability. This chapter outlines five lived-experiences as cases where attempts were made to enact government policies and directives as designed. The cases provide different lens, approaches, and rationales for implementing solutions which when shared can influence the impact of what is intended and what actually

occurs during decision-making. Each contributor answered/considered the following questions in their narratives:

1. What directives regarding education were provided from your Government?
2. How did these directives influence your teaching activities and how you home-schooled your children?
3. What other decisions did you have to make (re: your life, family, etc.) to support educational activities?

2 Pandemic Pedagogy: The Caribbean as a Region

The Caribbean is made up of more than 700 islands, with 13 countries and 15 dependent territories speaking six languages. This makeup within the region is a reflection of its history with further influences as to how each society established their own governance and independence. The education system reflects the changes in governance and worldly norms all associated in some part to decolonisation of the region (Carrington, 1978). The education sector is divided into pre-primary, primary, secondary, technical, and vocational (tech-voc), teacher training and tertiary. The sector is mostly publicly-run meaning that governments are largely charged with providing education to each of their constituents through Ministries of Education or similarly-structured departments. The Minister of Education, along with advisors provide all of the decision-making for how schools are resourced, are financed and what curriculum is provided. Schools are managed by a Principal with the job of ensuring that all directives sent from the government are implemented. The challenge of how to implement any decisions provided from the Ministry provides an impetus for open discourse on interpretations, rationalising belief systems and in itself, reflecting and hypothesing on situational implementations given the current phenomenon being experienced by all (Sawyer & Norris, 2009).

3 Experiences during the Pandemic

3.1 Methods

The following narratives used a duo-autoethnographic approach which systematically analyses lived experiences along with anecdotal evidence as a way to connect an autobiographical story to wider, cultural, political, and social meanings and understanding occurring around one centralised problem. To this end, the authors self-reflected on their own experiences of differences through the recreation of in situ perceptual meaning of implementing educational solutions during the COVID-19 pandemic in the region (Sawyer & Norris, 2015). The duo-autoethnography method allows researchers to use dialogue to develop a higher

form of consciousness leading to solutions, a call to action and recommendations for the future. These narratives, weaved together, create one story focused on ***the why***, all discuss the use of technology as a way to achieve the directed solutions; yet each story demonstrates the complexity of each context and the ability or inability to achieve the intended learning experience. The story is supported by newspaper articles and perspectives of consultants external to the educational system who are from the native region. This form of triangulation seeks to bring new meaning to the intentions and the interpretations of what was implemented and experienced. Thus, using the duo-autoethnographic method allows for a disruption of the implicit meta-narrative and provides readers with an experience witnessed by multiple perspectives (Norris et al., 2012).

The story of teaching during the pandemic in the Caribbean is presented through the eyes of educators who tell their stories from different perspectives, where the personal and the professional meet. We [the authors] experienced this phenomenon through the eyes of a special education classroom teacher (St. Maarten), a tertiary-level lecturer who is a parent (Trinidad and Tobago), a policy maker who is an older sister (Guyana) and two educators who are native to the Caribbean mentoring teachers in the region (the Bahamas and Australia). Critically we highlight the intersection between the personal and the professional through a brief description of the context, this highlights the positionality of the authors and adds texture to the narrative.

3.2 Educator Bios

Special Education Classroom Teacher Lorraine was born in Trinidad and Tobago and works as a Special Education Teacher, in St. Maarten. This island has over 60 different nationalities. Some young students are locally born but their parents do not speak the language of instruction used in the schools their children attend. There are a number of systems used to educate the masses for example the Dutch system, the English System, the Montessori System, and on the French Side the French system of schooling.

Lecturer and Parent Talia is a national of St. Lucia, living and working in Trinidad and Tobago as a tertiary level educator. Her experience with the early childhood and primary school education system in Trinidad and Tobago is through her children where she gained a deeper understanding of the politics of school placement, the importance of racial and ethnic ties, school type, social networks, and the relative roles of state versus church in relation to that process.

A Bahamian Educator Mentoring Teachers Dauran was born in the Bahamas and resides in Nassau where he received his formal education. He taught at a private high school and currently lectures at a technical vocational institution. Given these roles, he has been responsible for the delivery of instruction and assessment.

Through his mentorships, he encourages a strong commitment to improving delivery of education, equity in education, technology integration and fostering global citizenship.

Education Policy Maker and Older Sister Laurette, is a citizen of Trinidad and Tobago, who works for a regional inter- governmental organisation. Her duty station is in Guyana which is the only English-speaking country in South America. Her work largely involves the creation of regional public goods that enable the coordination of regional policy agreements and the harmonisation of systems and practices at the national level. She is still connected to the classroom given her many years of service as a primary school teacher and then as a teacher educator. That connection is strengthened given that she has two siblings who are classroom teachers at the Primary and Secondary level. Their day-to-day experiences are often points of reflection and engagement for her.

Regional Native Who Is an Australian Educator Mentoring Teachers Camille is a native of Trinidad and Tobago where she attended the regional university to complete her Bachelor's and then moved to the US to complete her Master's and PhD. After completing her PhD, she moved to Australia. Still very stubborn to relinquish her ties with the region, she still teaches at the regional university as an adjunct faculty member and uses her expertise to help the regions educational systems improve.

3.3 What Happened…

Different parts of the Caribbean responded differently as the news of the pandemic approached. The following case is based chronologically on the experiences of each of the authors.

March 2020 was the yearly Heineken Regatta in St. Maarten. It was not well-attended due to everyone instilling caution with the unknown. Lorraine, recalls her experience:

> We were ordered into total lock down without much time to prepare. Curfews were introduced and it was then that many of us as teachers came to these two realizations; many parents were essential workers. Internet access was almost nonexistent. Most parents in the household had internet access on their phones ONLY. That, combined with the fact that the parent/s are essential workers in a shift system, did not help matters when their child had to be schooled at specific hours online. Online education began abruptly as the lockdown continued in St. Maarten.

By May 2020, Laurette was concerned for her siblings, knowing that the combination of being a teacher and parent will soon mean one will have to win over the other. She noted through her own day-to-day activities as she caught up with her siblings.

> ...I spent hours engaging with my siblings around the ways in which the insecurities created by the pandemic and its interaction with policy imperatives were increasing anxieties while creating opportunities for innovation, forcing them to think differently about how they connected with their students while maintaining the progress for their own children. I saw the workday for my siblings radically extended. I witnessed my siblings advocating and fundraising, begging for donations in order to provide devices and food for their students in need. Their concerns became my worries, as I fretted over that child or family that they were worried about and seeking to support. I spent hours problem solving with my sister on the phone around the ways to tackle a particular lesson in an online environment. The experiences were increasingly stressful as I know my siblings were also managing increased surveillance from parents and educational authorities who needed to assure themselves that teachers were teaching

Talia had a first-hand knowledge of what Laurette's siblings were experiencing. In October 2020, she shared similar experiences:

> This was particularly a problem because I have children at different stages within the school system and with diverse challenges. Thus, my six-year-old twins continue to struggle with class in the virtual space. This was challenging for them given that they moved from a preschool with much of their time spent with play and learning, to an online environment that attempted to go structured. They both resisted and did not want to be part of that space. The hardest part for the children was the constant flow of work throughout the day. They were doing at least 5-6 assignments a day and, in some days, more. This is being done with both parents working and without an understanding that the parents are not in a position to fully assist or support those children while they are engaged in online learning. There was no feedback on the completion of the assignments or on the work completed. My eldest is at the Caribbean Advanced Proficiency Examination (CAPE) level, with classes for an entire day online, with notes for the entire period, and with classes beyond the school time

Going back to May 2020, this picture varied across different parts of the Caribbean as in St. Maarten Lorraine's job was compounded by the realization that the Department of Education was also struggling.

> It took a while for our school and the Department of Education to realize how dire the situation was as online instruction began. While most parents and students were able to operate a phone, many had no inkling of how to use an email address, or a password. Therefore, to introduce Google Classroom and Zoom Meetings especially in English to the parents was an uphill continuous battle. This was compounded with the essential worker taking the only access to the internet with them when they went to work during the school hours, often returning home late into the night. Only then were students able to access work done that day at school. The internet system on the island was in no way prepared for the barrage of online signals needed by all the schools at the same time each day, in addition to the volume of employees who were now working from home.

As teachers sought to provide solutions for those in need, it took a while for them to realise that they too also struggled to make everything work. Lorraine struggled to help parents enable their student's access and success while having her own challenges with a reliable access to Wi-Fi telecommunications access to share with others and help her students succeed:

> I was in a similar situation as the parents as I only had data on my phone. Two of my neighbours thoughtfully offered me their passwords to access their internet which I gratefully accepted.... This online teaching was an utter nightmare for me. I decided to work from school most days as the internet quality at home was poor. The change of location was not

> much help at all. The signal was intermittent. Add to that taking all the time from the lesson to just explain to the parent or the older sibling or the child itself how to log on was extremely frustrating for me. There were days when I was close to tears.
>
> I also worked late into the night after 9 p.m. sometimes as that was when the parent returned from work with the device that was needed to conduct the lesson. I ended up taking my tablets with me when I went by the neighbour and just kept them on constantly when at home. Self-imposed on call was the order of the day! I even conducted a lesson with one of my students on the top of a washing machine as the strongest signal from the neighbour's house for the student to do the lesson was there.

And Talia, even as a tertiary educator herself reflected on that time where she felt overwhelmed, due to the chaotic nature of blending home and work-life during 2020

> For peace of mind, I ignored certain expectations. I made selective decisions on what I responded to that were within reasonable expectations of the children during this time. I changed my work schedule to provide some time to assist/support them during this time. I also made a decision, not to remain silent and to speak out on some of the injustices within the school system. Even when I did this, I noted that there was no acknowledgement of the difficulties for parents and families and again a reversion to the business-as-usual mode. This reinforces my fundamental decision to choose what my children must respond to at this very trying time.

As the realisation of the pandemic settled various governments began to make plans. In the Bahamas, the directives given and communicated through the media from a governmental perspective was that education must continue by all means. This meant a number of different initiatives such as establishing a virtual school, the creation of instructional resource kits and producing specific review packages for national examination candidates (The Bahamas Ministry of Education, 2020). The governmental directives for educational continuity in Trinidad and Tobago revolved around:

1. keeping students and teachers safe, thus significant investments were made to improve WASH facilities in schools, including air marking specific drop off, pick up and sick bay areas,
2. providing the resources (tablets, computers, wi-fi access) where feasible and affordable to teachers and students, including igniting the private sector to support,
3. accelerating teacher training to support emergency remote teaching (ERT), noting that ERT was not only about online technology and connectivity but also about finding ways to keep learning going, with the support of parents, through the use of packages for students who even if their got a device could not use it because of a lack of wi-fi or electricity and,
4. maintaining social protection through the provision of food cards, hamper drives and psycho-social support.

What is key is that critical attempts were made to promote interoperability as a part of the education response in order to address the deep inequity of access and participation in education that was exposed and heightened through the pandemic. According to the Bahamas Union of Teacher president, Belinda Wilson states, "A large number of teachers used Zoom, Edmodo and Google Classroom platforms

that they subscribed personally" (Ward, 2021). A key source of information also became the Ministry of Education (MOE) website, with supplemental material for the National Examination candidates (Lloyd, 2020). The government's intention to provide instructional packages, devices and internet connectivity all fell to no avail. The challenges were quite similar to the other countries where there was a lack of reliable infrastructure (internet and electricity) to sustain the connections that were needed for remote teaching, the constraints of the state to respond to these infrastructural demands/requirements, and the collective impact of these on the delivery of education during that time.

During the main pandemic period of 2020, some schools reached out for help for their teaching staff as everyone was seeing and feeling the despair of the teachers as they were front and centre of the delivery:

> I (Camille) was asked by a Principal in Trinidad and Tobago to assist her teaching staff where the interpretation of the Ministry of education's directives were that the teachers were expected to swap their 8 hours of teaching in a face-to-face environment to 8 hours of teaching using Zoom. They were asked to take attendance twice a day and basically teach as if they were in a face-to-face classroom. As a result, many teachers bought whiteboards and installed them in their houses, thus making make-shift teacher podiums which would be projected via synchronous technology (Zoom). What I saw was teacher's going above and beyond to action mandates which they themselves did not quite understand. This resulted in lots of personal costs and sacrifices used and an increase in mental health issues (i.e., insomnia, Zoom fatigue, various levels of stress, etc.). My assistance seemed to focus on kind words instead of the technology-based solutions that were needed. There was also this belief that the developed countries were doing better so seeking their expertise would remarkably provide a relief of solutions. What they didn't realized is everyone was just coping the same everywhere.

The countries involved in these cases shared similar context in response to how education should be directed and implemented in light of COVID-19. During the pandemic the Caribbean region like the world at large had to divert its learning to a virtual modality. In many cases teachers, students and parents were challenged with learning various forms of technology and online resources to facilitate learning and shouldering the financial, physical and mental costs attached to doing so (Parsanlal, 2020). In addition, teachers were also tasked with utilizing existing resources, rethinking inclusive practices and creating instructional resources for assessment and learning without sufficient instructional and technological infrastructure (Dunkley-Malcolm, 2020; Kalloo et al., 2020). According to UNESCO (2020), "School closures have left seven million learners and over 90,000 teachers across 23 countries and territories in the Caribbean sub-region grappling with a new reality of distance-learning". This case provides an example of this finding with self-reflective evidence of how decisions were enacted at varying levels of society.

4 Recommendations and Lessons Learned

For much of the early period of this pandemic, educators and policy makers grappled with the uncertainty of the pandemic, but also with the need to make clear decisions to guide the process of educating and training within the collective school system. To a large extent, the process of planning and adapting was influenced by the lack of data both on the pandemic, on the vulnerable groups within the general student population, and on the readiness of the school population to adapt to teaching and learning within a remote environment.

While some of the key considerations to continue teaching and learning functions remain justified, mounting questions unfold in relation to the strategies, procedures, and outcomes of this process. The chapter provided some initial insights into some of the contentions, struggles, and gaps within the experiences of teaching remotely during this pandemic. Some key lessons learnt within the discussion of these experiences revolved around the need for sustained systems of support for vulnerable groups, to work with teachers, students, parents and school administrators in the drafting and implementations of strategy to adjust during this time, and, to increase the compassionate responses that allow for continuity with flexibility. This is particularly the case for pedagogical approaches and assessments utilised during this pandemic.

Given these concerns, our recommendations are for:

1. More robust and continuous data collection processes that feed into the development of protective mechanisms/interventions strategies, which are aimed to address existing and new educational inequalities/gaps.
2. Ongoing dialogue with critical stakeholders in the education system, (including but not restricted to teachers, students, parents, and administrators) to address some of the challenges of teaching and learning during difficult times and to adopt more flexible methods as a continuous measure of improvement regardless of dire straits.
3. A review and actioned approach to the physical, system and institutional infrastructure that supports the intention and expected educational outcomes

These concerns are not unique to the Caribbean and are particularly important for assessments of the efficiency of public design, implementation, outcome and most importantly sustainability of the region.

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Chapter 13
A Family of K-12 Educators' Innovative Responses to Overcome COVID-19 Challenges: Researchers' Reflexivity Accounts

Hui-Chen Kung Durley and Xun Ge

Abstract The COVID-19 pandemic has brought unprecedented challenges as well as opportunities in different aspects of life and various settings, including K-12 public schools. This chapter presents the first author's reflexive accounts of her family's innovative responses and transformative experience to overcome the challenges as an educator and researcher, as well as her scholarly discussions with the second author regarding critical incidents she had identified. As researchers, we report our reflexivity process based on theoretical grounding, examine critical events, analyze themes and trends that emerged during the pandemic, co-construct meanings, and develop our positions. As a result, three themes emerged from our reflections: Shared physical and virtual spaces: family, school, and work all in one; learning and growing together in the shared space; and innovation to combat disparities between urban and suburban school districts. Our research reflexivity provides insightful implications to inform educational practice and improve the current educational systems. It also generates some theories to enrich current literature while revealing some directions for future research.

1 Introduction

Witnessing the changes taking place in education amid the COVID-19 pandemic has inspired us to pursue this research. The void caused by sudden school closure in the last two months of the 2019–20 school year prompted emergency responses involving new policies and guidelines, curriculum adaptation, alternative

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_13

instructional delivery modes, and a substantial investment in technological infrastructure and student devices for remote learning. The opportunity to live through these real-life events has allowed us to undertake reflexive examination into the experiences of our personal, family, and professional lives. Our observations, experiences, perceptions, and reflections as both educators and researchers served as a critical lens to examine the adaptive situations and develop a holistic understanding of emergency education in K-12 settings. Such reflexive experiences have led us to identify gaps in educational practice and research and propose creative solutions to new issues and problems. They also help us to examine our own thoughts, feelings, values, and identity that have an impact on our personal, family, and professional lives. Thus, we set our quest to explore the questions: What had transpired in our lives as a result of pandemic responses in education? What implications do we learn from our adaptation to the new change and new routine? What possibilities and promises are held out for us in the future of education?

2 Contextual Background

The lived experiences of Dr. Durley's family during the pandemic were the central unit for this reflexivity activity. She and her husband were K-12 educators in an urban district, and their biracial children (the third grade and the 12th grade) were students in suburban schools. Thus, their family's experience provided a unique study context for us to understand adaptive education and its impact on individuals at personal, family, and professional levels. Both districts (urban and suburban) issued personal computing devices to students and distributed workbooks to their homes, which enabled them to receive remote and online instruction. All teachers were expected to develop online courses, create learning activities, and post assignments through Canvas - a learning management system. Teachers met with students remotely four days a week, with one day designated for student self-paced, independent, virtual learning. The suburban district, however, implemented a two-day in-person and three-day virtual learning weekly schedule. Thus, the parents and their children had an overlap of three days a week schooling and working at home for the most of the fall semester in 2020.

Dr. Ge was a university professor of Learning Sciences. She had a personal and professional relationship with Dr. Durley. They collaborated on several research projects and published a few co-authored articles. They often engaged in intellectual dialogues on many issues regarding educational practice and research. Her role in this reflexivity was an outsider taking an *etic* position and a researcher who brought a unique perspective and insight to Dr. Durley's reflexivity.

3 Systematic Approach

The home-bound, social distancing had, in fact, afforded researchers an opportunity for soul-searching and reflexivity activities. To guide our inquiries centering the emerging phenomena during the pandemic, we chose to move away from the positivist research paradigm and adapt reflexivity as a research method (Attia & Edge, 2017; Fook, 1999). Reflexivity is more than a reflection. It involves the examination and reflection of researchers' beliefs, values, judgements, and practices during the research process. It is a process that challenges and questions researchers' own implicit assumptions (Bolton & Delderfield, 2018). Research reflexivity is a critical approach to professional practice that questions how knowledge is generated and how relations of power influence the process of knowledge generation (Lay & McGuire, 2010). Reflexivity is a position while reflectivity is a general process, and our position of reflexivity is complemented by a process of reflectivity (Fook, 1999).

In this research, we, as researchers, were the central participants. We were aware of the subjectivity and experiences that influence our interpretations, analyses and perspectives (Bolton & Delderfield, 2018; Fook, 1999). We intentionally engaged in the critical processes that were brought to bear upon what might have been a routine or typical event (Bolton & Delderfield, 2018). As reflexive researchers, we deliberately examined critical incidents, social and cultural contexts, participants, and our relationship with others that had a significant impact on our everyday life during the pandemic. We deliberately reflected on the dynamics of the interactions between all the incidents, situations, contexts, and factors.

Writing and developing this chapter was a reflexive process. We approached it in two ways: (a) observations and reflections, and (b) dialogues with each other and interactions with other professionals (Attia & Edge, 2017). Each of us engaged in a process of introspection and self-reflexivity, while at the same time in dialogues with one another. In addition, we also had conversations with our family members, professional colleagues, and community members. In doing so, we attempted to establish a reflexive practice that was not only informative but also critical and transformative. Through our own introspections and ongoing dialogues, we looked beyond problems, issues, and challenges in search for meanings to drive us to move forward. Table 13.1 shows the structure of our reflexivity activities including different types of dialogues and examples.

4 Meanings Generated from our Reflexivity

In this section, our reflexive accounts are shared, centering the lived experiences of Dr. Durley's family in our quest for understanding the challenges, opportunities, and possibilities afforded by the pandemic. These accounts are organized by presenting Dr. Durley's introspection first, followed by Dr. Ge's comments and sharing. Reflection of critical incidents are presented, critiqued, and discussed, followed by

Table 13.1 Different types of dialogues in critical reflexivity and examples

Dialogues	Subject(s)	Examples
Intrapersonal dialogues	Within oneself	Dr. Durley considered involving her son in small group intervention to tend to his learning needs while acknowledging the benefits of working and learning from home. Dr. Ge reflected both the benefits and downside of the benefit of working from home - the shared physical and virtual spaces for personal and professional life.
Interpersonal dialogues	Between the two authors	Dr. Durley described her experiences with the shared spaces that made family life, schooling, and work all in one, which inspired Dr. Ge to reflect upon her own experience and talk about her shared physical and virtual spaces for personal and professional life.
Social conversations	Professional community	Dr. Durley shared conversations and insights with her colleagues at school, while Dr. Ge gained insight through her interactions with her graduate students who were K12 educators.

dialogues and insights between the researchers. Three major themes emerged in our reflexive process: (1) shared physical and virtual spaces, (2) learning and growing together in shared spaces, and (3) disparities between urban and suburban schools.

4.1 Shared Physical and Virtual Spaces: Family, School, and Work all in One

Dr. Durley This pandemic had really brought us closer as a family. I could hear my husband teaching his fifth-grade class in our bedroom. I could homeschool my son the same time I taught my third-grade small group intervention. My daughter, a senior in high school, had been working quietly in her room but once in a while she complained about how loud we were when we taught and how noisy her brother was playing in the living room. Our home turned into a schoolhouse, bedrooms served as classrooms. The only difference was that our students were at their own homes, and their homes, and sometimes, they were as noisy and loud because there were several classes in session at the same time.

In our home school house, we were able to engage all individuals of our family and our students and their families in a highly technology-mediated educational journey. We learned to depend on one another to make school happen. I realized that when home transcended into school, and families became learning communities, my professional and personal lives were integrated seamlessly, allowing all of us to gain a more holistic perspective in approaching teaching, learning, and even living and developing wholeness within our own individual personhood as well as a sense of togetherness as communities of learners. This experience influenced my thinking about the importance of family and community development and engagement in

educational processes as an integral part of student growth for my kids and professional development for myself as an educator.

Dr. Ge The pandemic has led us to discover interesting phenomena that we had never thought of or experienced before. The experience shared by Dr. Durley, about one home space turned into multiple virtual spaces simultaneously, had also been experienced by many. Being an empty-nested parent, my experience with shared spaces was more confined to my personal life and my professional life. My home office space overlapped with my virtual office space and with my virtual classroom. My institution provided every faculty member with a Zoom account, which enabled me to conduct synchronous conferences from home, where I taught classes, interacted with students, and held office hours. The videoconferencing tool also allowed me to invite guest speakers from any corner of the world to join my class and share their research virtually. For example, I invited Dr. Durley to join my virtual class to share her technology integration projects with my graduate students. Through videos Dr. Durley showcased her third-grade students working on robotic and augmented reality projects. It was as if my students were taking a virtual tour visiting Dr. Durley's classroom. This virtual tour experience was an eye opener to my graduate students, who gained a better understanding on how technology was integrated to support student learning in an urban school. In addition, the virtual conferencing tool also enabled me to attend professional conferences during the pandemic, and I was able to present my research and interact with other professionals while sitting in the comfort of my home office.

However, with the overlapping of physical and virtual spaces, we also experienced some inevitable challenges, such as background noises from other family members or pets sharing the same physical space as we try to focus on our work in each of our own virtual space. Some of my students, who were school teachers, complained that the fuzzy boundaries between their work and school had made it difficult for them to manage and allocate their time for timely completion and submission of their assignments.

4.2 Learning and Growing Together in Shared Spaces

Dr. Durley The shared physical and virtual spaces of family, work and school have worked well to facilitate shared learning and professional development. Teaching and schooling at home compel us to become more resourceful and creative as a family. My husband turned to our 11th grade daughter for help so he could have a Bitmoji[1] classroom designed on his Canvas homepage for his fifth graders. She went on to YouTube, learned the process, and designed the class homepage for her daddy.

[1] A virtual classroom where teachers cartoonlike their photos to deliver fun and engaging learning content

She felt a sense of accomplishment and pride, so she came and offered help to create one for my class. I also involved my son in my third grade reading intervention group of English Learners. I tried to incorporate new technology devices (e.g., Lego sets, drones, and Merge Cubes[2]) that I bought with my grant money into my reading lessons to create a novel, virtual learning experience for my students. My son became my aid in operating the devices and testing the simulated learning environment I had designed. He also learned to construct a Lego robot and develop block coding using the Lego set I brought home. I was surprised with his spatial awareness and understanding when he successfully built a robot cat by following the instructions on the iPad.

Dr. Ge Wow, your stories are so amazing! You have all learned so much from each other in your shared family space. Your children are social-media resourceful, tech savvy, and they are able to figure out problems to help their parents. Learning has become both meaningful and fun for your children. Such informal learning is motivating, goal-driven, and even self-directed, which is critical for the development of metacognition and problem solving. At the same time, the teacher parents also develop their skills with the use of technology to integrate into their teaching.

Dr. Durley The pandemic has provided affordances for metacognitive skill development that was rarely the central focus of school curriculum. When schools reopened in late March, 2021, I was impressed with my students utilizing their Chromebooks to explore new interests, for example, learning to use a cloud-based voice editor and collaborate with their classmates to create new music or put paper over the screen to trace images of favorite cartoon characters. Technology enabling free exploration allowed students to chart into new territories of their own liking and develop new knowledge or skills based on personal interest. However, not all explorations led to worthwhile pursuits for learning and development, and some of these discoveries could be easily addictive, requiring us educators and parents to provide guidance and support to utilize technology with wisdom and self-control.

Dr. Ge The adapted responses to life, work and school during the pandemic led to the creation of new routines, structures and orders. Our new multi-purposed and multi-faceted home environment served as a comfortable and safe space to engage in self-directed learning, just as Dr. Durley's two kids did. That said, scaffolding is still needed to help those students develop self-directed learning skills. There are various technology tools, apps, and devices (smart phones and watches) available to help students develop plans, monitor time, manage school work, and regulate their learning processes.

[2] An app-enabled cube that enables the user to hold digital 3D objects, which provides an innovative way to learn and interact with the digital world.

4.3 Disparities Between Urban and Suburban Districts

Dr. Durley I thought that putting devices in the hands of our students might have given them a chance to level the playing field and bridge the digital divide gap between them and their suburban counterparts. However, my experience of remote teaching at the beginning of the school year indicated that disparities continued to exist between our urban schools and my children's suburban school district. My school district was a Community Eligibility Provision district that serves non-pricing meals to low income areas, so almost one half of the student population had a bilingual family background. In my school, over 60% of students were identified as English Learners who had yet to reach full proficiency in English. When school first started remotely, parents had already picked up devices for their children, but they didn't know what to do or how to connect to their children's teacher through Canvas and Google Meet. Teachers were asked to contact every student's parent to initialize remote learning, however, most teachers were unable to provide the needed technology assistance. Because of low educational background and language barriers, some parents relied on their own children to translate and relay information for home-school communication. Thus, confusion and uncertainty about remote schooling added even more stress onto the parents in addition to what they had already been suffering due to COVID.

The suburban district, on the other hand, had implemented 1:1 Chromebook and Canvas for secondary students, and classroom sets of iPads were also available in elementary classrooms three years prior to the pandemic. With strong parental engagement and financial support from the district, all students had already had access and experienced the latest technology, tools, and resources both in school and at home. Through the parent portal, I was also able to monitor my children's academic progress and express my concerns to their teachers with little effort.

My experience as an urban school teacher and a suburban parent led me to be more conscientious about what I should focus on to make optimal opportunities accessible to my students. I was blessed to have my effort rewarded with $5000 grant from DonorsChoose[3] in July, 2020. The grant provided funds for the newest technology equipment, such as 3D printers and robotic devices of an innovation lab for school-wide implementation. I collaborated with several teachers and coached them to integrate coding and 3D printing into STEM[4] lessons for all grade levels at our school. Together, we witnessed the excitement and curiosity of students flourishing and felt that our effort helped pave the way, which allowed us to take one step further toward bridging the gap between our students and their suburban counterparts.

Dr. Ge It seems that the pandemic has further revealed the digital divide and widened the gap between the suburban and urban schools. On one hand, we felt positive

[3] A crowdfunding website supporting public school teachers to purchase classroom materials

[4] An integration of science, technology, engineering, and mathematics in project-based learning

that the federal, state, and local government, as well as school districts had responded to the pandemic by providing technologies and infrastructures to teachers and students. On the other hand, we saw further disparities between the urban and the suburban schools. The urban schools seem to have caught up with educational technologies, but in fact they still lagged behind due to the lack of student and teacher preparation for using technology to implement remote instruction. However, I found hope in some dedicated educators, such as Dr. Durley, who worked tirelessly to change the educational conditions for their students in the urban school areas by keeping up with the latest technology development and figuring out how to integrate technology and best practices in their instruction for the best interest of their students.

5 Implications & Conclusions

Our reflexivity helps us gain insight into the meanings of our experiences during the pandemic. The pandemic has confined individuals in our homes, but it has also afforded us with opportunities and possibilities to be creative, resourceful, and innovative and to achieve more than what we could have imagined. The shared virtual and physical spaces have enabled us to integrate family, school, and work into our home spaces, in which we learn and grow together to develop essential knowledge and skills for the twenty-first century. We recognized the existence of disparities and the challenges confronting educators in urban districts, but we also noticed that educators were inspired to respond to the emergency situations with creative and innovative educational practice during the pandemic.

The reflexive practice reported in this chapter provides a critical lens to examine our personal and professional experiences during the pandemic. Our everyday life was disrupted. However, we found that resilience, creativity, and professional expertise flourished in our dealing with emergency situations. New perspectives also developed, and we have become more integrative, transformative, reflexive, and even technologically advancing in solving problems we encountered in our personal, family, and professional spaces. In our attempt to provide a narrative for meaning making, we characterized, compared, and interpreted pandemic responses of K-12 public schools in different social and economic settings. We hope that our efforts would offer new insights for classroom practice, new directions for professional development, and new explorations for future research. The events, practice, and experiences identified for our reflexivity interpretations were intentional and purposeful so lessons could be learned not only in challenging times such as a global pandemic, but also for future practice and research in education.

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Chapter 14
Translating Distance Education Theory into Practice: Developing an Emergency Teaching Framework for a Caribbean University

LeRoy Hill

Abstract The COVID-19 pandemic compelled universities worldwide to address the issue of continuity of teaching and learning. The request for teaching and learning continuity took many by surprise and as such, many universities were unprepared for the rapid shift. The transition from face to face to remote teaching therefore required a quick, but careful consideration to the planning, design, implementation and evaluation of remote teaching and learning. Notwithstanding this challenge, it becomes necessary to ground decisions within theoretical contexts that support and advance effective remote teaching and learning practice. Theory is well established as a tool to shape the effective teaching and learning within the higher-education setting and while there are frameworks that support traditional teaching and learning, not much attention is given to distance education frameworks. This chapter therefore intimates reflection on the utility of distance education theoretical frameworks to advance and sustain remote teaching practice at a Caribbean university.

1 Introduction

In response to the COVID-19 pandemic, the governments of Caribbean territories mandated lockdown of all higher education (HE) establishments resulting in the push for HE institutions to switch teaching and learning to the online setting. The Caribbean university presented in this study was therefore required to address the need for an emergency remote teaching (ERT) framework. While online teaching and learning was not new at the university, teaching and learning posed a unique challenge as the entire university had to shift to an ERT approach with little time to spare. Therefore, there was a need to design an ERT framework that was grounded

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in best practices in order to address effective teaching and learning in the ERT setting. As lead learning designer and head of department, I wanted to explore an approach that valued theory and practice. This, led to careful consideration being given to theory as a way to ensure greater success of the response to an ERT framework. This chapter demonstrates learning design innovation by testing the utility of distance education theory in advancing the development an ERT framework for the specific Caribbean university context. More so, the chapter showcases how a Caribbean university grounded its ERT framework to theory as a way of ensuring adherence of best practice in the distance, online education context. Online education in this chapter is presented as a subset of distance education and at times is used interchangeably for ease of reference. The use of theory to support best practices in traditional teaching and learning in HE is well established. There is however, the continuous disparity in the perception of quality and credibility of online education that continues to present itself as a recurring concern within the HE sector (Stith, 2000; Ulmer et al., 2007). Notwithstanding this disparity, it made sense to ensure quality of the teaching and learning during ERT setting was guided by relevant distance education theoretical conceptualisations. I begin by giving some attention to the organisational context.

1.1 The Organisational Context

The Caribbean university employs both traditional FTF and distance education. Distance Education at the Caribbean university has its genesis in the introduction of extension campuses in 2005. The introduction of the Learning Management System (LMS) in 2008 served as a way to support the growing demand for blended and online courses. Faculty increasingly adopted the university's LMS to teach blended and online courses. Against the growth of extension campuses across the Caribbean as well as the increased demand for flexible online and blended offerings, the university in 2015, established a department with specific attention to growing and managing distance and online education at the university. In that same year, the first fully online programme was launched. The development of the department saw the rapid advancement of systems to support the growth and development of distance and online learning at the university and by 2017, the department managed six extension campuses and four fully online programmes.

Accordingly, by March 2020, online and blended teaching and learning was well-established within the university. Against this setting, careful consideration was given to address an approach that would ensure that the online and blended courses and programmes would continue parallel to the ERT framework. Consequently, FTF was deconstructed as 'remote teaching' as this allowed a clear communication regarding the narrative around an equivalent approach that FTF learners could identify with. This equivalent approach was foreshadowed against the premise that ERT learners were not typical distance education learners. Additionally, students and faculty had expectations regarding an approach that

would be equivalent to FTF and as such, it made sense to create an ERT framework that valued greater emphasis on the provision of synchronous sessions supported by appropriate videoconferencing tools. Notwithstanding the theoretical and practical implications of this approach, there was a universal question that served to drive the design and development of the ERT framework:

How do I go about developing a framework to guide effective ERT?

In the following sections of this chapter, I present a learning design case as a perspective through which I present the operationalization of turning theory into practice. Specifically, I wanted guidance on a framework to support:

- Capacity-building approach to address faculty and student readiness for ERT,
- Structure, dialogue, and learner autonomy for ERT
- Methodology to monitor and measure success of ERT framework

2 Response to Challenges

The response to the ERT challenges needed careful consideration of the organisational, pedagogical and technological constraints and affordances to address the development of an ERT framework. There was consequently, a need to attend to the organisational response for the most efficient implementation of distance education, technology integration while valuing student success (Olson & Einwohner, 2001; McFarlane, 2011) in the ERT setting. The importance of this ERT framework is measured in part by the value placed in its adoption as part of institutional decision-making and response to ERT since the framework served to guide decision-makers in the move to support teaching and learning continuity against the constraints of the COVID-19 setting.

To address the level of student and faculty readiness, I used an approach where I conducted a number of meetings and consultations with various stakeholders. Drawing on data it was clear that a greater portion of students and faculty were not prepared for teaching and learning in the ERT setting. Additional consultations in gauging the readiness for ERT was done through an advisory committee—a committee comprising a wide cross-section membership across the university. The level of readiness while posing a challenge provided impetus to plan and implement faculty and student development and support events. The faculty and student development sessions focused on providing faculty and students with the foundational socio-technical skills in the use of the LMS as well as the videoconferencing tool as a way to ensure teaching and learning continuity. The professional development sessions were conducted for an entire week. Faculty and student support sessions was added as part of the professional development framework and this focused on providing individual (one-on-one) sessions to faculty. During the faculty support sessions, the aim was to deepen their value for structure, dialogue and developing learner autonomy in the ERT setting. The thematic focus of the professional

development sessions emanated from the operationalisation of two distance education theories and the evolution of this is described in next section.

2.1 Turning Theory into Practice

To address the appropriate level of structure, dialogue and learner autonomy needed during ERT, I deepened focus on distance education theory. There are a number of theoretical conceptualizations that serve to provide guidance in supporting teaching and learning in the distance and online setting. More importantly, within the context and setting of ERT, it became necessary to review frameworks that provided plausible guidelines in shaping the ERT framework for teaching and learning continuity. Primarily, the goal of planning in the ERT setting is to ensure that there was appropriate support to ensure adequate equity in student learning experience when compared to FTF (Simonson, 1999). Moreover, online teaching and learning was new to many faculty and students and since I wanted to control the narrative regarding the ERT framework, I adopted Equivalency Theory (ET) (Simonson, 1999) and Transactional Distance Theory (TDT) (Moore, 2007) as they supported the development of an acceptable response to guide the planning, implementation monitoring and evaluation of ERT at the university. These two theoretical conceptualisations were core in translating theory into practice and provided a meaningful way in addressing some of the foreseen challenges regarding the incongruence of thinking and practice among faculty regarding effective teaching in the ERT setting.

2.2 Implementing Equivalency Theory

Simonson's Equivalency Theory promotes the idea of a learning environment where online learning experience is equivalent, and not identical to traditional FTF. The theory is guided by the premise that traditional and online education are inherently different teaching and learning contexts and as such, there should not be the attempt to apply the same FTF practices to that of the online setting. Owing to this, it was felt that ET would serve as a theoretical frame to assist faculty in understanding the need to design learning activities and courses that support and sustain equivalent experiences in the ERT setting. This is particularly important to note since faculty when prompted to convert their FTF to online were tempted to apply the same approaches without careful consideration of the affordances and constraints of the ERT learner and learning context. This consideration is particularly important as learners in the ERT setting would require a different mix of learning experiences (Simonson et al., 2011). Above all, ET supports the need to value instructional planning and implementation that provides an appropriate and equivalent FTF opportunity for each learner (Simonson, 1999). In operationalising the theory, I wanted to ensure that faculty understood their role in translating good instructional practice in

the remote teaching environment. This value was heightened in the communication strategy to ensure that faculty understood expectations regarding the ERT framework. Against this thinking, facilitators were encouraged to provide a collection of learning events, artefacts and opportunities that would not only be equivalent but appropriate for each learner or target group in the online learning situation. However, simply telling faculty to provide equivalent online experience was not sufficient to scaffold their full understanding and application. For this reason, I adopted TDT as it provided further guidance on structure of learning to include careful attention to dialogue as well as the level of support needed to develop learner autonomy.

2.3 Implementing Transactional Distance Theory

Transactional distance is described as primarily a psychological construct which supports the proposition in TDT of reducing the transactional distance in the teaching and learning process as a way to address student success in the online education setting (Moore, 1997). Specifically, educators should during the planning and execution phase take into consideration the structure, dialogue and learner autonomy as a way of reducing the level of transactional distance. It follows therefore that facilitators at the university should be intentional in planning events, activities and online learning environments that are not only equivalent but also factor in the level structure, dialogue and learner autonomy in order to present a learning environment that is relevant and meaningful during the ERT setting. If these factors are not addressed, then this would impact the teaching and learning experience of the distance learner (Moore, 1993; Shearer, 2009). It should be noted that structure in this setting refers to what information is needed as well as how learners are going to access the information. Consequently, facilitators should provide a clear idea how the learner is going to access, locate, use and manage the information. However, even if a course had the necessary structure, there can still be high levels of transactional distance if dialogue is not sufficient. Dialogue in TDT refers to the spectrum and level of communicative events and activities used to support learning within the course. It follows therefore that in order to reduce transactional distance faculty are recommended to design courses with sufficient dialogue or opportunities for dialogue between learners and learners, as well as learners and facilitators (Moore, 1997). Naturally, the inverse can also lead to where a course has good dialogue and poor structure and if both structure and dialogue are low then transactional distance would logically be high. The aim therefore is to ensure that the ERT framework values a sufficient balance between structure and dialogue. Learner autonomy is the third factor in TDT and this indicates the level of the teaching and learning dependency between faculty and learners. Learners with a high level of autonomy are more emotionally independent of facilitators and therefore have better understanding of self-directedness while learners do depend more on instructors for guidance (through course structure; dialogue) have low levels of autonomy (Muller, 2003). It follows then that the greater the transactional distance, the greater the need for learners to demonstrate

learner autonomy. The goal therefore was to strike a balance between the variables of learner autonomy and the other variables of structure and dialogue, with a clear understanding of the expectation that the ERT learner needed to increase their level of self-directedness in the ERT environment.

I therefore adopted strategies that provided a framework to allow sufficient structure and dialogue as well as opportunities to deepen learner autonomy in the ERT setting. Adopting theoretical frameworks is one thing, but what is more essential is how these theoretical conceptualisations are applied to make meaningful the teaching and learning process in the ERT environment. This complex milieu is illustrated in Fig. 14.1 and it is clear that there were a number of factors that influenced the development of the ERT framework for the Caribbean university. Thus while theory was seen as a basis for grounding the ERT framework to best practice, there were the social, personal and the wide-ranging COVID-19 influences that shaped the emergency response in the institutional context. Factors such as the expectations from students, faculty and the accreditation agency also played an important role in shaping what the ERT framework looked like. Answering the question of what an ERT framework for the Caribbean university look like, therefore demanded a careful attention to the various organisational, pedagogical and technological constraints and affordances some of which were supplemented into a ERT checklist (see Fig. 14.2) as a way to guide the implementation and monitoring of the ERT framework in the Caribbean university context.

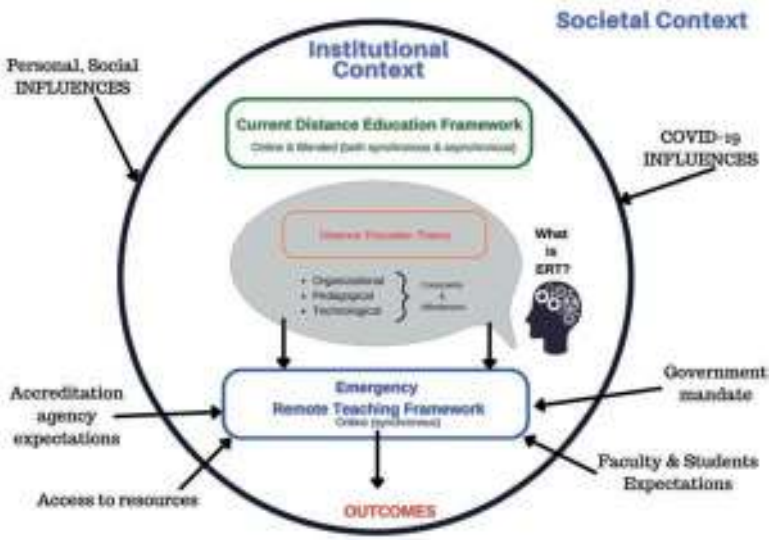

Fig. 14.1 Showing context for ERT framework

ERT CHECKLIST	
Action/Activity	Above Standard, At Standard, below Standard
ORGANISATIONAL	
Developed Emergency/disaster continuity policy	
Development/revision/approval of ERT framework	
Updated policies and guidelines	
Implementation of monitoring and evaluation mechanism for ERT	
Sustaining faculty and student support regarding ERT	
Communicating and sharing framework with stakeholders	
Contingency plan to support digital divide among faculty & students	
Access to support personnel to meet ERT demands	
PEDAGOGICAL	
Assessment framework/guide for ERT	
Implementation of faculty development events that integrated approaches to addressing theoretical underpinnings of EQ and TDT;	
Provision of LMS templates to simplify ERT implementation and structure of RT learning experience	
Remote teaching guide & checklist	
Deepening appreciation and understanding of need to the translate theory to practice	
Advocating for virtual office hours	
Student support system (counselling, IT, Advising, Finance)	
Provide a variety of communication strategies to faculty	
Continuous faculty & Student development sessions and Support	
Schools/faculty revise instructional content and guide for greater student engagement, presence and student-centeredness	
Revision of course syllabus for guiding ERT expectations	
TECHNOLOGICAL	
Creation/revision of online centre for student success	
Technological security audit for emergency/disaster	
Subscription of tools to be used during ERT	
Technology plan/policy regarding assessment security during ERT	
Introduction/upgrade of LMS or delivery system to meet ERT demands	
Develop/Revise Data recovery plan/data redundancy plan	
LMS, SMS, web portals addresses accessibility standards	

Fig. 14.2 Initial ERT checklist

2.4 Translating Theory into a Checklist

Translating theory into practice in this setting provided an opportunity to meaningfully address the knowledge barrier among decision-makers and other stakeholders regarding ERT. I wanted to influence decisions that resulted in accepted framework that supported a frame for good level of structure, dialogue and learner autonomy. Grounding the design of the ERT framework to a research-based, data-driven approach meant provided stakeholders with a sense of surety of the framework. Moreover, activities, actions and events in the wider organisational, pedagogical and technological setting were mapped to ET and TDT. This checklist serves as an innovative contribution that while not prescriptive is useful in contextualising key aspects regarding an option to guide ERT.

2.5 Sustaining Framework Through Communication, Monitoring and Evaluation

In order to sustain the framework, it became necessary to constantly and consistently promote the framework to faculty and students. Weekly reminders were sent to faculty outlining institutional expectations regarding the ERT. There was also a need to gain deeper insight into how faculty and students were coping with ERT transition. To support this need, a survey was conducted among faculty and students in April 2020. The survey results pointed to a number of positive outcomes. Faculty and students responded that they were able to successfully transition to the ERT framework. However, a closer review of results revealed that students longed for greater engagement and against this challenge, a number of resources, and faculty development activities focused on student engagement strategies.

As a way of ensuring compliance to the framework and standards, a monitoring and evaluation system was instituted. This system adopted a data-driven approach where data regarding the use of videoconferencing tool was aggregated in daily and weekly reports which were made available to Chairs, Deans and senior management. Moreover, Chairs, Deans and senior management at the university had access to a database of course access information, and with this data could conduct virtual walk-ins or virtual classroom supervision sessions.

3 Conclusion

Turning theory into practice in the ERT setting at the Caribbean university provided a unique way of addressing response to emergency teaching without compromising the quality of teaching and learning. Quality here is contextualised within distance education setting. Therefore, grounding the university's ERT framework served to test the utility of two distance education theoretical conceptualisations. It should be noted that the application of these theoretical conceptualizations into an ERT framework is not intended to be generalised to other HE settings. The aim of this activity was to find a meaningful way to factor the careful consideration of key social and institutional constraints against the challenges by the COVID-19 emergency teaching situation. A key takeaway of this process is that policy-makers, and academic leaders alike should value data-driven and research-based approaches when making important decisions regarding university-wide teaching and learning. What emanated from this activity was the development of an indigenous educational innovation in the form of a ERT framework and by extension a ERT checklist. This ERT checklist was grounded in distance education equivalency and transactional distance theory and this further serve to support their relevance as tools in assisting learning designers put forward meaningful conceptualizations to support quality teaching and learning.

It is recommended that further research into the development of other ERT frameworks be explored. This can only serve to deepen the discussion on what quality teaching and learning looks like in the ERT setting. Additionally, the Caribbean university ERT framework while not designed for generalisation to other contexts can be compared with frameworks used by other institutions within the COVID-19 setting. Doing so would strengthen the Caribbean university ERT framework. I also acknowledge the need to compare and further develop the Caribbean university ERT checklist against established benchmarks for measuring quality of programming in the online and distance education setting.

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Chapter 15
All Hands on Deck: Faculty Collaboration in Transforming to Remote Teaching

Wanju Huang and Jennifer C. Richardson

Abstract On the eve of spring break March 2020, we received an emergency email from Purdue University's Office of Teaching and Learning. We were invited to be part of the University's contingency team planning for and developing resources to assist faculty with transitioning from face-to-face to emergency remote teaching and learning. Using the experience and expertise we have in the online learning realm, we were tasked to develop resources covering the most essential topics faculty needed for emergency remote teaching. Seven topics were selected based on the Community of Inquiry framework and the needs shared by our colleagues: (1) Availability and Communication, (2) Discussion Board Tips, (3) Setting Student Expectations, (4) Building Community, (5) Delivering Course Materials, (6) Adding Technology to Your Toolkit, and (7) Checking for Student Understanding. Recognizing the recommended resources and strategies needed to be relatable and replicable to earn faculty's buy-in, we used the snowball sampling method to identify faculty from across campus who could help achieve this goal. This process gave us the opportunity to get to know our colleagues, uncover their talents, and create a new platform for shared expertise in teaching and learning. This book chapter will discuss how we structured and developed the resources for faculty by including them in the process. Further, it will show how faculty driven approach can augment the collaboration between the administration and faculty to enhance teaching and learning.

1 Introduction

It may seem cliché to say, "it takes a village" to deal with the challenges caused by COVID-19, nevertheless, that was what we experienced during the initial weeks of the crisis at our home institution, Purdue University, and we know the same was true at other educational institutions around the globe. On the eve of spring break 2020 we received an emergency email from Purdue University's Office of Teaching and Learning. We were entreated to be part of the University's contingency team,

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_15

planning for and developing resources to assist faculty with transitioning from face-to-face instruction to remote teaching and learning. The contingency team included ten members from the Learning Design and Technology program faculty (the authors), the Center for Instructional Excellence, Teaching and Learning Technologies, and Purdue Online all headed by the Vice Provost for Teaching & Learning. Our experience was unique due to the sheer size of the institution and other complex factors related to instructors, learners, and resources:

- 5000 face-to-face courses needed to be moved "online" for remote teaching within 2 weeks, some courses had 20 students, some had 1100+ students;
- Purdue University had just started transitioning from Blackboard to Brightspace. Many faculty faced additional challenges because they had not been slated to transition yet and had no experience with the new Brightspace platform;
- The international context of a large number of our students and faculty, many of whom were leaving campus to return home in the early days before they were closed out of their home countries, and ensuring the availability of content abroad;
- The fact that we are a doctoral university designated as R1 or Very High Research Activity institution; although teaching is important to many faculty and we have a number of innovators, we need to acknowledge that we also had a number of instructors who had largely avoided online teaching and tools until it was mandated.

Using the experience and expertise we had demonstrated in the online learning realm (see Purdue Repository for online Teaching and Learning, launched January 2019) (PoRTAL Team, 2019; Purdue Innovative Learning, 2020), we were tasked with developing a set of expectations for remote teaching and resources covering the most essential topics faculty needed. Specifically, we were to create resources that could be digested and implemented easily and quickly. More importantly, the recommended strategies needed to be relatable and replicable. With that in mind, we used the snowball sampling method to identify faculty from across campus who could help us achieve this goal. This process gave us the opportunity to get to know our colleagues, uncover their talents, and create a new platform for shared expertise in teaching and learning to develop practices related to resources for instructors to sustain learning with some continuity and flexibility. Ultimately, we used a faculty-driven approach rather than a top-down leadership-driven approach to design the materials and resources.

1.1 Elaboration of Context

As we began the transition to Emergency Remote Teaching (ERT) the Teaching and Learning contingency team encountered issues familiar to many other institutions and instructors. As a team we worked on solving issues as they came up, meeting once or twice daily as needed. For example, we had instructors who were not wanting to heed time zone issues and/or they wanted to teach their courses

synchronously in order to maintain what they would have done in their face-to-face classes. On the other side, we faced issues with basic internet connectivity and especially high-speed internet connections that would need to be in place for synchronous sessions. A sample email that went to faculty as an example of what students were dealing with included the following:

> One of our students had to return to southeast Asia because of COVID-19, and was asked to take a timed synchronous exam set for 2 a.m. their local time. This student is in a COVID quarantine camp with limited access to technology and a very poor Internet connection. So, in addition to normal test anxiety, this student is worried about potentially being sick, living in an unfamiliar environment that is likely not conducive to studying, and dealing with a significant time difference. Obviously, the student is not going to be able to perform their best on the exam.

The institution also had issues with infrastructure such as bandwidth that limited the number of synchronous sessions that could be held without interruption. This became very evident within the first few days of ERT, and it was determined that cameras should be off simply because the infrastructure couldn't handle it with so many classes being offered simultaneously in a synchronous manner. Beyond the campus this was also a community problem as shown by this example sent to faculty:

> Now, let's go just 17 miles east of campus. Another student lives in the "Wi-Fi desert" of Rossville, Ind. This student also does not have adequate Internet service at their house. Just downloading the welcome message from their course instructor triggered the dreaded "Wi-Fi spin," and many of the locations that offer free Wi-Fi have closed (e.g. libraries, Starbucks). The student is sharing one computer with their parents, so must take turns with who can work.

Not only were many instructors teaching online for the first time, they were teaching online when all these other factors were happening, and ERT was not a format that they were in any way prepared to offer. For example, some faculty went to the extreme, with at least one who oversaw a large undergraduate course saying he "was done teaching, [and] the course couldn't be offered online"; the Provost informed him otherwise.

2 Systematic Approach

Prior to the move to remote teaching, all faculty received an email stating, "Faculty and staff should begin to consider how, through Purdue learning management systems or other means, they would deliver classes and continue communications with students to keep their educational programs on track." This was followed by "University administration is currently working with the Innovative Learning team (Purdue Online) on approaches that will allow us to continue to deliver courses."

Based on the information we received from our colleagues, as well as from departments that work closely with faculty for course development and transformation, it became apparent to us that faculty needed concrete examples they could

implement in their courses immediately. While concrete examples would be beneficial and valuable, we knew it was equally important to showcase evidence-based practices validated and supported by research in order to earn faculty's buy-in. Extra kudos when we could identify colleagues on campus who had used the practices successfully and could share their experiences as exemplars. At the same time, we were getting daily reports from faculty-facing services (e.g., technology assistance requests) and the Provost's Office collected feedback from instructors through surveys. Based on these inputs, we determined that our initial primary focus should be on developing general resources for online teaching and learning while collecting exemplars for more specific topics such as laboratory settings and large lectures.

2.1 Selecting Resource Topics

Our goal was to create a quick and easy self-guided ERT webpage with examples and suggestions from the University's faculty and our own online teaching and course development experiences. We deliberately chose the Community of Inquiry (CoI) as a framework to structure the resources (see Fig. 15.1). The Community of Inquiry is a commonly adopted framework for online and blended learning (Garrison et al., 2000),which views learning, the educational experience, as resulting from the interaction of three kinds of presence—social, cognitive and teaching. Essentially, it is a socio-constructivist model which suggests that well designed online learning materials are not enough to guarantee online learning, but rather it needs human interaction and instructional guidance. Even though the course transformation goal that the faculty aimed to accomplish in the beginning of the pandemic was not converting their courses to fully asynchronous online courses, we saw the benefits of using this framework to identify the resource topics. Additionally, the authors have previously developed a series of short articles related to online learning and CoI (i.e., PoRTAL) that could be incorporated in the ERT resources.

The ERT resource page titled "Practical Tips and Examples for Faculty by Faculty" (Richardson & Huang, 2020) includes the following topics: (1) Availability

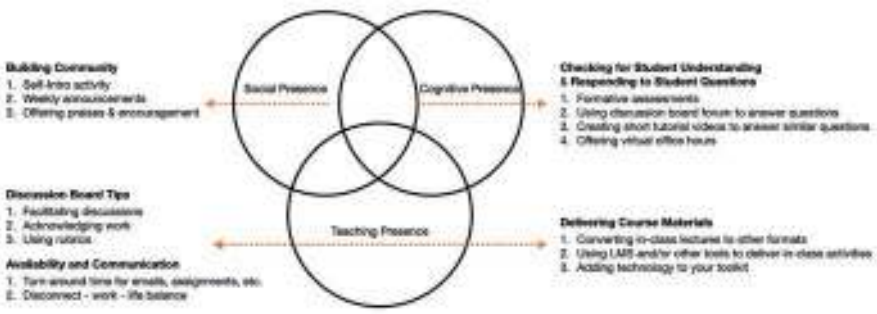

Fig. 15.1 Community of inquiry for emergency remote teaching

and Communication, (2) Discussion Board Tips, (3) Setting Student Expectations, (4) Building Community, (5) Delivering Course Materials, (6) Adding Technology to Your Toolkit, and (7) Checking for Student Understanding, Descriptions of each are provided in the following sections and Fig. 15.1 presents a visual of how the topics fit within the CoI framework.

2.1.1 Delivering Course Materials: From In-Class Lectures to Videos and Beyond

"How can I teach my class online?" That was perhaps the most popular question we encountered from faculty, especially from those who had never taught online or taken any online courses prior to the pandemic. In general, teaching a face-to-face course involves teaching learning content or sharing expertise (e.g., lectures) and stimulating students' participation in class (e.g., discussions, group activities). Orlando (2020) states "Too often faculty go into the course development process with the 'content coverage' mentality" (para 6). In fact, faculty frequently focus on the content and its delivery initially when converting their face-to-face courses to other formats.

Although teaching remotely means teaching synchronously while students are present online, it is different from teaching face-to-face as remote teaching takes place on a different medium. One primary challenge is that instructors might not be able to see the facial cues of the class especially when the class size is big. Moreover, students could be distracted more easily by other on-screen activities (e.g., email, social media, etc.) than they would be in face-to-face courses. It is essential for faculty to deliver course materials in a more engaging and concise manner. Additionally, it is necessary for faculty to know lecturing through a webcam is not the only method for sharing their expertise with their students. Also, the scheduled online meeting class time is not the only time they can share their knowledge with their students.

We identified examples that demonstrated how instructors could deliver course content through videos and other formats such as lecture notes or key terms. Knowing that creating video presentations might be the option most faculty would choose, we deliberately added a suggestion that was relevant to video recording in order to minimize faculty's concerns and to help them realize the long-term benefits of using videos:

> If you create videos for lectures, for weekly introductions or overviews, do not worry about the small stuff. Did your words get tangled? It's okay. Did your technology go off for 10 seconds? It's okay. This is not a feature film—green screen and special effects are not necessary. A more natural delivery will be closer to a normal classroom experience. Your students want to see the real you. Later, when you get settled, if you want to edit and re-use the video, there are support staff to help with that.

2.1.2 Stimulating Learner Interaction: Transforming In-Class Discussion Activity to Online Discussion

Student participation in class could involve small group discussions or real-time knowledge-check activities through Kahoot!, iClicker, Hotseat, etc. Alternatively, using a well-structured asynchronous discussion activity benefits both teachers and students, but it requires different levels of involvement from both groups than doing it face-to-face. From the perspective of teaching, being present in discussion is essential but can be tricky. Research shows that "students like discussion led by the instructor" (Richardson et al., 2015). While it is important to be present in online discussions, it can be challenging and difficult for an instructor to figure out the level of presence they need to have in their course/s. Anecdotally, some instructors felt overwhelmed by implementing online discussions in their courses because they thought they needed to respond to every student. These instructors expressed exhaustion from responding to students' individual posts and grading students' posts. On the other hand, some instructors were not participating in discussions and let students discuss among themselves, which sometimes leads to a common complaint about online courses—"I am teaching myself." Our recommendations regarding discussion board activities included helping faculty find their realistic levels of participation while setting student expectations. We offered a clear statement that faculty could include in their syllabus to accomplish this:

> When participating in the online discussions, I/the instructor will check in a minimum of three times per week. Keep in mind that it is not possible for me/the instructor to respond to every single posting every week (nor is it pedagogically appropriate), but I/the instructor will be sure to respond to a variety of postings and students each week and attempt to assure equality in responses to students. If you feel you are being neglected in any way, please contact me/the instructor.

We also encouraged instructors to set clear student participation directions and expectations in their courses by including discussion grading rubrics or discussion post examples. Further, we offered tips on how instructors could be "present" in discussions. For example, we recommended instructors address multiple posts at once, share or promote different students' posts each week and encourage students to return to discussion to fully participate. For larger classes, we encouraged instructors to put students into groups, making it easier for students to access their peers' posts and feel more comfortable expressing their opinion.

2.1.3 Checking for Student Understanding

When teaching face-to-face, faculty can quickly sense whether students understand the content or not through students' facial cues, body postures, or even the classroom atmosphere. In our experience, teaching remotely caused some instructors to wonder how they could understand students' learning and address their questions effectively and efficiently. Some students did not turn on their cameras, or the student videos were too small for the instructors to see the facial expressions, and

finally the University requested that cameras be turned off due to bandwidth issues. Hence, it was difficult to take the pulse of students' learning and provide just-in-time or immediate feedback. However, we recommended tools and methods that instructors could implement to address students' questions.

- Creating a discussion forum for students to ask questions. We recommend instructors use a title such as "Ask the instructor, Ask a peer" and also give the discussion forum a description that says "Post any general questions about the course to this discussion forum. Feel free to respond to the questions of your peers so that we can all learn from one another!"
- Besides using discussion forums for students to ask questions, instructors can use formative assessments as "exit ticket" activities to evaluate students' understanding. These assessments can be quizzes or reflective assignments

2.1.4 Responding to Student Questions

Providing feedback or answering students' questions can present another challenge. It is especially difficult for big classes or courses that involve complex topics such as mathematics, coding, simulations, calculation, etc. We offered two specific instructional strategies that would enable faculty to respond to students' questions effectively and efficiently.

- Providing video tutorials to answer common questions. We reached out to faculty who are known for using videos to answer students' questions rather than text and asked them to share their video clips with our colleagues. Through this approach we were able to provide a variety of tutorial videos ranging in level of professionalism from studio production to self-directed. Regardless of the method, students benefited from seeing the instructor answer the assignment questions and being able to replay the concepts that they needed more time to comprehend. It should also be noted that once they are created, videos can be used in other courses, as well as when faculty offer the same course next time.
- Offering drop-in virtual office hours. Office hours area common practice when teaching face-to-face courses. This is also a fairly common practice for instructors who teach online. What is tricky here is to find a time that can work for most of the students, especially when students and instructors are located in different time zones that might have huge time differences. We offered resources that help instructors understand the time differences within their classes and also suggested a more practical approach—drop-in virtual office hours that allow students to "stop by" their instructors' virtual "offices" within a set period of time.

2.1.5 A New Way of Teaching: Adding Technology to Your Toolkit

Teaching remotely requires instructors to adopt new tools to deliver their courses. This can be intimidating as not all instructors are tech-savvy or have the equipment they need to teach remotely. Our message to the instructors is to choose technology they are comfortable with first and also to avoid trying tools that might have a steep learning curve. In addition, we encourage instructors to test any new technologies that they would like to include in their courses with colleagues or a small group of students to avoid creating extra anxiety or frustration felt during teaching and learning.

2.1.6 Work-Life Balance: Availability, Communication and Setting Students' Expectations

Teaching remotely through a monitor or interacting with students online can be energy draining. It is essential for faculty to disconnect. We offered concrete tips that help faculty to stay present in the course while maintaining work-life balance. For example:

- Inform students you will not be in the course 24/7. Let them know when you plan to be in the course reviewing their work so they can anticipate when you will be providing input and/or feedback. For example, "I will plan to be participating in discussion boards MWF 11-1."
- Similarly, communicate to students what your turn-around time is for emails (e.g., 24–48 h during business days). Share that if they haven't heard back from you by that time, it's appropriate for them to send a follow-up message.

3 Considerations and Lessons Learned

COVID-19 presented the teaching and learning community as a whole with a challenge and also an opportunity to explore its own hidden wealth of knowledge and potential in teaching and learning. Perhaps the most surprising lesson learned is that with our team and instructors across campus we were able to accomplish much more than we ever imagined in just a few weeks; if only higher education always worked this quickly! We also learned that the instructional designers and educational technologists across campus were invaluable and we would not have made it through 2020 without them.

Overall, we found that by incorporating a faculty-driven approach we were able to highlight a number of colleagues' innovative efforts more prominent, allowing them to be appreciated across disciplines in a way that has never before happened. Moreover, by embedding faculty exemplars into our resources we added credibility to our guidance framework (CoI); faculty are more likely to pay attention when they

see others they respect and know sharing their work. Specifically, we believe that the incorporation of the CoI into our planning has also helped our faculty and instructors have a better understanding of all that is necessary in online and hybrid environments to make the educational experience meaningful for learners.

As many others have discussed, we have had a real opportunity to reexamine our practices for everything from how to teach in an online/hybrid environment to how we support learners to how to levy our communities to be part of the conversation. Moreover, we also learned that being flexible in how we think about teaching and learning can have its advantages, as demonstrated by the more widespread use of virtual labs in engineering and science (see Instruction during pandemic provides foundation for future STEM education), the reimagining of the Writing Lab on a large scale in the online environment, and "operating in hybrid mode … to push ourselves into that new world and learn" (Edelman, 2021).

We believe we also saw a transformation at the institutional level of the People—Process—Technology principle (Dennen, 2020). Going in, those new to teaching online perceived it more as Technology with a capital *T* and then *content*, *people*, and finally *process* simply because that *Technology* was what we felt looming over us. As educators and instructional designers, we hope that faculty continue to recognize the need for continuous improvement in their teaching, take pride in what they accomplished under pressure and continue to embrace innovation. At the same time, we hear the grumbles of "online learning was horrible", so continuing to repeat the message that "ERT is not online teaching" is necessary for all of us. Overall though, we feel that faculty now know it is possible to teach and learn effectively at a distance. Our shared goals are to make sure we have learned from our experience in 2020 and embrace opportunities to improve our practices with a specific focus on the Community of Inquiry framework as a guide for design and pedagogy and our colleagues' exemplars as inspiration for innovation.

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Chapter 16
Virtual Making: Transforming Maker Education in a Teacher Education Program During the COVID-19 Pandemic

Yi Jin, Jason Harron, and Helen Maddox

Abstract Promoting educational innovations through maker-centered learning in teacher education programs has been substantially disrupted due to the emergency situations resulting from the COVID-19 pandemic. This chapter illustrates the transformation of a maker education initiative, led by an instructional technology coach at a southeastern university. Through a process of curating resources, documenting new and existing practices, and creating multimedia-rich online materials, the coach designed, developed, and implemented two virtual makerspace tours in addition to virtual and hyflex making sessions. In this chapter, the authors share the transformation process and multiple artifacts. This chapter intends to guide future practices of promoting educational innovations during emergency situations through sharing these innovative methods, strategies, and examples. Meanwhile, the authors share their perspectives on the advantages and disadvantages of virtual making and potential opportunities and barriers for teacher educators' professional development and pre-service teachers' preparation.

1 Introduction

The promotion of educational innovations involving maker-centered learning has been substantially disrupted in teacher education programs due to the COVID-19 pandemic. This problem is unique since maker-centered learning has traditionally focused on hands-on instruction where students construct personally meaningful artifacts and share them with others. Over the past decade, there has been a surge of interest in how the habits, practices, and tools associated with "making" can benefit teachers and teacher educators (Clapp et al., 2016; Martin, 2015). Rather than perpetuating the century-old industrial model of lecture-based education, making in the

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classroom serves as a vehicle to support student-centered instructional practices where learners are creators rather than consumers of knowledge.

Grounded in *constructionism*, a learning theory that suggests that the most effective learning experiences emerge through the active construction of objects that are both personally and socially meaningful (Papert, 1991), educators who enact these maker-centered practices recognize that "knowledge is not simply transmitted from teacher to student, but actively constructed in the mind of the learner" (Kafai & Resnick, 1996, p. 1).

To support maker-centered learning, K-12 schools, colleges, and universities have been adding makerspaces that serve as a communal space where "makers" can share tools and resources while also collaborating as part of a maker community (Mersand, 2021). While making is often associated with high-tech tools such as 3D printers and laser cutters, makers also express themselves through no-tech and low-tech forms of making such as baking, knitting, carpentry, metalworking, glass blowing, and other creative endeavors. Makerspaces in K-12 education globally come in a wide variety of forms ranging from a corner for making in the library, repurposed computer labs and shop classes, to mobile makerspaces that can travel from school to school in buses or recreational vehicles.

However, in 2020, the adoption of these maker-centered educational innovations came to a grinding halt globally due to the sudden closing of schools and shift to remote teaching. As a result, the educational innovations associated with maker-centered learning were placed aside as teacher educators resorted to established curricula as they struggled to cope and adapt to online teaching. Thus, if teacher educators hope for maker-centered learning to continue as an educational innovation, they must find a way to transform these traditionally hands-on pedagogical practices to fit a virtual and hyflex world.

This chapter illustrates the transformation of a maker education initiative, led by an instructional technology coach at a southeastern university. Based on the methods, strategies, and examples presented in this chapter, the authors intend to share successful strategies and experiences to better support maker practices and pedagogies across virtual and hyflex contexts.

2 Methods

This chapter adopts a case study method (Yin, 2011). The first two authors are the researchers of the current study and have an established body of work studying K-12 maker education. They interviewed and collected artifacts from an instructional technology coach who is the leader of the maker education initiative at a teacher education program in a southeastern public university. The third author, Helen Maddox, is the instructional technology coach who was interviewed by the other two authors. She has been leading the maker education initiative at her college for over 3 years. She identifies herself as a maker/crafter and has enjoyed maker activities, such as taking apart rotary telephones and televisions, ever since she was

a child. Helen has a computer science degree; therefore, she has a lot of experience with computational concepts and coding. In the past, she worked as a computer consultant in the private sector. She also loves to explore different tools and technology while thinking about how to integrate them into education. Later, she changed her career path and worked as a K-12 technology support specialist for 10 years before transitioning to her current role as an instructional technology coach in a teacher education program, which she has been working for the past 8 years.

Three years ago, Helen advocated for starting a maker education initiative in her teacher education program because of her strong personal interests, the increasing popularity of maker education, and inspirations from social media. She is in charge of leading and managing the makerspace and its resources and materials, supervising undergraduate student assistants, offering coaching and consultation to teacher educators who are interested in integrating maker education into their curricula and providing professional development sessions to pre-service and in-service teachers. Besides these activities, she also operates an open house of the makerspace for faculty and students to explore and make and hosts themed maker activities from time to time. During the year before the pandemic, more than 1200 educational stakeholders visited the makerspace and participated in the professional development sessions hosted by Helen and her student assistants.

However, in March 2020, the university canceled all in-person classes and activities, including any scheduled making sessions. All academic courses were required to transition to online learning. The majority of teacher and teacher educators had rarely taught entirely online before, which caused them to fall back on established curricula instead of introducing innovative practices into their courses. Therefore, maker education was somehow left out of the online curricula. Instead, there emerged a strong need to prepare professional development, coaching, and consultation on online learning for faculty members and students. As the instructional technology coach of the college, Helen was the ideal person to offer this instructional support. Thus, she joined the technology team and spent hundreds of hours developing and delivering professional development (PD) to faculty, teacher candidates, and in-service teachers from March to May 2020. During this time, Helen did not have the time or personal bandwidth to promote her maker initiative due to the emergency demand, the shift in her focus and job role, and resistance from overwhelmed faculty.

3 Findings

To continue the push for the integration of educational innovations during the pandemic, in particular, maker education, it requires teacher educators to be astute and creative in leveraging virtual platforms to share practices, tools, and resources. Helen designed and implemented (a) two versions of the virtual makerspace tour, (b) a series of virtual making stations, activities, and sessions, and (c) multiple hyflex making sessions with accompanying instructional materials and resources

for pre-service and in-service teachers' different teaching and learning needs. Below is a description of the design process and rationale summarized from the interview data.

Starting in May of 2020, Helen began thinking about how she could adapt her existing makerspace activities to a virtual setting. She had over 3 years of photos and videos archived in cloud storage that she used as a guide for student assistants to set up materials for activities. Prior to the pandemic, there was no plan to share these resources as part of a virtual makerspace tour. These resources, however, became ideal once she committed to creating the virtual experience.

There are many trade-offs when it comes to transferring making to a virtual setting. First, one of the main tenets of constructionism is the social aspect of creating the artifact. Makers usually work as part of a learning community, where they share tools, resources, and expertise. This knowledge sharing is usually not formalized but takes place through ad hoc interactions. Second, making is often resource-intensive. This includes both reusable resources such as programmable robots and microcontrollers, as well as consumable resources such as cardboard, copper tape, and 3D printer filament. While many of these resources are common in makerspaces, most of the high-tech tools associated with making are not commonly found in residential homes. Third, the need to socially distance during the pandemic also meant that both the community and tool sharing aspects of maker-centered learning were difficult to achieve due to health and safety guidelines. Thus, transferring authentic making experiences to a virtual setting can be a challenging task.

At the start of the pandemic, educators from around the globe developed and shared curated lists of resources to help teachers transition to virtual teaching. These curated lists were often compiled as Google Docs or spreadsheets and served as a community space for educators to share, store, and organize lesson plans and other teaching resources. Rather than simply curating a text-based list of maker resources, Helen wanted to create an experience where users could gain a better understanding of making in context. Her multimedia archive allowed her to place visuals at the forefront while trying to recreate the makerspace experience for a virtual audience.

There were several design considerations that Helen kept in mind while creating her virtual makerspace tour. First, the experience needed to look and feel like an actual visit to the makerspace. Visitors needed to be able to see an overview of the entire space while also being able to visit different lab stations that contained maker tools and resources. Second, the virtual tour needed to be multimedia-rich and allow for the embedding of photos, video, and PDF documents. This way Helen could fully leverage and share her multimedia resources. Third, the tour had to be easy to navigate, preferably with a point-and-click interface that could run on all devices. Based on these design considerations, Helen selected ThingLink as her development platform. The creation of the virtual makerspace tour took place over the summer of 2020. During this time, it was Helen's top priority since she wanted to ensure teachers and teacher candidates had access to the resources at the beginning of the 2020–2021 school year.

3.1 Virtual Makerspace Tours

The physical makerspace that inspired the design of the virtual tour hosts a variety of innovative educational technology tools, such as a 3D printer, laser cutter, and educational robotics (e.g., Bee-Bots, Ozobots, and Sphero). This space also has no- and low-tech tools, such as squishy circuits, drawing tools, and crafting materials. Because of Helen's expertise, hospitality, and the abundance of the latest educational technology, this makerspace is a highly popular lab in this teacher education program. Furthermore, she frequently receives requests to host in-person tours of the makerspace.

Before the pandemic, this designated makerspace was regularly visited space by educational stakeholders who represented organizations at the local and state level. The flow of makers and visitors suddenly vanished when the university announced the transition to online learning and related pandemic policies on classroom use. Helen quickly realized that the closure of the makerspace caused her maker education initiative to derail.

During summer 2020, Helen brainstormed approaches and went through her multimedia archive to locate the best resources, tools, and instructional materials. With ample digital materials, she got the inspiration to create a hands-on virtual makerspace tour that replicated her physical makerspace. She created two separate virtual tours, one for pre-service teachers focused on Birth-to-K education (https://bit.ly/3y3tVMx) and a second one for general K-12 education majors (https://bit.ly/3y2B27R). These two virtual tours show the physical space and layout of the makerspace with some themed stations that are set up for maker activities, such as digital storytelling, educational robotics, Lego challenges, virtual reality, 3D Doodlers, and various coding tools. As of October 2021, the Birth-to-K virtual tour has more than 186 visits while the K-12 tour has more than 10,200 visits (see Fig. 16.1). These tours primarily served to introduce pre-service teachers to the tools and resources associated with maker education. Due to the tools being locked on campus, there were limited opportunities for pre-service teachers to enact these practices during this time outside of completely virtual tools, such as the coding language Scratch. However, these virtual tours reach outside the program and disseminate maker education practices to a broader audience. Creating and sharing global makerspaces on similar virtual platforms can facilitate conversations on maker education, even during emergency situations.

3.2 Virtual Making Sessions

Before the pandemic, Helen frequently reached out to the faculty members and invited them to discuss maker education and its connection to their curricula. To continue the promotion of maker education integration, she decided to transition the making lessons into virtual making sessions. After researching various tools and

Fig. 16.1 Virtual makerspace tour for K-12 pre-service teachers

approaches, she chose to design Bitmoji classrooms for the virtual making sessions because of its affordability of including numerous multimedia resources on the same page. These Bitmoji classrooms served as an ideal virtual platform, hosting the instructional materials and resources that could be used before and after the synchronous session. Helen designed a variety of Bitmoji classrooms tailored to specific courses and implemented them virtually, one for Birth-to-K pre-service teachers (https://bit.ly/3y1heC1) and a second one for K-12 pre-service teachers (https://bit.ly/2V3Z7g4). Meanwhile, Helen delivered a professional development session about how to create Bitmoji classrooms to provide content-specific differentiation for the college using Microsoft Teams. She also designed a Wakelet page, which has videos, links, and resources for using Bitmoji classrooms in teaching and learning (https://bit.ly/2V8KOad).

During the pandemic, it was challenging for students to access physical educational robotics, thus, Helen designed and implemented some virtual coding sessions. For example, pre-service teachers used a Bee-Bot Emulator for virtual programming activities. Then, they brainstormed different ways of merging making into coding activities in the classrooms. She also designed a themed virtual coding session, called *The Grinch Hour of Code,* for all faculty, staff, and students at the college to participate (https://bit.ly/3zxKSzd).

Another example was making props and characters for creating digital storytelling videos at home. According to the learning needs of the courses, Helen designed three types of making and video creation sessions: (a) creating green screen videos, (b) creating stop motion videos, and (c) creating Adobe Spark videos. Some

students chose to use their own devices while others checked out iPads from the lab. Pre-service teachers first outlined their storyboards, made their own props and characters using household materials, and then created their videos following the instructions Helen gave through the Microsoft Teams meetings. The projects that students worked on included animations, book trailers, and the retelling of social studies and children's stories. For these virtual making sessions, Helen collaborated with the teacher educators on designing and implementing rubrics to assess students' performance. Collectively sharing these innovative strategies and opportunities of publicly available virtual making sessions can also benefit the global maker community.

3.3 Hyflex Making Classes

To ensure every student had access to the making activities/projects in their courses, Helen designed and implemented some hyflex making sessions. One example is the Finger Capes Maker Project for pre-service teachers who took the Birth-to-K literacy methods course. During this project, Helen and the course instructor designed and co-taught some Hyflex sessions together with an in-the-makerspace experience for the students. Face-to-face and virtual pre-service teachers made their finger capes at the same time. During the walkthrough, some pre-service teachers shared their designs and talked about the symbols on the capes and their meaning either in the classroom or virtually. A second example is a lesson to support Social Emotional Learning. Students learned that a storm had gone through the park and opened conversations about fear, loss, and support. During class, students in the lab used Duplos and a build card to rebuild their ride, and online students were asked to build using either physical Lego bricks from home/daycare or with virtual bricks via the Lego Duplo App.

A third example is the Avatar Graduation Ceremony Project. Helen collaborated with the course instructor and designed a hyflex making session focusing on the connections between design thinking and performance arts. Using Lego STEAM Park sets and other materials, students made a graduation ceremony for the avatars. Face-to-face students used online chat tools to discuss with virtual students. Collaboratively, they assigned different roles for themselves, such as scriptwriting, composer, stage builder, puppeteer, and presenter. At the end of the project, students presented together by sharing their screens. The song was played about graduation and students read their scripts to create an online performance. Other hyflex making sessions were coding with physical Bee-Bots or Bee-Bots Emulators and various Lego challenges.

Based on the success of these sessions and perceived future needs, Helen has committed herself to preparing teacher candidates and educators to adopt hyflex making in the classroom. She recognized the affordances of both physical and virtual making and plans to bring this narrative to her maker education initiative, which should be a goal for global maker educators. Additionally, she began advocating for

the industry to create more digital tools to accompany the physical education technologies, which might be more convenient and suitable for virtual making. These practices can prove maker education across international educational settings.

4 Lessons Learned

Throughout the pandemic, Helen exhibited resilience and persistence in pushing her maker education initiative forward. These innovative practices contribute immensely to the continuation of the maker education initiative. Thus, based on these findings, the authors have included the following discussion about the advantages and disadvantages of virtual making.

4.1 Advantages of Virtual Making

The advantages of virtual making include the potential to improve access and equity, increase participation, broaden the dissemination and integration of making, advance computational literacy, and promote innovated pedagogy and assessment tools. Because of maker education's hands-on and collaborative nature, it is highly dependent on physical spaces, tools, and materials. The division between people who have access to these resources demonstrates a big gap in the learning outcomes concerning the integration of maker education. Therefore, international educators need to spend more time and energy when seeking practical solutions to deal with the issues brought by the digital divide. Designing virtual tours and making sessions is one approach to address this issue that provides more flexibility in time and space related to when and how to offer the making sessions. Virtual designs also lower the thresholds of joining the making community, resulting in more participation and broader dissemination of maker education integration. The authors envision that virtual learning will stay even after the pandemic, so it is crucial to continue to design virtual making experiences that ensure access and equity. It is also imperative to include the narrative of access and equity into the professional learning of maker education integration when preparing our pre-service and in-service teachers.

Another advantage of having virtual making sessions is that this creative approach positively promotes computational literacy and the use of innovative pedagogy and assessment tools. The use of these virtual technology tools for maker education integration help advance pre-service and in-service teachers' computational literacy, which might transfer into the cultivation of K-12 students' computational literacy. Similarly, modeling the use of innovative pedagogy and assessment tools facilitates pre-service and in-service teachers' future use of these pedagogy and assessment tools. The authors recommend other teacher education programs across the globe considering designing and implementing some virtual making sessions that will cultivate pre-service and in-service teachers' computational literacy. By

doing so, it will prepare them to use more innovative pedagogy and assessment tools as part of their teaching practices.

4.2 Disadvantages of Virtual Making

The disadvantages of virtual making include issues related to reinforcing equity issues, limited hands-on collaboration, a lack of virtual tools, and few established pedagogical practices and assessment tools. Equity issues with making are often due to a lack of materials and resources at home. While most students have access to no-tech maker materials such as cardboard, paper, and cereal boxes, few have high-tech digital fabrication tools such as 3D printers and laser cutters. This further exacerbates the digital divide and can lead to inequivalent experiences across social classes. Equity issues also impact the type of device that the student is using to engage in virtual making sessions. Students participating in video conferences on their phones might have more difficulties seeing the instructions. The authors recommend that virtual making tools and resources should be designed for a wide variety of devices to ensure all students can have an equitable experience.

Maker activities often thrive on their collaborative hands-on nature. In contrast, the virtual makerspace tour does not capture the joy and excitement of people making. The authors recommend that the designers and developers of maker tools should think about how the tools can be used across both in-person and virtual environments. Designers of hands-on maker tools should work towards developing digital simulations that allow global students to co-create, while also supporting communication and critical thinking skills.

Lastly, practitioners and researchers need to continue to learn more about how maker-centered learning can be supported online. While the previous decade saw a deluge of in-person maker pedagogical practices, there has been very little development of maker pedagogies that currently transfer to the virtual environment. Additionally, the authors recommend the development of new assessment tools that can measure the most effective maker practices. These assessment tools can be built into virtual maker activities and improved upon following a design-based research approach.

Acknowledgements We would like to thank the instructional technology team at the Bagwell College of Education of Kennesaw State University for their contributions to the transition to online learning and the administrative team who demonstrated tremendous leadership and applied innovative approaches during the pandemic.

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Chapter 17
Reflecting on a Year of Emergency Remote Teaching

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Abstract This chapter reflects on lessons learned from a year of emergency remote teaching at a technology-focused university since the pandemic outbreak in March 2020. We focus on practical implications for supporting faculty in future emergency remote teaching situations based on an understanding of how faculty adapted to this novel phenomenon and the challenges they encountered during the rapid transition. Specifically, we examine faculty members' perceptions and attitudes toward emergency remote teaching by taking a mixed-methods approach. We conducted a study using data collected from two anonymous online surveys administered in April 2020 and December 2020 as well as case study interviews conducted in May 2020. Our findings suggest that engaging students in interactive discussions or collaborative activities and assessing students' learning were the areas in which faculty struggled the most persistently across both semesters. Yet, we observed between the two semesters an increasing trend in the proportion of faculty who felt their course was suitable for online instruction. We also observed a similar uptick in faculty who sought instructional resources from within their department and technology experts on campus. Our study findings capture creative and flexible strategies that our instructors have used to overcome these instructional challenges (e.g., re-configuring projects to handle logistical difficulties). We also identify varying needs and other important individual factors that might explain different transitioning experiences among faculty. The chapter concludes by discussing next steps to effectively support faculty members' instructional practices and rebuild "the hybrid model" of education for the post-pandemic era.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_17

1 Introduction

The coronavirus disease (COVID-19) pandemic has shifted higher education in significant ways. In March 2020, many colleges and universities around the world switched abruptly from face-to-face to remote delivery of courses in response to the public health emergency. To better understand what this novel phenomenon entails for faculty in the longer term, research is needed to examine its impact on faculty perceptions over time. To address this problem, our mixed-method study sought to elucidate how faculty members have adapted to emergency remote teaching between Spring 2020 and Fall 2020 and discuss what lessons we have learned based on our study findings.

1.1 Notion of Emergency Move to Remote Teaching

Since the unprecedented global pandemic began in early 2020, an increasing body of research has investigated the recent institutional transition to remote teaching and suggested that this phenomenon should be considered as distinct from pre-planned and carefully designed online or distance education. Emergency remote teaching forces teachers to deliver courses with limited support within a very short amount of preparation time (Hodges et al., 2020; Trust & Whalen, 2020). Like teachers in traditional classrooms, teachers in the emergency remote teaching situation need to navigate through an iterative process of constantly evaluating the circumstances and resources available, classifying environmental factors that they can or cannot control, and adjusting teaching methods. But unlike a traditional classroom, many of these teachers have little or no experience in an online environment, are unfamiliar with the technology required, and have little to no time to prepare for the transition (Whittle et al., 2020). Not to mention the fact that their students might be equally unprepared and inexperienced in an online class.

Research findings have revealed that emergency remote teaching demands a great deal of effort and flexibility at both the faculty and institution level. For example, institutions should be capable of providing an extensive library of open online resources such as webinars and pre-planning to prepare necessary tools for online teaching (Kessler et al., 2020; Safi et al., 2020). Furthermore, this emergency has prompted some institutions to develop innovative and sustainable tools that can be easily scaled across many courses to improve remote teaching practices (Lee et al., 2020).

1.2 Challenges with Adapting to Online Teaching

From a faculty perspective, the implementation of new teaching technology can be seen a daunting task because it generally requires institutional support and opportunities to practice implementation (Kukulska-Hulmes, 2012). Safi et al. (2020) support this perceived difficulty, as their findings suggest that adapting to new technology, creating interactive class materials, and arranging collaborative projects were among the top concerns for faculty during the period of emergency remote teaching. In another study, Cutri et al. (2020) have expanded the concept of faculty readiness to transition to online teaching in the context of the pandemic crisis. Their findings suggest that faculty online readiness can be viewed as rather "forced readiness" in which preparation and teaching occur almost simultaneously due to uncertainty and temporality of the context (p. 533). To gain further insight into faculty's challenges, our study focuses on capturing faculty voices through the means of online surveys and case study interviews.

To mitigate faculty concerns with online teaching, previous research has emphasized the need for online platform and pedagogical training. For instance, one-on-one assistance through collaboration with colleagues and university personnel have been found to enhance faculty's preparation for online teaching (Lackey, 2011). However, it is possible that these well-known types of resources may not necessarily be feasible to supporting emergency remote teaching practices due to limited time and resources. Our mixed-method study aims to offer implications for the types of resources that faculty members have actually sought and found as potentially beneficial during the transition to online teaching.

Our study poses four research questions. First, how did faculty deliver instruction and perceive during emergency remote teaching between Spring 2020 and Fall 2020? Second, what instructional strategies did faculty use to support students' online learning? Third, what were some salient challenges faculty faced during remote teaching? Finally, what resources can be helpful in the future?

2 Method

2.1 Participants and Settings

Two anonymous online surveys were administered to teaching faculty at a technology-focused public university in a southern state of the US, with one toward the end of Spring 2020 (sent on April 10th, 2020) and another in Fall 2020 (sent on December 15th, 2020). Each survey was open for 2 weeks. As a result, 266 faculty respondents completed the Spring survey, while there were 148 respondents for the Fall survey, out of roughly 1100 faculty overall. Of those 148 Fall 2020 respondents, only 40 reported that they had participated in the Spring 2020 survey. In general, the distribution of demographic characteristics of faculty who responded to the survey was similar between the two semesters (see Table 17.1).

Table 17.1 Distribution of demographic characteristics of survey respondents

Current position	Count (percent)		Years of teaching	n (%)		College	n (%)	
	Spring 20	Fall 20		Spring 20	Fall 20		Spring 20	Fall 20
Professor	75 (30%)	56 (38%)	0–5 years	54 (22%)	23 (16%)	Business	19 (8%)	16 (12%)
Associate Professor	33 (13%)	20 (14%)	6–10 years	53 (21%)	27 (19%)	Computing	17 (7%)	4 (3%)
Assistant Professor	25 (10%)	20 (14%)	11–15 years	42 (17%)	21 (15%)	Design	9 (4%)	10 (8%)
Academic Professional	17 (7%)	21 (15%)	16–20 years	25 (10%)	19 (13%)	Engineering	85 (35%)	44 (33%)
Adjunct/ Lecturer	31 (12%)	17 (12%)	20 years or more	74 (30%)	54 (38%)	Liberal arts	48 (20%)	27 (20%)
Other	68 (27%)	11 (8%)				Sciences	66 (27%)	32 (24%)
Grand Total	249 (100%)	145 (100%)		248 (100%)	144 (100%)		244 (100%)	133 (100%)

For the case study, seven faculty members (three non-tenure-track and four tenure-track faculty members) participated in one-on-one interviews during May 2020. Three participants were from the College of Design, two from the College of Engineering, and the other two from the College of Sciences. The range of years of teaching at the institution was between 2 and 34 years.

2.2 Procedures and Data Sources

To capture both general trends and faculty voices for understanding the complex phenomenon of emergency remote teaching, our study adopted a convergent mixed methods design in which we gathered both quantitative and qualitative data concurrently and compared the results (Creswell & Guetterman, 2019). First, the researchers coordinated with the Office of Provost to distribute a survey link through the all-faculty e-mail listserv. Only faculty who were currently teaching and used to teach in-person were invited to participate. Interested faculty were asked to review a consent form before continuing the survey, which took less than 20 min to complete.

For the case study interviews, a stratified sampling method was used in which we contacted via e-mail two or three faculty members who were recommended by the Dean's Office in each of the six colleges. Faculty members who expressed an interest in participating in the study were asked to review a consent form before proceeding. The individual interview sessions took place virtually and were audio-recorded using BlueJeans, a web-conferencing tool. Each session lasted for approximately 30–40 min.

2.3 Measures and Data Analysis

The online survey consisted of 18 closed-ended and 2 open-ended questions that were designed to capture participants' remote teaching experiences. Measures of faculty perceptions consisted of five specific scales, including: degree of adjustment to instruction, suitability of course subject to remote teaching, and perceived level of comfort, satisfaction, and difficulty. The quantitative portion of the survey data was analyzed primarily by using descriptive statistics. Regarding the qualitative data (i.e., open-ended response data), a constant comparison analysis was conducted in which we iteratively compared and interpreted codes to identify broad patterns of perceptions or behaviors across the respondents (Creswell & Guetterman, 2019).

Questions for the case study interview were designed to gather faculty's input about their teaching background (five questions) and emergency remote teaching experience (five questions). Two of the researchers analyzed the case study interview data with a particular focus on identifying the participants' salient needs and areas of resources that may be beneficial in the future. We conducted a systematic coding analysis to compare the data collected within and across cases and thereby capture nuanced viewpoints (Yin, 2003). We first created initial categories about notable issues and resources and subsequently made detailed descriptions of each case. Then, we expanded and revised codes through an iterative process of carefully describing and classifying codes and interpreting relevant themes that emerged across the data (Creswell & Guetterman, 2019). Specifically, through this process, we identified six broad categories of resources that can help meet faculty needs.

3 Findings

3.1 Faculty Experience and Perception About Transition

First, we sought to examine how faculty delivered instruction to adapt to emergency remote teaching. There was a notable difference in the trends between Spring and Fall respondents such that they have increasingly used synchronous or live delivery methods and even some in-person methods, which is somewhat expected. Almost half of the total Spring respondents (47%) reported using a combination of asynchronous and synchronous methods. Also, 35% primarily used synchronous methods while the remaining 18% relied on asynchronous methods. Among Fall respondents, 48% reported primarily using synchronous methods. Another 33% indicated implementing face-to-face elements. Only 19% reported using asynchronous methods.

Then we examined the faculty's perceptions, specifically around the degree of adjustment, suitability, comfort, satisfaction, and difficulty (see Table 17.2).

On average, the Fall group reported making slightly more adjustments and perceiving more difficulty in switching classroom activities to online than did the

Table 17.2 Comparison of transitioning perceptions between the semesters

Perception area[a]	Likert scale	Spring 2020		Fall 2020		t
		Mean	SD	Mean	SD	
Adjustment	0 = none to 4 = a great deal	2.82	0.96	3.08	1.00	−2.59*
Suitability	0 = not well at all to 4 = extremely well	1.95	1.15	3.30	1.15	−11.25***
Comfort	1 = very uncomfortable to 5 = very comfortable	3.87	0.83	4.07	1.07	−2.31*
Satisfaction	1 = very dissatisfied to 5 = very satisfied	3.60	0.76	3.68	0.81	−1.01
Difficulty	1 = very easy to 5 = very difficult	3.15	1.06	3.41	0.77	−2.39*

Note. * indicates $p < 0.05$ and *** indicates $p < 0.001$

[a] The comfort scale incudes four sub-scales: updating the syllabus, moving quizzes and homework online, transitioning lectures to online, and engaging students in discussion with online forums. The satisfaction scale includes delivering learning content, uploading learning materials, communicating with students, holding office hours, and assessing students' learning and progress. The Cronbach's alpha of the comfort scale was 0.77 and that of the satisfaction scale was 0.83, indicating acceptable levels of internal reliability

Spring group. However, interestingly, the Spring group perceived on average that their course subjects were only "moderately" suitable for online instruction whereas the Fall group indicated "very" suitable. Also, the Fall group reported an increased level of comfort toward conducting remote teaching activities, compared to the Spring group. Yet, within the comfort scale in each semester, a relatively large proportion of faculty (22% in Spring and 23% in Fall) reported either "uncomfortable" or "very uncomfortable" with engaging students in interactive discussions online. Both groups also reported very similar levels of average satisfaction, which ranged somewhere between "neutral" and "satisfied." Within the satisfaction scale, assessing student learning was the area with which both groups were least satisfied, as nearly 30% reported being "dissatisfied" or "very dissatisfied."

3.2 Instructional Strategies to Support Student Learning

We analyzed the survey response data collected from two open-ended questions to capture a snapshot of how the faculty respondents generally dealt with the issues of decreased interactivity since switching to remote teaching. In one question, we asked the respondents to report any instructional strategies they used to enhance a sense of belonging in their courses. As a result of the analysis, four broad topics emerged from both surveys. In Spring 2020, 27% of total comments (n = 214) mentioned providing students with social support by showing empathy and warmth or by holding a virtual "happy hour" in which the class members could casually interact with one another in real time. The respondents also commonly reported having frequent communications with students about their learning experiences through virtual office hours (25%) or engaging students in collaborative activities (e.g., discussion boards) (23%). Another 19% mentioned offering students personalized care

or being responsive to students' individual concerns through email or phone calls. The results of the Fall 2020 survey showed slightly different trends (n = 111). Almost half of the comments (45%) mentioned using collaborative activities, and 34% mentioned offering extra class meetings. Compared to Spring, a smaller proportion of respondents reported providing social support (12%) and personalized care (5%), suggesting that faculty might feel that students had adapted better by Fall and thus perceived less need for social support.

Another question asked how the faculty accounted for students in disadvantaged situations such as having limited access to the internet. Results from both surveys revealed that many faculty members added some degree of flexibility to the format of lectures, assignments, or exams (e.g., logistics, deadlines), 60% of the total comments from Spring (n = 244) and 63% from Fall (n = 118). One of the commonly mentioned strategies included dividing a continuous long lecture into a series of short videos—typically less than 15 min—when uploading pre-recorded lecture videos. Next, 15% of the Spring total and 22% of the Fall total reported accommodating students' individual needs related to time zone differences or electronic device issues. The remaining 11% in Spring and 5% in Fall indicated that they were aware of the issues but did not use specific strategies. Overall, these suggest faculty used creative strategies to support students' learning and access to resources.

3.3 Challenges During Emergency Remote Teaching

Finally, we examined prevalent challenges and issues that faculty often faced during emergency remote teaching. Our survey findings showed that many faculty respondents continued to encounter a range of challenges across the semesters. These challenges centered on connectivity and technical problems. One survey question asked respondents to report whether they had any issues during remote teaching and if so, what the major sources of these issues were. In the Spring data (n = 243), more than three quarters of respondents (76%) reported having some issues related to remote teaching. Regarding the primary sources of issues, internet connectivity was most frequently reported (20%), technical issues outside their control was next (14%), followed by teaching equipment issues (12%). Thirty percent of those who reported having issues chose "Other" sources of issues. Similarly, yet a slightly higher percentage of the Fall respondents (82%; total n = 142) reported experiencing some issues such as technical issues (20% of this 82%), connectivity problems (19%), and teaching equipment issues (13%) and other issues (30%).

To broaden our understanding of the source of these issues, we analyzed optional open-ended comments submitted by those respondents who selected the "Other" category. According to their comments, these issues fell within four broad categories: (1) unfamiliarity with instructional tools (28% of the Spring total; 30% of the Fall total); (2) difficulty of assessment (26% in Spring; 19% in Fall); (3) students' accessibility issues, different time zones, and personal challenges (29% in Spring; 30% in Fall); and (4) time constraints and extra effort from instructors (17% in

Spring; 21% in Fall). Our findings suggest that faculty's challenges appeared to stem mainly from technology issues across the semesters. However, it is worthwhile to note that many of our respondents had to continue dealing with both their students' and their own personal and emotional challenges, which seemed to add more difficulty to their transitioning experience. Moreover, as we observed in case study interviews, we should note that there exist varying needs and other important individual factors (e.g., familiarity with technology, home environment, professional history) that might explain different transitioning experiences.

3.4 Lessons Learned: Implications for Helpful Resources

Finally, we were interested in drawing implications for types of resources that can help faculty better cope with future emergency remote teaching situations. A set of survey questions asked faculty to rate the helpfulness of various instructional resources for remote teaching that were available at the institution during Spring 2020 and Fall 2020. Across the semesters, many respondents rated support from their department or college and shared tips from other faculty as either "very" or "somewhat" helpful, ranging from 57% to 73% (see Fig. 17.1). In fact, these types of resources continued to be sought by faculty most actively, indicating that faculty might view such internal resources as beneficial for the emergency situation. We also observed a notable uptick in faculty who sought instructional resources from technology experts on campus. This suggests that faculty's needs for receiving appropriate technology support require constant attention from the institution.

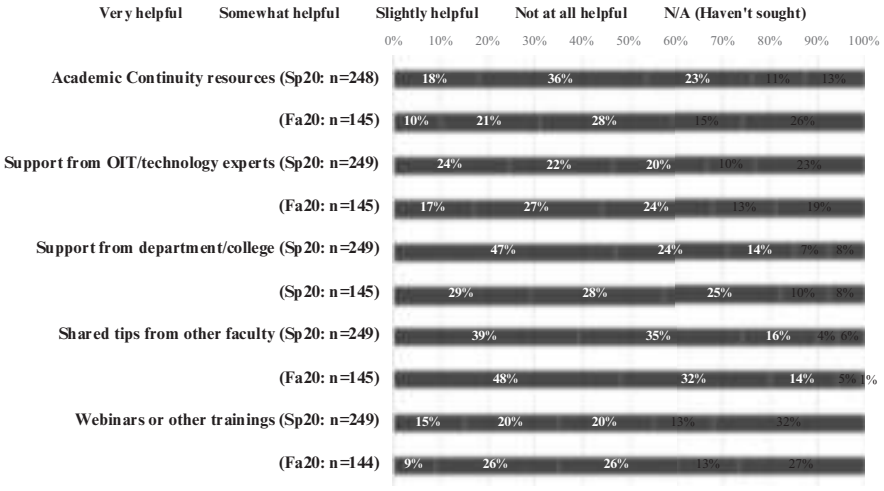

Fig. 17.1 Perceived helpfulness of different resources for remote teaching

With respect to the interview data, we identified six broad categories as a result of the coding analysis. The first category is provision of accessible teaching equipment and tools. The participants often mentioned that they wished they could receive more help from technology experts or IT staff to learn new features in the Canvas learning management system or get access to a variety of digital tools that are suitable for different modes of course delivery. Second, the need to increase logistically accessible learning materials and facilities for students was also brought up frequently, especially for hands-on subjects (e.g., studio courses). As for the third category, the participants echoed the potential benefit of receiving customized support for remote teaching. Examples of such types of resources would include proactive support from the department (e.g., purchasing equipment), workshops tailored to subject matter or class size, and tips from peer faculty members. Fourth, many participants expressed interest in connecting with teaching experts to have opportunities to learn, practice and apply various instructional strategies to online teaching. They were interested in learning best practices to personalize teaching, maintain student engagement, and facilitate critical thinking and collaborative learning. These findings suggest the value of providing individual faculty members with personalized resources and tools that they can implement effectively and efficiently to their remote teaching.

Fifth, beyond individual perspectives, the participants generally voiced the need for active communication from the institution to ensure quality and standards in remote teaching and learning. They often mentioned that they would benefit from receiving clearer guidance on exams or assessment policies (e.g., honor code, digital proctoring) and resources to promote the sustainability of a hybrid teaching model. Lastly, it seems crucial that the institution dedicates resources to supporting the well-being of faculty members. These resources are expected to not only make the transition less stressful for faculty but also equip faculty with appropriate tools to help students overcome personal challenges. Overall, our findings highlight the essential role of institutions in setting clear expectations about emergency remote teaching practices and building a supportive campus community that can help faculty members meet such expectations.

4 Conclusion

During emergency remote teaching and swift adoption of the hybrid teaching mode, faculty perceived increased levels of comfort and greater suitability of their courses for online teaching. Moreover, faculty appeared to shift their focus of instructional strategies from social and emotional support to academic support by implementing various interactive class activities and actively addressing individual students' needs. Nevertheless, faculty continued to experience obstacles associated with reduced interactivity and connectivity while adapting to remote teaching. Based on our findings, institutions should consider increasing accessibility of teaching and learning tools, provide systematic resources to ensure instructional quality, and encourage local units (e.g., colleges, schools) to proactively support faculty needs and concerns.

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Chapter 18
A Reflection on Online Teaching and Learning Through the Pandemic: Revisiting Creativity

Jin Mao

Abstract Teaching through the pandemic has revealed critical educational issues related to online learning as well as the importance of considering contextual influences and creative solutions. The purpose of this chapter is to reflect on those issues and discuss creative alternatives in response to the changing social, cultural, and technological systems. The reflection centers around three themes with a focus on recommendations for the future based on what we can learn from the emergency remote teaching and learning (ERTL) experience. The ideas proposed in the reflection themes can help establish the needed mindsets and generate creative approaches to ERTL during crisis times. Creativity is discussed and redefined within the context of ERTL during the pandemic. We should develop creative thinking, creative mindset, and creative design in re-conceptualizing assessment activities and the assessment culture for online learning as well. Recommendations to help sustain the impact of creative solutions include the need for solid network infrastructure, an innovative mindset for assessment, and a need for educational design research on creative solutions to online learning problems.

1 Introduction

On March 11, 2020, the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) as a global pandemic (WHO, 2020). Since then, school closures (SCs) affected the educational routine of nearly 1.6 billion learners across more than 190 countries on all continents, which became the largest disruption to education systems worldwide (United Nations, 2020). SCs continued to be implemented globally in 2020 and by May 2021, there were still 26 country-wide SCs and over 182 million learners affected with many countries having more than 41 weeks of SCs (UNESCO, 2021). In the worldwide wave of SCs, many schools

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_18

and universities transitioned to virtual environments to ensure the continuity of teaching and learning.

As a result, the term "online learning" became an overnight buzzword that was thought of as the immediate solution available for all schools and universities in countries with proper broadband access. In the U.S., nearly 93% of households with school-age children reported the use of distance learning and online resources by August 2020 (McElrath, 2020). Globally, there have been numerous efforts in improving the use of educational technologies, including virtual learning and other traditional technologies such as radio, television, and texting to support access to remote learning during the pandemic (The World Bank, 2020). Learning technology professionals attempted to differentiate this type of emergency remote teaching and learning (ERTL) from regular online teaching that has been seriously researched and developed based on decades of research on distance education. ERTL has revealed critical educational issues and the purpose of this chapter is to reflect on the issues and the creative alternatives in response to the changing social, cultural, and technological systems.

1.1 Critical Questions

A year after the initial experimentation of ERTL, the debates on the ERTL as a boon or bane and its impact on post-pandemic normalcy are still going on. In addition, there have been various debates and predictions on post-pandemic education: Are we going back to normal (i.e., traditional, in-classroom, and structured education) or a new normal (i.e., flexible, online, and just-in-time education)? Regardless of the different attitudes toward ERTL, there have been research findings showing different degrees of learning loss during the COVID-19 pandemic. Engzell et al. (2021) found that even with the best-case scenario like The Netherlands, with a short SC, strong and equitable school funding, and broadband access, students still made little or no progress in learning from home, especially in disadvantaged homes. Moreover, there have been inequitable effects on different countries and regions or different schools and various degrees of negative effects on students with different levels of economic status or performance (Engzell et al., 2021; Kuhfeld et al., 2020).

Combined with the constantly changing COVID guidelines from the pandemic experts, these different perspectives and predictions can only add to the confusion and unpredictability that have already been agonizing educational leaders who are trying to make school-opening decisions. Various issues related to ERTL have intensified the debates on the business and learning values of online education as well as the overall technology use in education. These issues and debates have challenged technology professionals with critical questions such as: Will the business-focused conceptualization of technology use and online education continue to stay after the ERTL and the pandemic times? What should we do to ensure quality learning, equity, and democracy in educational processes while the world continues to combat the pandemic or other environmental disasters in the future? How can we

disseminate the knowledge base and best practices from the field of learning technology and design to optimize technology-supported learning environments? By no means serving as a direct response to these broad questions, the reflection can hopefully lead to improved design practices that address quality and equity, and establish mindsets for true learner-centeredness during crisis times.

2 A Mindful Reflection

Following the above discussion, I will reflect on the ERTL and discuss the implications for future online teaching and learning. The reflection centers around three themes with a focus on what we can learn from this experience: (1) There is a need to integrate humanity, care, and empathy into emergency online teaching practices. (2) Using systems thinking to guide the planning, design, and development of online courses and programs while considering technology affordance may provide new insights into the role, characteristics, and preparedness of online learners and instructors (Mao & Shearer, 2019). (3) Embracing the ubiquitous influence of distance learning and creative use of technology should become part of our everyday preparation for the changing educational and global environment. While focusing on establishing responsive mindsets for teaching through the pandemic, the three themes aim to propose creative ideas and guidance for both ERTL and future online education. They are connected and may collectively help educators prepare for times of flux using technology.

2.1 The Need to Integrate Humanity, Care, and Empathy into the Emergency Online Teaching Practices

SCs have always been one of the nonpharmaceutical measures taken to curb the spread of disease during a pandemic. However, the current wave of SCs has left parents scrambling for alternative solutions, trying to fulfill all duties required of parents, caretakers, homeschool tutors, and various other responsibilities as needed by a household while working from home. Concerns about the pandemic, along with problems such as social isolation, economic vulnerability, increased tensions, and domestic violence unavoidably produce an indirect impact on the home environment, where students are expected to continue education.

Therefore, there is a serious need to integrate humanity, care, and empathy into the ERTL practices. When teaching through a pandemic, educators should not assume that everything is “normal” for students. All personal and environmental conditions that normally support a learner have been more or less changed or even severely disrupted. In such crisis times, survival, safety, and emotional health should come before accountability when learners experience more social or emotional

isolation than usual because of the disrupted social and home environment. Moreover, not only students but also teachers in K-12 education, parents, and faculty members in universities are faced with similar challenges when working from home during the SCs or by hybrid modes afterward. Marshall et al. (2020) found that teachers felt inexperienced with online teaching and unable to make a normal transition to ERTL because of the extraordinary circumstances both at school and at home. Parents in Turkey viewed ERTL as a challenging option due to increased screen time and social isolation and considered it unsuitable for students with special needs and young children (Misirli & Ergulec, 2021). Vanleeuwen et al. (2021) found that higher education faculty members felt as if they were "juggling while blindfolded" when working from home, and experienced "a cycle of never-ending repetitiveness, sadness and loss, or managing life, teaching and other professional responsibilities with little sense of direction" (p. 1306).

Correspondingly, there have been a lot of creative approaches to integrating humanity, care, and empathy into the ERTL. For example, many universities changed course discussions or projects to authentic topics related to the pandemic, provided pass/fail or satisfactory/unsatisfactory as a grade option, and some instructors made due dates much more lenient. Example emerging approaches to ERTL also include Ravitch's (2020) flux pedagogy that encourages responsiveness, compassion, and adaptability; and Baran and Alzoubi's (2020) human-centered design that emphasizes empathy and pedagogical problem-solving. Caring for the learners, referencing personal experiences, and considering the learners' perspectives are the three conceptions of designer empathy in distance learning contexts (Matthews et al., 2017). These examples can help educators model good practices in integrating humanity, care, and empathy into ERTL or future online teaching.

Important findings about the relationship between emotion and cognition owing to the rapid growth in Neuroscience research have provided further guidance for integrating humanity, care, and empathy into ERTL practices. Emotion is defined as "the state of mind a person is in at a particular moment, as well as the psychological response a person is experiencing at that time" (Radvansky & Ashcraft, 2014, p. 471). As part of the umbrella term "affect" (Schunk, 2020), emotion influences memory and intrinsic motivation, and it is crucial to plan and provide the most effective emotional atmosphere to build student confidence and help reduce adolescent stress that may impair effective learning (Willis & Willis, 2020). Such research findings on emotion and cognition can serve as a guidance that helps educators effectively integrate humanity, care, and empathy into ERTL to produce positive emotions and energize the learners during the pandemic. This may help reduce learners' anxiety and stress and avoid long-term damage to their intrinsic motivation, problem solving, and the ability to learn.

2.2 *Using Systems Thinking to Guide the Planning, Design, and Development of Online Courses and Programs*

Despite the vastly available tools and resources, pandemic-relevant research findings have revealed the consequences for education such as interrupted learning and development, exacerbated gaps, uneven and inconsistent access to the internet and electronic devices, and the aggravated limitations of standardized testing (García & Weiss, 2020). Issues such as inequitable access, learning loss, and mental health can be universal and are not limited to developing countries. These serious issues can be envisioned in Bronfenbrenner's contextual model of human development, which depicts concentric circles around a child's development as illustrated by Schunk (2020). Mao and Shearer's (2019) system-informed framework for technology affordance also provides a holistic understanding of the relationship between technology affordance and context. Using a system modeling approach, their framework conceptualizes the interactions and feedback loops among many variables of an online learning ecosystem including design, infrastructure, and users. Ideally, contextual factors should be considered holistically together with technology affordance so that any negative influences caused by equity, affordability, or accessibility could be reasonably considered and minimized.

This calls for an increasingly important need in providing educators or designers professional learning to develop an awareness of contextual influences and how technology use and learning design can work creatively toward the intended learning gains under such influences. The awareness of contextual influences and how they interact with the planned learning environment by systems thinking may help designers plan instructional and assessment activities in a true learner-centered manner. It may also help educators avoid involuntarily following the accountability requirements from a state of normalcy and leaving no room for creating a flexible, compassionate, yet rigorous learning environment during crisis times. Although examples for implementing systems thinking on a comprehensive scale for online education are yet to be developed, there have been efforts in using systems thinking to analyze inequality and learning loss in ERTL (Belafi, 2020).

2.3 *Embracing the Ubiquitous Influence of Distance Learning and Technology as Part of Our Everyday Preparation for the Changing Educational and Global Environment*

The COVID-19 pandemic continues with the recent Delta variant regardless of vaccination status (CDC, 2021). While ERTL has been imposed on every stakeholder by the ongoing pandemic, the ubiquitous influence of technology-empowered distance learning is becoming part of our everyday preparation for the changing educational and global environment. The use of learning technologies should stay as a

foundational and integral part of future pedagogy, and digital literacy should be a basic requirement not only for all citizens.

It is time to rethink if the current online course design, development, and delivery that model good practices from in-person environments are effectively producing the intended learning outcomes and satisfactory experiences, especially with the added physical, psychological, and technological difficulties during the pandemic. Many complaints against ERTL seem to stem from the sudden, unplanned switch to an online delivery mode and the apprehension about ERTL for the first time. Proper instructional planning and good preparation by both educators and learners are key to success when consistent access to the internet and electronic devices are in place. It will only be a partial conclusion to conclude online learning is not effective based on the sudden switch to e-classrooms and ERTL during the pandemic, but we can certainly learn from the problems exposed in this global experience and use them to improve future online learning.

3 Revisiting Creativity

Summarizing the reflection on ERTL, it is clear that crisis times demand responsive mindsets and creative alternatives when in-person interaction is limited or even obstructed. The ideas proposed in the reflection themes can help establish the needed mindsets and generate creative approaches to ERTL during crisis times. What is creativity? I will discuss how creativity is defined in both the literature and the context of ERTL during the pandemic.

Hokanson (2018) says, "Creativity will always be in demand because the future will always be different from the present in which we are comfortable" (p. 1). The future is now the reality that we are faced with. Globally, there have been exacerbated disagreements on ideological beliefs, racial strife, equity issues, social justice, and economic disparities in addition to the pandemic effects. All of these have led to an urgent need to generate creative solutions and prepare for uncertain times because of the fast-changing environmental, political, and social factors and their ripple effects on education.

Creativity or creative thinking is generally defined as the ability to generate ideas or solutions that are novel and applicable, and it is different from problem solving and innovation (Hokanson, 2018; Schunk, 2020). Creativity is considered a higher-order thinking skill and creating is the highest level of cognitive process by the revised Bloom's taxonomy (Anderson et al., 2001). The close yet complex relationship between creativity and technology has been constantly emphasized in education with the advancement of digital technologies, innovation, globalization, and rapid digital change (Henriksen et al., 2018).

In ERTL, creativity is more important than ever to help continue education and keep students engaged. Educators have used many creative solutions including using various technology supported instructional or assessment techniques, or even edutainment (mixing entertainment and education). In some countries, WhatsApp

and Tiktok are used for teaching during the pandemic. In the U.S., a teacher dressed up as more than 30 characters from Jedi Master Yoda to Picasso in her middle school language arts and social studies class Michigan (Blackburn, 2020). Bitmoji classrooms have become many teachers' favorite method to interact with their students virtually. Many school districts used Wi-Fi buses to help students who lacked access to the internet. Inviting guest speakers and using creative online resources have been widely used in both K-12 and higher education during the pandemic. Tapping into star power or creating opportunities to unleash student creativity are recommended innovative ways to make online learning creative and effective (Kurlander, 2020).

Following these examples and the reflective discussions in this chapter, I would define creativity as the ability to identify new approaches to meeting the challenges in teaching through the pandemic by adopting systems thinking and technology affordance views, considering contextual influences, and integrating humanity, care, and empathy into online course design and teaching. According to Hokanson (2018), creative ideas should be novel (new) and applicable (useful). The COVID-19 pandemic presents unique challenges for the world and for education, which make it impossible to replicate past experiences (Engzell et al., 2021). Creative solutions in ERTL can help mitigate various limitations of online delivery such as the digital divide, inequity, isolation, and others. Such creative solutions may even fundamentally change traditional instructional methods to a degree that makes educators and students feel it hard to go back to the old normal after the pandemic.

4 Conclusion

In conclusion, the answer to the debate on going back to "normal" in post-pandemic times and the discussion on which type of "normal" we will return to depend on the great impact of creative solutions empowered by technology use during the pandemic. To help sustain the impact of creative solutions, we need solid network infrastructure as the basic support, an innovative mindset for assessment, and a need for educational design research on creative solutions to online learning problems.

First, the success of online or ERTL will ultimately depend on solid network infrastructure. Implementing creative solutions requires not only educators' investment of time, energy, and creativity, but also resources, professional support, as well as support from all levels. However, none of these would be possible without a sound network infrastructure, which requires policy-level support to ensure affordable and equitable access as the basic technology affordance for all.

Second, we need an innovative mindset for assessment after decades of criticism against the positivist assessment culture while education and its relevant ecosystems have been changed by digital technologies significantly. Involving students in assessment and switching to assessment for learning are new perspectives that have been recommended in assessment reforms for years (Mao & Peck, 2013). Digital tools and applications have greatly enhanced the feasibility and impact of this line of assessment techniques, for example, e-portfolios, virtual labs, gaming and

simulations, and digital badging and micro-credentialing. Learning analytics research and practice have made it possible to generate automated, personalized, and adaptive assessment and feedback processes (Ifenthaler, 2017). Using technology-based assessment activities may unlock the full potential of online environments, assessment for learning, and active learning while at the same time reduce test anxiety and inequity for students. It is clear that we should develop creative thinking, creative mindset, and creative design in re-conceptualizing assessment activities and the assessment culture for online learning.

Finally, we are faced with a critical need for educational design research on creative solutions to online learning problems. Using a systems approach, research on contextual factors in combination with technology affordance may provide new insights into the role, characteristics, and preparedness of online learners and instructors (Mao & Shearer, 2019). Furthermore, Reeves and Lin (2020) called for meaningful educational design research to address serious problems related to teaching and learning instead of expecting the newest technical innovation to change education. Globally, the issues from ERTL have accentuated the importance of considering contextual influences in designing and researching technology-supported learning environments. Using educational design research to study these issues and the creative solutions to the issues may lead to significant and meaningful contributions that are critically needed by the changing education landscape globally.

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Chapter 19
Chilean Perspectives on Educational Experiences and Innovations in Emergency Contexts

Jaime Sánchez and José Reyes-Rojas

Abstract Emergency remote teaching began suddenly and widely by March 2020 after the World Health Organization declared the coronavirus pandemics Chilean education, as many other countries around the globe, adopted the methodology of remote teaching with little no previous experience and a lack of adequate and pertinent administrator, teacher, student, and parent preparation. This chapter presents, analyzes, and discusses the Chilean higher education experiences and innovations in emergency contexts during the COVID-19 pandemic. Actual and future perspectives are discussed on the basis of education in a country with frequent emergency contexts such as earthquakes, tsunamis, floods, fires and now a pandemic. We applied a systematic review research method to the higher education data and information that emerged during the coronavirus pandemic in Chile during the last year. As a result, we ended up drawing some trends, issues, and perspectives on Chilean higher education teaching and learning activities and innovation in emergency contexts. Finally, considering the results obtained, we discuss the main themes that emerged, and some lessons learned by Chilean education in times of pandemic, in order to be better prepared and equipped to face emergency situations with less disruption and detriment to teaching and learning in the future.

1 Introduction

COVID-19 forced a large part of higher education institutions to maintain academic activity remotely, even when the capabilities or technological means were not necessarily available to carry it out. For Vallejos and Guevara (2021) emergency remote

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_19

education constitutes the breaking point that the educational systems of the world needed to rethink the ways of managing learning (p. 170).

There are multiple investigations that have addressed the experience of higher education institutions in the context of a pandemic. Authors such as Marinoni et al. (2020) report multiple difficulties in higher education institutions (HEIs) across the globe, while other studies such as those by Ali (2020) approach the phenomenon in an exploratory way during the first months of the pandemic, which makes it difficult to elaborate a vision about the difficulties inherent to emergency remote teaching and, instead, reviews the ways in which HEIs embraced remote education.

This diverse scenario of studies, although allowing us to approach the experience of HEIs during the COVID-19 era, does not yet permit us to identify clear trends that allow us to contribute to the construction of what will be post-pandemic education or education for crisis situations. Studies such as those of Said-Hung et al. (2021a) that considers the realities of various Latin American countries, and Ali (2020) in his review of HEIs in the world, address the phenomenon in an interesting way, but at such an early stage of the pandemic that it does not necessarily reveal the way in which the HEIs maintained the educational exercise as it continued.

Therefore, there is a need to search for these trends in regions that have been less explored during the course of the pandemic, such as Latin America, and especially in a country that has certain technological conditions to develop a remote education, and further, has social inequalities, which may possibly be influencing the way in which teachers and students participate in their HEIs through online communication systems. Therefore, we set out a study based on the following research questions: (1) What are the main trends emerging from the educational experience in higher education in the COVID-19 era? (2) What projections can be established considering the findings proposed by the scientific literature regarding experiences in higher education in the COVID-19 era?

2 Methodology

To answer the questions raised, we implemented a systematic literature review, a research procedure that reduces the risks of a partial selection of bibliographic material (Cremin & Oliver, 2017, p. 271), while critically addressing both the characteristics and the findings within a given topic under study (Sánchez & Reyes-Rojas, 2020).

To focus the search, the initial selectivity criterion was that the documents in whole or in part describe experiences or proposals carried out in higher education institutions in Chile. For this, the following search string was constructed: *(higher OR superior) AND (educa* AND covid) AND (Chile*).* The search was carried out in two databases with high academic impact, Web of Science (WOS) and Scopus, at different times during 2021. A total of 28 documents were selected from the 2 databases, of which 6 were repeated and 1 was excluded because, despite being published in the COVID-19 era, the information collection had been carried out 2 years

before the pandemic (Cobo-Rendón et al., 2020). In this way, a final sample of 21 documents was obtained.

3 Results: Main Trends

3.1 Mental Health

This trend accounts for the problems brought about by the change in modality from face-to-face to remote at the level of the entire educational community in the different tracked higher education units.

At the level of teachers, great stress is reported because of the change of modality due to intensifying working hours and being under the pressure of having to acquire new teaching skills to carry out remote education (Gajardo-Asbún et al., 2021; Cano et al., 2020). From the same teaching staff, voices appear that alert with fear a possible technological replacement of university professors (Gajardo-Asbún et al., 2020), while other studies in addition to stress, investigate anxiety, which at the level of professors increases in those with a negative view of their own institutions (Said-Hung et al., 2021b). These data are similar to the studies that considered not only professors but also university officials, where most of the sample presented symptoms related to stress or anxiety (Jorquera & Herrera, 2020). Finally, the evidence that stress is greater in academic than non-academic officials, or that stress symptoms are greater in workers under 40 years of age, opens the door to new studies that allow the evolution of these trends on employment to be followed. Academic and labor malaise in the context of higher education radically transferred to remote education in Chile.

At the student level, the picture is no different. Studies report a risky trend in terms of discomfort, anxious or depressive symptoms in students, as is the case in the work of Pérez-Villalobos et al. (2021), who show how a large part of the students claimed to perceive that their professors did not even ask them about their state of personal well-being during the most intense months of the pandemic. In this sense, the research by Carvacho et al. (2021) allows to know in detail the evolution of stress symptoms among students surveyed before the pandemic in contrast to other respondents during the pandemic, which as a result, showed a significant increase in both women and first-year students. The latter contrasts with other studies in the sample that have identified a higher degree of acceptance of online education in first-year students in careers such as pedagogy in physical education (Flores et al., 2020) and in health careers (Pérez-Villalobos et al., 2021). Finally, studies such as those of Klaassen et al. (2021) help to compare the evolution of stress in dental health students between contexts that abruptly moved to remote education, in contrast to others in which the change was a bit more progressive, resulting in less development of stress symptoms in the latter.

3.2 Increasing Gaps

This trend shows how previous socio-economic and cultural gaps not only affected the participation and health of the different members of the educational community, but also that such gaps became more acute in the context of emergency remote education. Thus, for authors such as Alarcón López et al. (2021) affirm that the unequal conditions of access to the internet or to devices suitable for participating in classes, exacerbated the origin gaps, among which economic differences and gender discrimination stand out. In line with this finding, studies affirm that being a woman is a strong predictor for the variable stress and anxiety in dental health students (Klaassen et al., 2021, p. 5). Other studies affirm that stress is greater in female university officials and professors (Jorquera & Herrera, 2020, p. 5). Among the conditions that may be exacerbating this gap are concerns within the home and care tasks also appear as an important factor in the incidence of mental health risk, higher in women than in men (Alarcón López et al., 2021; Said-Hung et al., 2021b). To these tasks are added the longer working hours (Gajardo-Asbún et al., 2021) or barriers in moving from work to home, such as a poor internet connection and access to electronic devices (Said-Hung et al., 2021b; Cano et al., 2020; Alarcón López et al., 2021).

3.3 Return to Traditional Ways of Teaching

Another relevant trend that stands out is the retreat of student-centered methodologies and the return of traditional forms of teaching, more expository and less based in field experience. For authors such as Canales and Silva (2020), online education through platforms "should not focus exclusively on the creation of forums and delivery of tasks", but rather active methodologies should be sought to put students at the center of the process (p. 9). This theoretical proposal within the sample collides with complex online teaching experiences, in which teachers have been forced to apply technological tools without necessarily doing so from a constructivist paradigm. Such is the case of the study by Pérez-Villalobos et al. (2021) on the level of student satisfaction with remote teaching during the first months of the pandemic, who reported an inclination of their professors towards more expository and less student-centered methodologies (p. 11). In the case of the study by Cano et al. (2020) the same professors who point out that they continued conducting their classes as if there had not been a change of modality, to which the authors reply stating that "online education must be transformed" with tools that allow students to have an adequate experience in a context of new learning and communication tools (p. 56). The perspectives of these studies raise concern regarding the possibility that the intensification of online education because of the sanitary restrictions imposed in the management of the pandemic, could mean a setback in educational paradigms focused on the experience of learning.

3.4 Academic Performance

When reviewing how the students performed in the context of emergency remote education, we can appreciate different strategies and ways of facing the emergency, which accounts for differences both in the student body and in the institutions in charge of training (Chávez et al., 2021; Gonzalez-Perez et al. (2021). An example of this can be found in pre-service teacher training, where a study reported a greater commitment in the evaluation process in the face of the changes in approach introduced by the researchers, yet it also showed signs of low levels of commitment with innovative experiences in evaluation during the pandemic (Charbonneau-Gowdy & Salinas, 2020). There are experiences that show how faculty have managed to overcome the problems of student engagement with their own experience and their higher education institution, through peer tutoring systems, where the student-tutors considered that their task was better carried out when there were more symmetrical relationships between them and their peers of lower years (Araya et al., 2020). There are also experiences in the training of health professionals where they faced the lack of clinical practices, implementing various strategies as solutions such as the implementation of bibliographic videoconferences, online seminars with clinical cases, video analysis with specific surgical techniques, etc. (Álvarez et al., 2021).

4 Discussion

The results obtained show a clear concern about the consequences that remote education is having at the mental health level for different actors of the community. As well as the initiatives that promote the need to implement institutional measures that ensure the well-being of the Chilean higher education community, there are voices that point out that the health and safety of the students, officials, and teachers of the institutions should be a main priority (Sahu, 2020), while studies carried out with students from countries such as the United Kingdom affirm that the COVID-19 pandemic has negatively impacted on the mental health of students (Savage et al., 2020), which coincides with the findings of Carvacho et al. (2021) in Chilean university students. This trend is repeated at the level of teachers, where studies at the higher education level in countries like Spain reveal an increase in stress and anguish, while socioeconomic and gender gaps in teachers are widening (Ozamiz-Etxebarria et al., 2021), which coincides with the studies on teacher discomfort in Latin American universities both due to the increase in anxiety symptoms and the problems caused by moving work to home (Said-Hung et al., 2021b). The results obtained in the present study also agree with recent findings on problems in well-being and mental health in school teachers, where the variables that have to do with job instability increase the risk of mental health problems (Palma-Vasquez et al., 2021). Contrasting these perspectives on mental health are documents such as those by Canales and Silva (2020), who do not consider the variable of mental health or

teacher well-being when making training proposals on the use of ICT in distance education contexts, while in school education proposals such as those of Darling-Hammond et al. (2020) highlight the importance of preparing teachers to reinvent the school based on the COVID-19 experience, although without taking into account the evidence regarding the worsening of socioeconomic and gender gaps, or mental health problems that emergency remote education has brought in education workers.

The worsening of social gaps is another element that stands out in the findings on experiences in higher education, facing the COVID-19 pandemic. For Alarcón López et al. (2021), the pandemic led to the rise of a new protagonist in the educational exercise, namely, the internet provider on whom the teaching and evaluation processes now depend (p. 8). Inequality in access to virtual space due to differences in households also sets back the possible effect that teaching has in trying to match the learning outcomes of students. In this sense, we found diverse results in the study. On the one hand, the study by Franco et al. (2021) managed to show that the performance that students obtained in secondary education failed to predict performance in the first year of the pandemic, which suggests that the factors that moderate this performance were related to the material conditions given by the context of the pandemic, as well as with the flexibility measures taken by the university. On the other hand, the study by Lobos et al. (2021), although it reduces the influence of teachers' expectations on student performance, it shows that their previous performance is the variable that best predicts outcomes, which contradicts the study by Franco et al. (2021). However, both agree that online performance has much more to do with aspects of the reality of students, than with expectations or the moderating role that teachers play in learning contexts.

5 Conclusion and Future Work

The abrupt and massive shift from face-to-face education to remote forms of work and education have changed the way in which higher education institutions ensure access to education. There is a general agreement in the attention that any action plan in emergency contexts must put first the humanitarian aspects, the well-being and mental health of the people who make up the educational communities. On the other hand, there is evidence of an increase in the existing gaps before COVID-19, which reduces the effect of institutions to equalize the conditions of access to education. Finally, the study made it possible to answer the research questions posed:

RQ1: What are the main trends emerging from the educational experience in higher education in the COVID-19 era?

The main trends are focused on the concern for the well-being and mental health of the members of the educational communities. An increase in anxiety and stress symptoms is reported in both teachers and students from the experiences of remote emergency education. There is also evidence of an increase in pre-existing gaps such as socioeconomic and gender gaps, where connection problems or the diversity of concerns at home prevented adequate participation of students and teachers

in the educational or administrative activities of their universities, which sets back the possible effect of institutions in equating the conditions of origin of their participants. In addition, the abrupt change of modality did not find the institutions or teachers equally prepared to face a 100% online education, therefore a possible return to traditional and expository forms of teaching is reported, less focused on students and more focused on the transmission of disciplinary content. On the part of the students, some experiences are reported that managed to maintain and even improve their performance, which suggests paying attention to aspects such as collaborative work, improving online engagement, diversification of channels for learning and communication, evaluation, and monitoring and accompaniment as a necessary policy to ensure good performance in university education even in adverse contexts.

RQ2: What projections can be established considering the findings proposed by the scientific literature regarding experiences in higher education in the COVID-19 era?

The main projections generated by the scientific literature aim to increase support, consulting and accompaniment systems that allow higher education students and teachers to complement academic performance with self-care tasks. In the same way, it is proposed to take advantage of the experience during the COVID-19 emergency so that the institutions improve their protocols regarding the management of emergencies, which involves not only the active concern for the members that make up the educational communities, but also that also the needs expressed by society as a whole and where higher education institutions can collaborate through their knowledge and skills generated.

The results obtained reveal a need to maintain and extend scientific attention to the way in which social gaps have worsened from remote emergency education in higher education institutions. It would be interesting to continue investigating how much institutions and teacher mediation influence learning outcomes in a remote or hybrid education context, where the conditions of origin seem to be more decisive than in face-to-face education. Finally, as the growing concern of researchers about the mental health of participants in educational communities is evident, it is necessary both to monitor the evolution of the trends found, as well as to contrast the educational policy proposals for training and performance in virtual environments, with the problems that emergency remote education has meant for the participants.

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Chapter 20
Implementation of a Digital Live-Action Gaming Experience for Interprofessional Learning and Training

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Abstract Interprofessional education is required by all athletic training, medical, pharmacy, nursing, and public health students at Texas A&M University. One such opportunity for collaborative training has been Disaster Day, the nation's largest student-led interprofessional emergency response simulation. This annual training of 500–800 students takes place on a single day, in two 4-h sessions, at a designated site on campus. Due to COVID-19, the simulation could not be offered in-person in 2020, so the organizers looked for alternative solutions. We opted to use digital games, which have been proposed and used for formal and informal education for several years. While there have been games specifically developed for interprofessional training, none of those games were readily available for use by other institutions, nor is their focus on disaster response. In this chapter, we provide a detailed analysis of how an interdisciplinary team of health professions educators and game designers met interprofessional learning requirements while maintaining student engagement. Lessons from an abbreviated schedule and limited budget will be discussed. The approach incorporated different technologies and tools that are readily available. We will discuss pitfalls, assumptions, and full implementation of our approach. This will allow others to replicate our method and create similar highly engaging learning experiences for remote and online learning.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_20

1 Introduction

Collaboration among health and healthcare professionals is crucial for effective all-hazard emergency response, and interprofessional education (IPE) is a critical approach to building team-based competencies among students in the health professions (Sargeant, 2009). The COVID-19 outbreak both underscored the vital importance of collaborative practice and, ironically, caused some institutions to cancel their IPE activities, while others opted to move IPE training to virtual platforms (Langlois et al., 2020).

Translating a live interprofessional disaster preparedness exercise into a virtual training experience can be challenging, particularly with time and resource constraints (Langlois et al., 2020). Moving these collaborative simulations online in a meaningful and relevant way is more than simply gathering all participants on a virtual platform to discuss a disaster scenario; rather, it means building a robust, online interprofessional simulation where students work together to manage disaster logistics, diagnose patients, manage broader population concerns, and provide treatment for optimal patient outcomes (Bridges et al., 2011). Such complexity adds another layer of difficulty to converting a live interprofessional event into a virtual learning experience. Furthermore, disaster simulations are often implemented on a large scale, which can further complicate the transformation to a virtual event.

In this chapter, we share our best practices for translating a live disaster simulation for health professions students into digital live-action games in response to the COVID-19 pandemic. Section two provides an overview of a live interprofessional disaster response event, and section three elucidates the rationale behind the use of digital live-action games as the solution for a virtual version of the live event. Section four details the game design process, and section five offers lessons learned from game design, and recommendations for educational practices and future research.

2 Interprofessional Disaster Response Education at Texas A&M Health

Interprofessional education (IPE) occurs "when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes" (World Health Organization, 2010, p. 7). At Texas A&M Health, Disaster Day (DD) provides one such opportunity for interprofessional practice for students across multiple health professions.

DD is the largest student-led interprofessional all-hazard emergency response simulation in the nation. Various health professions are involved including medicine, nursing, pharmacy, public health, psychology, athletic training, veterinary medicine, and students in the Texas A&M Corp of Cadets. Other key partners include the Texas State Guard and the Texas Division of Emergency Management.

The event takes place at a world-class training facility for emergency responders known as Disaster City, in College Station, Texas. Interprofessional student teams work to rescue survivors, manage logistics, and diagnose and treat standardized patients in various disaster scenarios such as train wrecks, hurricanes, wildfires, tornados, and chemical explosions.

For event day, students are assigned to one or more of the following disaster locations: a patient extraction site (the disaster site), a triage area, a field hospital with pharmacy, and/or the Emergency Operation Center (EOC) where the event is managed. They perform various roles at these locations, including mock patients, Community Emergency Response Team (CERT) members, physicians, pharmacists and pharmacy technicians, psychologists, athletic trainers, public health field officers, and triage team members.

Communication during the event is complex and takes place both within event sites (e.g., within the Field Hospital) and across event sites (e.g., EOC to Disaster Site), which are separated by as much as a half mile. Fig. 20.1 depicts this complexity.

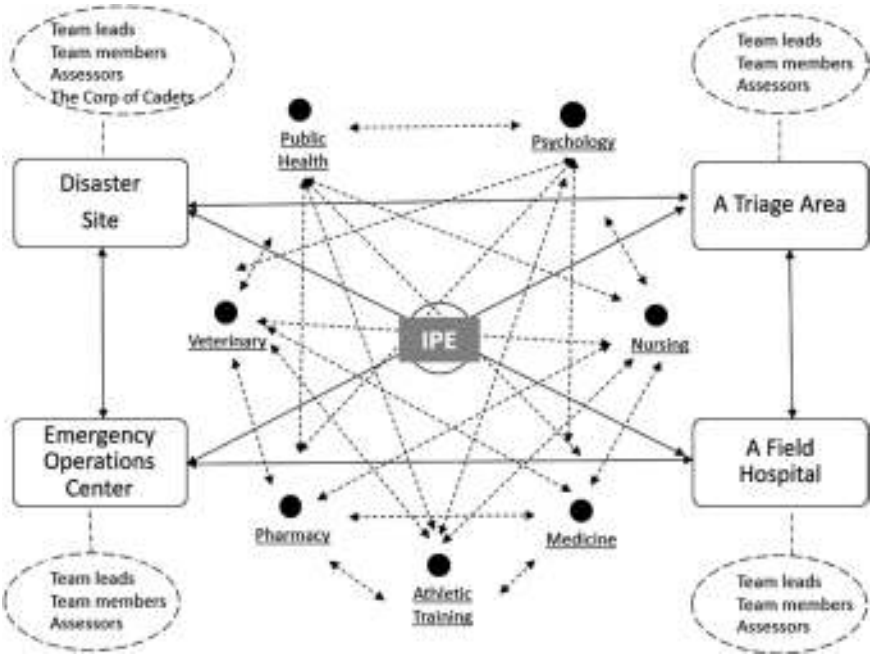

Fig. 20.1 Complexity of Collaboration in Disaster Day (live event)

3 Digital Live-Action Game

To meet accreditation and curricular requirements, the Disaster Day Steering Committee (composed of faculty from all disciplines represented) explored an alternative to the live event given the COVID-19 pandemic. The committee engaged the LIVE Lab in the Texas A&M College of Architecture, a locus of expertise in educational game technology, to develop a digital game. Digital games have been proposed and used for formal and informal education for several years now (Boyle et al., 2011; Garris et al., 2002). Research indicates that games can be helpful tools to engage learners in the learning process and to motivate learners to master learning outcomes such as motor skills, technical skills, and affective and cognitive skills (Boyle et al., 2012; Deater-Deckard et al., 2013; Garris et al., 2002; Iacovides et al., 2011). In addition, games can assist learners to better transfer knowledge and skills to a real-life scenario that the game simulates (Boyle et al., 2012; Chen et al., 2019).

Given the nature of DD, a Live Action Role-Playing game (LARP) was identified as the appropriate genre that supports students in achieving the targeted objectives. In a LARP, players use a given set of rules, conventions, and information to accomplish the goals for their roles (Utne, 2005), which provides players "engaging game-based learning experiences that emphasize role-play and an element of physical enactment" (Brom et al., 2019, p. 65).

When using a LARP as an educational tool, researchers discovered several benefits associated with cognitive and affective learning (Bowman, 2014; Brom et al., 2019; Utne, 2005; Vanek & Peterson, 2016). First, game-based learning excelled at promoting problem-solving skills (Bowman, 2014). LARPs require students to integrate knowledge in actions in the problem-solving process, through which learners bridge theoretical knowledge with practical application in role-playing scenarios (Blatner, 2009; Harder, 2007). Second, LARPs empower learners with a high degree of engagement and participation through role-playing and decision-making (Howes & Cruz, 2009). Third, LARPs trigger students' intrinsic motivation through their characters, the narrative, and the meta-narrative (Hyltoft, 2008). Last, LARPs gaming process can increase students' self-efficacy by achieving the structured goals (Balzac, 2011).

4 The Design Process

At their core, live-action role playing games (LARPs) are role-playing games (RPGs), collaborative and interactive acts of storytelling in which all players work together to create a story that interests them. A gamemaster (GM), who is responsible for overseeing an RPG, builds a reactionary world that players inhabit and explore. GMs are responsible for creating scenarios based upon the players' actions that may change the story of a game in both long- and short-term ways. Conflicts among players are resolved with guidance from a GM through mechanics like dice-rolling, which allow for variable outcomes in every game. These games allow

players to explore novel situations in intertwined stories, presenting them with challenges that they can approach in any way they—or their characters—would. The enjoyment hinges on the communication and teamwork between the players. The more players inhabit their characters, the more fun these games can be. Players work together to resolve challenges, but there is usually enough freedom that they can pursue their own goals entirely separate of the plot.

4.1 Preproduction

4.1.1 Learning Objectives

The first step in creating the games was to understand the ultimate learning objectives. Educational games require clear learning objectives with outcomes that can be measured through success or failure within the game. These learning objectives have a profound impact on every part of the game, and therefore on planning and development. For this initiative, students were assessed on their demonstration of the following four nationally recognized collaborative competencies: values and ethics for interprofessional practice, teams and teamwork, roles and responsibilities, and interprofessional communication (Interprofessional Education Collaborative, 2016). Fortunately, RPGs are fueled by communication between characters with different desires and jobs, which strongly reflects the stated competencies. The Steering Committee worked together to understand and infuse these objectives in the digital environment. In addition to the interprofessional competencies, uniprofessional competencies were also considered (those related to each participating discipline). These were there to help guide players and give them attainable goals that did not rely on other players but would still fuel the broader interprofessional outcomes.

4.1.2 Game Pillars

We built our game pillars on the interprofessional competencies mentioned above, as well as on surge capacity, and macro- and micro-level play. One of the valuable qualities of the live DD event is the sense of urgency it creates in students. Their abilities to communicate and collaborate are tested by being overwhelmed by a high number of patients. This element was essential in the virtual environment. Macro-level play largely involved public health students, who would review data related to the disaster as the game progressed and would react by sending resources and support. These students would also control the game map, quarantining areas and helping distribute resources. Micro-level play involved doctors, nurses, pharmacists, and athletic trainers who were focused on individual patients. These players may have gained some sense of the larger "narrative" as clusters of patients with similar symptoms came in, but their ability to play was not dependent on it. These central tenets guided the design process and kept the team focused.

4.1.3 Games

As we learned more about the distinct groups of players that would be involved in our game, we realized that there were three groups, each with different needs. We implemented a "3 games, 1 world" approach. Each of the three games had different rulesets, but they were all played at the same time, in the same game world. In practice, this meant each game would run on the same timeline, so whenever an event occurred, it would affect all players.

The disaster that the game simulated was a meteor strike that caused devastation in the downtown area of the local town. A meteor strike was chosen because it could happen anywhere and almost all possible occurrences of related incidents, from floods, to fire, power outages, radiation and chemical leaks etc. can happen during such a disaster.

Disaster Site—This game was comparable to a traditional pen and paper RPG. The players were CERT nurses, exploring a map to find patients that were 'sent' to the onsite triage (not to be confused with Triages indicated below). Some of these patients were under rubble or in other places that required some form of extraction, though none severe enough to prevent CERT nurses from performing this action. Players would also be racing against the clock since the possibility for patients to expire or other events to occur always existed.

Emergency Operation Center (EOC)—The focus of this game was emergency operations, which was largely the domain of public health, though players from other disciplines were involved to ensure interprofessional teams. In many ways, this game would play like a murder mystery party, with players exploring a map of a nearby town, gathering data, and making strategic decisions under conditions of uncertainty. For example, at one point late into the game, there was an event where a dentist's office was hit by debris, cracking the x-ray machine, and potentially leaking radiation into the surrounding area. At the specified time, the GMs started to send patients with symptoms of radiation sickness to the field hospital and onsite triages and provided data about these cases to the EOC players. Ideally, they would have viewed the data, pieced together what happened, determined the likelihood of a radiation leak, and mitigate appropriately (e.g., supplying the nearby hospital with iodine tablets).

Triage Areas & Field Hospital—There were two triage games, primary and secondary. Primary triage was staffed by nurses. These student teams were fed a constant stream of patients that could either be treated onsite (with extremely limited resources) or sent to secondary triage before entering the field hospital. Secondary triage was essentially the waiting area of the field hospital where charge nurses sorted and prioritized incoming patients before admitting them into the Field Hospital. The Field Hospital was by far the most complicated game technologically. We knew that it had the most players involved and heaviest technological needs. Players were, for the most part, placed into small interprofessional teams consisting of a doctor, a pharmacist, several nurses, and an athletic trainer. These teams were also constantly fed patients that they treated as quickly as possible. This allowed a consistent injection of patients into the game to potentially overwhelm the players.

Metagame—This was to be the overarching narrative, the timeline of the game that described all the events that would occur over the course of a session. This included events such as a radiation leak, a derailed train, or a gas main explosion. A small group of GMs would be in constant communication with all the other GMs seeded throughout the various games. Each game also needed several GMs to guide players, answer questions about rules, and intervene when necessary.

4.1.4 Core Game Loops

Once we understood the basic need for each game, we turned our attention toward creating core game loops. These were the actions that players performed second by second over the course of the game that fed all other actions. In most games, these would be actions like jumping, running, or swinging a sword. These games obviously required something different due to the wide-ranging number of different actions selected by players. We focused mostly on creating turn-based gameplay, giving structure while allowing maximum flexibility. It also preserved the essential element of a game loop, the ability to be infinite.

Disaster Site—Not entirely dissimilar to the Field Hospital (see below), the Disaster Site utilized a turn structure where each player had a turn to complete an action and see the related consequence. The biggest difference was that Disaster Site CERT nurse players had the additional element of movement on a map. Each group of CERT nurse players were given a map with several buildings, many of which they could enter to search for victims to triage. On each turn, the player moved then declared an action. A GM was available for each Disaster Site game to inform players of the outcome of their action.

EOC—Gameplay for the EOC needed to be on a map of the town in which the disaster occurred, so each team required some sort of unit or piece to move around the map. When players arrived at a chosen destination, they searched to determine what, if any, data was found. This pre-established data was determined by the roll of a die. Once players received this information, their turn was over, and they convened to determine the data's meaning while other teams took their turns. A major challenge of the EOC game is its inherent reliance on streams of information coming in over time from the other two games. The EOC game, steeped in the public health approaches of surveillance, compilation and analysis of data, and decision-making under conditions of uncertainty, needed a way to proceed in the event that players in the other two games failed to provide relevant information.

Triage Areas & Field Hospital—The Field Hospital had several wards where providers and patients were assigned. Each ward of players was limited in size. The order was prearranged, but players could change that order whenever they wanted so long as they did not take more than one turn per round. Turn order began when a patient entered the team's play space (the ward). Each player would declare an action that often had some cost associated with it. Once they declared the action, the patient would tell them the consequence of it and then the next player took their turn. This continued until the patient was successfully or unsuccessfully treated.

Actions included a wide range of possibilities such as taking blood pressure, applying a pulse oximeter, unblocking a patient's airway, or suturing a wound.

5 Lessons Learned

When we started this project, we did not know how it would end and there was no blueprint we could look up on how to pull this off. Knowing that games can be a very effective educational tools we had some inclination this might work, but really no idea about the obstacles we would face. Time and resources were also constraints as they are with all educational efforts. However, the scale of these obstacles was remarkable. Funds for the live event were diverted to buildout the online event, but they ultimately covered only half of the development costs, most of which was in student programming time. Additionally, the timeline was greatly accelerated; planning initiated in August for a February delivery. In the fast-moving educational landscape of the early pandemic months, development was roughly three times faster than what was necessary to deliver the intended product. Additionally, the February 2021 Winter Storm Uri resulted in a power crisis for the state of Texas, which further strained the timeline and funding.

Looking back, the entire team did a marvellous job pulling this together on such short notice and very limited budget and everybody feels it was a great first step into the right direction. Given sufficient resources and time, we believe a very compelling interactive online game can be developed for interprofessional training, allowing us to train students all over the world in interprofessional skills. Research needs to take place to compare the effectiveness of a game-based learning approach to interprofessional training against other forms of training or in combination with other forms. We believe game-based learning shows great promise for interprofessional training and can be a major tool in educators' tool belts.

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Chapter 21
Transforming Emergency into Opportunity: Unleashing the Creative Potential of Student-Faculty Collaborations to Prototype Better Educational Futures in Response to Crisis

Emily York, Diane Wilcox, Jonathan Stewart, Sean McCarthy, and Kenneth Barron

Abstract This design case offers a response to the pandemic crisis that cuts across pedagogical, technological, disciplinary, and administrative boundaries within a university in an effort to foment mutual learning and change. A team of five faculty from different disciplines joined forces to imagine a new online course that could contribute to novel educational redesigns. Titled "The Future of Learning at JMU," the course was sponsored by the university administration and presented innovative ideas to key stakeholders across the institution. Undergraduate and graduate students collaborated in multidisciplinary teams and worked with faculty to engage stakeholders from across the institution via interviews and participatory presentations. This constituted a novel learning partnership that radically reconceptualized a university course as a design space that can participate in transformational institutional change.

1 Introduction

The Covid-19 pandemic revealed significant challenges and opportunities that already existed in higher education. When the crisis hit, many of the responses were reactive and disconnected: students, faculty, staff, and administrators scrambled to develop feasible approaches to continue instruction online. During the initial stages

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_21

of the pandemic, the president of our university convened a task force to assess our response and to identify innovations that would be necessary to secure our institution's future. One task force team focused specifically on the future of learning, including the potential role of design thinking and other innovation methods. Along with the importance of supporting and developing hybrid learning strategies moving forward, they focused on the need to address existing inequities found on campus and across higher education, asking: How do we innovate to produce more access and equity on campus? And when we innovate, who makes decisions about inclusivity and stakeholder representation?

One of the task force members gained support from campus administration to design an experimental course to address the above questions. The course ran online during the Spring 2021 semester, with the goal of prototyping solutions that the institution might implement in the future. As the course progressed, however, research conducted by students and input from stakeholders animated classroom conversations about the question of *what future we were designing for*, precipitating a mid-semester pivot to scenario planning as a methodology to engage in longer-term forecasting and planning. What could interdisciplinary learning look like in 2030? How might accessibility and inclusion initiatives change the student populations and learning practices? Students explored such questions by interviewing stakeholders and experts in higher education.

This design case explores our course-based approach to emergency response by describing the course design and the pedagogical tactics employed by the faculty team to enable a rich learning experience for all. Additionally, the authors—all members of the faculty team—will reflect on how this course and future iterations of it may help solve complex problems in higher education institutions and change the nature of the student experience in times of crisis.

2 Our Problem Statement

This course approached emergency response by focusing on our *responsiveness* along two important dimensions: (a) institutional change and (b) classroom pedagogy. The university administration was necessarily focused on the immediate needs of students, faculty, and staff during the pandemic. Yet its support in exploring how this interdisciplinary course could become a design space to support inclusive institutional innovation also demonstrated commitment to being responsive to a broader set of goals related to equity, inclusion, and the long-term fulfillment of its educational mission. Pursuing such an ambitious goal in an experimental online course in the spring of 2021 amidst a host of pandemic-related challenges also necessitated developing a responsive, just-in-time classroom pedagogy.

3 Our Context and Course

The course was launched in the Spring 2021 semester in response to findings from a task force called to action by our university's president, and it was supported by the office of the provost and JMU X-Labs, an on-campus innovation space. The faculty and students (undergraduate and graduate) represented the disciplines of Education, Integrated Science and Technology, Psychology, Theatre and Dance, and Writing Studies, and student teams were formed to reflect this disciplinary mix. The course's purpose was to explore potential futures of learning in the university 10 years out and to inclusively envision and evaluate alternatives. Readings focused largely on the design methods the student teams would use to scaffold their research; once in their project groups, teams generated their own reading lists based on the topic they chose to explore.

The course met once weekly via Zoom for 2.5 hours. In the first several weeks, we introduced students to Design Thinking and Design Justice, and polled them to better understand their concerns and personal interests with respect to the future of learning. Based on their responses, we divided students into teams that worked together for the remainder of the semester to explore the future of learning at the institution in relation to one of the following five themes: Access and Inclusion, Collaborative Learning, Experiential Learning, Personalized Learning, and Practical & Professional Learning. Each team included different disciplinary representation composed of undergraduate and graduate students and one faculty member who served as a team mentor. Class meetings usually included activities to learn research and design methods, time for teams to work collaboratively on their projects, and live faculty-led interviews with invited stakeholders and experts to model interviewing and to collaboratively reflect with our students about stakeholder input. Each class also involved regularly gathering students' thoughts and reactions via online polling.

The course was conducted exclusively online because of COVID-19 restrictions and used a variety of technologies to facilitate student learning and team collaboration. We used Zoom for our virtual class meetings and used the university Learning Management System to post announcements. One of our goals for the course was to introduce students to technologies normally used for design and collaboration in the real world. For this reason, we used Microsoft Teams as the platform for teamwork, and for students to communicate with the professors and their team members, meet virtually, post files, collaborate with each other, and submit assignments. Miro was used for visualization, brainstorming, and design work. These tools became a strength of the course. As student Dlawar Kareem reflected, "… I think this course itself was innovation learning. Many innovation methods were utilized in the course, for example, teaching through MS Teams, using Zoom, getting familiar with Miro, the collaboration among peers, observations, learning records, etc., so this class provided many innovative methods of learning." We also used Mentimeter during class meetings as a vehicle to gather students' opinions after meeting with guest speakers. For research, some student teams used Question Pro and Google Forms.

Over the course of the semester, students researched their topic via secondary sources and weekly stakeholder interviews conducted outside of class, and participated in interviews conducted during class meetings.

Each team learned how to undertake a scenario planning process by researching, developing, and analyzing potential scenarios related to their team topic. For their final class project, student teams delved into one scenario more fully and published their findings on a WordPress website: https://sites.lib.jmu.edu/tfol-jmu-sp21/. On that site, each team had a page with information about the team members, the specific problem they were addressing, an in-depth scenario they were developing, and a sketch of a prototype solution. This website was shared widely across the university, and students presented these scenarios via Zoom to approximately 30 university faculty and administrative stakeholders.

4 Course Design

4.1 Interdisciplinary Pedagogies

Prior to the course, all students had a fairly traditional mental model of the "typical" semester-long college course. We quickly realized we needed to disrupt students' former ways of thinking about college coursework and use a variety of motivation, design, and engagement activities to introduce them to new ways of thinking.

We approached teaching through the lenses of our individual disciplines, and used several different pedagogical approaches and learning paradigms to frame the course. For example, we borrowed scaffolding and the zone of proximal development from Vygotsky to set up the project teams and facilitate team-based learning. A faculty mentor was assigned to each of the multidisciplinary student teams to oversee the team's continuous learning, communication, research, design, and development process. Each project team spent the semester in a learning partnership with their faculty mentor on the research of their chosen topic and in the scenario planning process.

We also employed Siemens' (2018) Connectivism in our evolving conceptions of our project work, and in our teams' communications, research, design, and development work. This connectivist approach was evident not only in our teaching, but also in the numerous technologies and methodologies chosen to carry out our collaborative work with students and keep all stakeholders informed throughout the semester.

Creating a vision for the future of learning during a pandemic was an entirely new experience for both students and faculty, and the faculty learned and participated in the project teams as both mentors and learners. We encouraged students to entertain and appreciate a diversity of opinions, and stressed that learning was continuous and collaborative. We helped students see and make connections between concepts, ideas, and different disciplines encountered in their research and through

interactions with key stakeholders. Students were encouraged to take risks, be creative, and consider failure an opportunity for learning and growth. As one student, Sophie Sons, reflected, "I've learned to appreciate this process because… they encourage big thinking and creative forms of strategizing in which everyone's contributions and opinions are valued, not just a select few."

Finally, to cultivate learning with ambitious goals regarding emergency response, we had to promote new ways of thinking about college coursework and provide students with tools to rigorously explore future scenarios. To do so, we introduced three complementary methodological approaches: Design Thinking; Design Justice; and Scenario Planning.

4.2 Design Thinking and Design Justice

Design Thinking (DT) is a method that foregrounds the importance of including the end-user in the design process. DT constitutes five processes—empathizing, defining, ideating, prototyping, and testing—that occur iteratively. That is, design is not a linear process, and often requires designers to learn through experimentation, making mistakes, and starting over. Damien Newman created the "design squiggle" in 2002 to encapsulate the somewhat chaotic reality of the five-step design sequence. We used Damien Newman's "design squiggle" to show students how clarity is gained through iterative design (Fig. 21.1).

As Newman's graphic illustrates, the early part of design is a messy, recursive process that eventually leads to the clarity of the single line and the design deliverable. The faculty team used the "design squiggle" to scaffold our students' learning and confidence. Most of our students were familiar with classes that had a single disciplinary focus and that favored linear progress and clear deliverables. For many, this course therefore represented a fundamentally different approach to learning. As student Karris Atkins noted: "This class has pushed me outside of that comfort zone. Having less structure in the learning journey has taught me to consider how I hold space for multiple solutions, ideas, and opinions differently than I have in the past."

Fig. 21.1 Design Squiggle

To complement our use of DT, we wanted to employ methods that embodied our commitment to inclusion and that would support our institution in thinking flexibly and creatively about emergency response. To that end, we made inclusion more explicit by introducing students to a "design justice" framework (Costanza-Chock, 2020) and by making the interviewing of stakeholders a central practice in our collective research. Design Justice focuses on questions about who gets to participate in design, and why. Specifically, we discussed ethical design practices, the concept of intersectional identities, and the import of learning about different perspectives and interests as part of framing problems and designing solutions.

4.3 Scenario Planning

Scenario planning is a strategic approach to trends analysis that supports identification and rigorous analysis of different scenarios—or stories—in the mid- to long-term range (Alexander, 2019; Wade, 2012). Students conducted research, including stakeholder interviews, to identify relevant social, technological, environmental, economic, political, legal, and ethical drivers—i.e., events or trends—that are likely to be impactful in shaping learning at our institution over the next 10 years. Considering different possible outcomes for these drivers in various combinations made visible the contingencies of institutional change that would enable and constrain the teams' goals. Creating multiple scenarios provided the basis for the teams to make broad recommendations to the institution with respect to current decisions and investments, with an eye toward the 10-year time horizon. Students visualized and analyzed these scenarios using the online collaboration tool Miro, enabling them to develop a portfolio of possible scenarios for consideration. Focusing in their final deliverable on one key scenario, students fleshed out a compelling, evidence-driven story for a plausible future of learning related to their team topic; identified each assumption that informed the scenario and tied each of those assumptions to specific research; imagined a plausible outcome that most aligned with a set of goals and values that the team had developed; and made recommendations for current action that would support that development. Reflecting on these methods, student Sophie Sons wrote: "Learning about the many drivers and contributing factors to the future of university-level education allowed me to understand the importance of how and what we learn, who and what that impacts, and how the state of the rest of the world can affect collegiate institutions."

5 Findings

Planning for change requires buy-in, and scenario planning provides a unique opportunity for institutions to plan in a way that doesn't paint themselves into a corner (Buller, 2015). Here, students used broad brushes to paint possible 10-year

futures for the institution and were provided multiple opportunities to present their findings to stakeholders. One team from the class was invited to join a working group within the Division of Student Affairs to help construct a new value statement on social justice and inclusion, while others were invited to share their class experience with senior administration and the University's Board of Visitors. The interest and opportunities from senior leaders at the institution were not only an indicator to students that their voices and work mattered to the future planning of the institution, but also indicated that the university is looking to continue supporting collaborative, interdisciplinary, and innovative courses. This support from administration was reinforced with the faculty through invitations to teach the course again.

Final presentations occurred virtually, with stakeholders and senior leaders from all over the institution joining our students in breakout rooms to explore the teams' scenarios. This enabled students to present a co-designed WordPress website that housed their team scenario and to engage in conversation with university stakeholders about the imagined futures of the institution. Feedback from stakeholders included themes of hope for the future, excitement to further explore specific scenarios, a desire to use the methodology in other contexts, and gratitude that student voices were given an opportunity to be heard. After their presentations, students spoke to a feeling of empowerment and desire to integrate what they learned into other contexts within their lives. For example, student Rachel Buczynski wrote, "The design and innovation methods in the Future of Learning course will be very useful in my work with businesses and nonprofits, now and in the future."

Our connectivist framework and methodology (Siemens, 2018) enabled buy-in to be obtained from multiple stakeholders and constituencies across the university. The process not only served the institution via the end product, but allowed new relationships and opportunities for conversation between students, faculty, and administrators across different disciplines and functional areas. In this way, the course can be interpreted as a learning partnership, not just between students and the teaching faculty, but one that also included administrators and other stakeholders. It also created a unique learning experience that multiple students have expressed as being the most meaningful learning experience of their college career. For example, student Brooke Solderich wrote, "This class truly has been a journey where I learned about the functioning of the University and what changes could be made, but I learned more about myself and the future of me. All of these learning dimensions are experiences I am able to apply in my work after this class and as a lifelong learner."

Throughout the semester, students maintained a portfolio of their work based on The Learning Record methodology (Syverson, 1995). The learning evidence they gathered included interview notes, ethnographic-style observations, screenshots from meetings, links to articles, and other supportive items. They used these data as evidence of learning in reflective writing prompts with specific themes: Research; Ethical and Inclusive Design and Innovation Methods; Communication Strategies; Collaboration; Confidence and Independence; Prior and Emerging Experience; and Creativity, Originality, and Imagination. Upon reading the reflections, it was clear that students were synthesizing information, making connections across classes and

disciplines, and applying their learning in and out of the classroom. Further, using the Learning Record as the primary assessment tool for the course gave students confidence that they were being assessed on their individual learning pathways, rather than on the success of their collaboratively-produced, experimental projects. Student LaMont Sledge wrote, "This class has been by far the best class I have had a JMU. It has been a fun, scary, and insightful journey. I have met and bonded with some real true friends, and on top of that, I learned some new tools and skills. My confidence has increased to the point that I was asked, by my teachers, to be questioned by the Board of Visitors."

6 Considerations and Recommendations

As we reflect on our initial offering of this course, we'd like to close by sharing major takeaways and lessons learned from the perspectives of our students, faculty, and administrators. Students are key stakeholders who bring unique perspectives. The design of this course provided a vehicle for students' voices to be heard early and often. But of equal importance, it offered students a methodology to be taken seriously as critical change agents capable of helping the university plan possible learning futures on our campus. Students noted how much their own thinking benefited from collaboration and working in interdisciplinary teams to better understand possible futures. They reflected on their personal growth and development both in the design thinking skills they gained to approach complex problems, and in the content knowledge they acquired on their topics. A student sentiment shared in a closing end-of-the-semester activity succinctly captures this: "We felt empowered to participate in this opportunity and to have a seat at the table at our university."

As faculty teaching this course, we similarly noted how much our thinking benefited from collaborating and working in a learning partnership. We felt challenged and inspired by each other's disciplinary approaches and methodologies. Our unique disciplinary lenses provided a critical lens for addressing different parts of the course and addressing different student needs. Just as student teams were encouraged to not be afraid to fail and to "pivot" to new approaches, our faculty team had to be similarly responsive to change. This openness to inclusive, responsive, and interdisciplinary decision making opened up avenues of creative, playful, and honest collaboration that everyone on our faculty team wishes to continue to practice into the future. We repeatedly found ourselves commenting how refreshing it was to get out of our disciplinary silos and to interact with a diverse, interdisciplinary team of students and faculty. Similar to other faculty learning community initiatives (Cox, 2004), we also experienced a greater sense of connection to our colleagues and institution, which was particularly powerful while working virtually through a pandemic. A faculty sentiment shared widely by our team was simply: "This was fun and a highlight of our professional careers... let's do it again!"

Lastly, our campus administration was given an opportunity to re-envision university planning that moved beyond more traditional committees, task forces, and

top-down driven approaches. Instead, our administration saw the power of adopting design thinking and longer range, scenario planning, and having diverse stakeholder voices at the table (especially the voices of students). Administrator sentiments shared in an end-of-the-semester activity included: "This is just the beginning! Students and faculty will continue to collaborate to develop ideas for the future of learning at JMU." and "I absolutely loved seeing students thinking about and wrestling with some of the really big ideas that surround higher education."

Acknowledgements Offices of provost & president; Bryan Alexander; our students and the many people who offered their time to make this course a success….

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Part III
European Region and Eastern Mediterranean Region

Chapter 22
Online Higher Education in the Wake of COVID-19: A Systems Thinking Perspective

Fawad Sadiq and Muhammad Sadiq Malik

Abstract COVID-19 has adversely affected almost all the spheres of life across the globe. As a result of subsequent lockdowns, Higher Education Institutes (HEIs) face the challenge of continuing educational services and overcoming related barriers. Developed countries have an upper edge in transitioning to remote learning models with systems in place for online HE. On the contrary, in several developing countries like Pakistan, HEIs had to step into the uncharted waters of online education. This paper adopts a systems thinking perspective and reviews the complex nature of online education by looking it from three levels i.e., micro, meso, and macro while discussing the response of HEIs in Pakistan during the COVID-19. It is imperative to understand the interactions of the various components and devise a tailored solution that works within the local context and aligns all three levels for online education solutions.

1 Introduction

The COVID-19 pandemic has shaken the very core of all the world's economic and social status as we know it. One of the areas worst hit by the subsequent forced and unavoidable lockdowns is the Higher Education (HE) sector. Online education has been recommended as a potential solution to this catastrophe in HE (Paudel, 2020). Although online education was pitched as a disruptive technology several years ago (Christensen & Eyring, 2011), the pandemic has shown the inevitable as the writing on the wall for the traditional education system.

Like most countries, in Pakistan, the challenge of continuing education in Higher Education Institutions (HEIs) during the COVID-19 lockdowns was taken up by the

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HE Commission (HEC), the government's statutory regulator and responsible for the facilitation and development of higher education in the country. The initial support provided to HEIs included the provision of policy guidelines to continue online education amid COVID-19. HEC delineated three different quality levels of online education, i.e., basic, effective, and exemplary (HEC, 2020). According to the initial assessment by HEC, most of the HEIs were at the basic quality level of online education and encouraged them to at least reach the effective level (HEC, 2020). A quality standard comprising eight areas was developed to assess HEIs' online preparedness. These areas included university, course, faculty, library, technology, students, evaluation and assessments, laboratory and practical instructions (HEC, 2020). Despite HEC and HEI initiatives, online education remains a challenge due to implementation issues.

2 Background

Online education emphasises "any time, any place" learning and the assumption that the student and the teacher are at a distance from each other (Gros & García-Peñalvo, 2016). With the advent of web 3.0 and advances in ICT, an online education ecosystem has emerged where teachers and students can engage in real-time online learning activities (Ohei & Brink, 2019). With such advancement of learning technologies, the digital transformation of HEIs is a subject that concerns both the learners and educationists. Digitalisation in the HE context has been referred to as "the sum of digital processes necessary to achieve a change process that enables HEIs to successfully leverage the use of digital technologies" (Kopp et al., 2019). Although HEIs are increasingly taking a keen interest in digitalisation, they often lack digital transformation processes.

Recent literature has criticised equating existing emergency response to COVID-19 by the HEIs with online education (Hodges et al., 2020). As Adedoyin and Soykan (2020) point out, online education is simply one of the many characteristics of digital transformation in HEIs. Many ideas and models exist to help plan and develop online education. Still, because of the pandemic, the conversion phase of HEIs to online education is dubious. These processes have encountered a lack of proper planning, design, and online instructional programs (Sadiq, 2020a, 2020b).

Adedoyin and Soykan (2020) highlighted several challenges to a successful transition to online education. They include technology, socio-economic factors, human and pets' intrusions, digital competence, assessment and supervision, heavy workload, and compatibility. Online education has multifaceted and interacting components that make its implementation a challenge even in normal circumstances (Kebritchi et al., 2017). Therefore, it's essential to understand it differently, such as from a system thinking perspective.

Online education is a complex system (Peck, 2019). It is essential to identify different components to review online HE as a complex system. Tamim (2020) proposes to use the systems thinking approach to analyse online HE. Adopting a

systems thinking approach means looking at the interaction between the components rather than as objects (Tamim, 2020). Zawacki-Richter et al. (2009) propose three broad meta-levels of education research, i.e., macro, meso, and micro. The macro-level represents the beliefs and theoretical perspectives of the online education system. Meso level represents the infrastructure and management. While the micro-level represents the online teaching practice and learning behaviour. Alignment between these three levels is the key to implementing the online education system and achieving desired outcomes (Reigeluth, 2019).

3 Online HE in Pakistan and the COVID-19

Higher education in Pakistan is comprised of 217 recognized public and private sector HEIs (HEC, 2020), having more than three million enrolled students. The history of remote learning in Pakistan dates to 1974 when Allama Iqbal Open University started offering open distance education (AIOU, 2020). Since then, other HEIs also started offering distance education programs, such as Virtual University, Preston University, and COMSATS University. Except for a few distance education programmes, the country's HE system is primarily face-to-face.

At the beginning of the COVID-19 nationwide shutdown, HEC provided several policy guidelines for the HEIs to prepare themselves for the transition, anticipating lockdown extension till Sep 2020 (HEC 2020). However, only a handful of the 217 HEIs could transition to online education as per HEC guidelines. The majority of the HEIs initially struggled to step into unfamiliar territory (Khan, 2020). Accompanying this struggle or involuntary transition to avoid academic and financial losses, HEIs faced multiple barriers. A lack of reliable internet connection, technological skills, inappropriate implementation of online education technology, lack of faculty training, and low interest in online teaching methods were the most commonly cited concerns during the COVID-19 in Pakistan (Sadiq, 2020a, 2020b). These issues and the resulting solutions applied by the HEIs can be analysed through a systems thinking perspective at macro, meso and micro levels.

3.1 Issues at Macro Level

Beliefs and Theoretical Perspectives—at the macro level of online education lies the teacher's pedagogical beliefs and theoretical perspectives (Tamim, 2020). Teacher beliefs generally refer to "suppositions, commitments and ideologies" (Ertmer, 2005). Teacher's beliefs impact how they employ technology in the classroom (Tondeur et al., 2017). In addition to pedagogical beliefs, there are beliefs linked with value. The importance instructors place on technology depends on whether or not they believe it can help them achieve their most important educational goals. During the COVID-19 lockdowns, poor and unplanned training interventions and

lack of technology capabilities strengthened teachers' pedagogical and value beliefs towards the conventional education system (Farooq et al., 2020).

Moreover, the impression of online education as a temporary and makeshift arrangement further complicated the transition to online mode. The majority of teachers previously had only experienced teaching face-to-face and had to make tremendous efforts to adapt to the circumstances based on trial and error (Dossa et al., 2020). Although online teaching activities persisted, instructors' comments revealed a stronger belief in face-to-face teaching. For example, instructors believed that face-to-face teaching allowed them to project their personalities into their classes better than during online education.

In Pakistan, before COVID-19, the theoretical perspective towards HE revolved around the traditional, face-to-face system. Only a handful of the HEIs were offering distance education programs. Therefore, during the initial transition to online education, the instructors replicated the traditional approach during online teaching.

3.2 Issues at Meso Level

The meso-level aspects of online education connect the macro and micro-level. Infrastructure and management translate the macro level's theoretical perspective into teaching and learning and related policies at the micro-level. Beaudoin (2016) highlights that the primary task is not to manage the technology or infrastructure but rather the change itself. It is crucial to create appropriate conditions for the change (Beaudoin, 2016). Change is often slow and requires adaptation because it doesn't come naturally.

Education Technologies in HEIs—compared with the traditional instructional system, online education heavily relies upon course technology. Course technology facilitates various online learning facets, including objective specification, curriculum organisation, interaction facilitation, and evaluation results (Aristovnik et al., 2020). Any learner-centric technology that fits with online instruction strategies is critical for student satisfaction (Sun, 2016). During the COVID-19 lockdowns, the HEC Pakistan worked closely with the HEIs to provide relevant guidelines for implementing educational technologies. For this purpose, specialized committees were formed to help arrange IT facilities, software, technical support, and curate online content (HEC, 2020). Course outlines and relevant reading resources were shared with the students through online learning management systems. Although HEC made obtaining appropriate online education tools easier, the shift was difficult because most faculty members had never taught online. The authors found that more than half of the 2814 online courses offered by a private HEI during COVID-19 did not fulfil the HEC guidelines for online course quality. These guidelines included best practices for teaching online. Though the acceptability of instructional technologies has improved over time, it still remains a challenge that needs more focused attention.

Internet Access & Devices—the two most essential elements to enable online education are internet connectivity and the devices through which online education is conducted (Adedoyin & Soykan, 2020). This issue can be seen in the context of the internet access rate in developing countries like Pakistan. Access to the internet has never been more widespread than it is today. More than 4.9 billion people on the planet have access to the internet as per internetworldstats.com (2020). While the developed world's digital divide has decreased, the discrepancy is more pronounced in the developing world. For example, Afghanistan has one of Asia's lowest internet penetration rates at 18.8% (including mobile and fixed broadband).

Similarly, the internet penetration rate in Turkmenistan is 20.9%, in Pakistan its 32.4%, and in India its 40.6%. Moreover, implementing online education in developing countries like Pakistan is difficult due to substantial socio-economic disparity (Dossa et al., 2020) and a noticeable digital divide. For example, United Nations D evelopment Programme (UNDP) in 2016 noted that in Pakistan, the income of the upper quintile grew by 31.7% compared to just 4.1% growth in the incomes of the poorest 20% during the period from 1987–1988 to 2013–2014. Furthermore, a study of 8749 students in a Pakistani private university during the lockdowns revealed that over 43% of them did not have access to a steady internet connection at home (Sadiq, 2020a, 2020b).

Faculty Readiness—Lack of online teacher training is a barrier to introducing online teaching (Tamim, 2020). During COVID-19, the HEIs' faculty members' instructions and guidelines differed considerably. The content was disseminated via several platforms. Faculty-focused learning management systems and IT teams were only available within a few HEIs. They used platforms like Zoom and Microsoft Teams to deliver live courses. Others advised instructors to screen record lectures and share them with students through WhatsApp or Facebook. The authors also noticed an absence of standardised online assessment training for faculty members, such as administering and grading online tests. Instructors were initially unsure of incorporating quizzes, polls, and assignments into online platforms to engage students due to the lack of proctoring mechanisms available to them (James, 2020).

Quality Assurance—The students' most frequent concern during online classes in Pakistan was online course quality (Khan, 2020), especially since online education requires different levels of effort from students and faculty. Although the HEC provided general guidelines on transitioning from face-to-face to online mode, monitoring the quality of online courses and programs has remained vague and inadequate. Furthermore, the understanding of such requirements by the HEIs also varied to a large extent. As a result, the HEC gave less than 50% scores to several HEIs on online education readiness during its first review. The HEC review parameters covered university, course, faculty, library, technology, students, evaluation and assessments, laboratory, and practical instructions (HEC, 2020).

3.3 Issues at Micro Level

Issues related to instructor—the academicians' capability to leverage the online tools and provide the learners with a conducive online learning environment has been seen as a challenge (Ramli et al., 2020). Faculty members transitioning to online education often resist change due to required modifications in their teaching methodologies and beliefs systems (McVey, 2019). The multipronged approach required in online teaching makes the job complex. In the *pedagogical domain*, this complex role is related to instructional design, learning resources, facilitation of student participation, and sustaining motivation. In the *professional domain,* it is related to ethical compliance, effective communication, and commitment. The evaluation domain is connected to monitoring progress, assessing performance, and evaluating course/program. Similarly, in the *technology domain*, it is linked with access to technological resources, selecting appropriate learning resources, developing different learning resources, and suggesting resources to students. These complexities in instructor require development and demonstration of relevant competencies according to the role one is assumed to undertake while teaching (Bawane & Spector, 2009).

During the online classes, due to lack of instructors' preparedness in pedagogical, professional, and technology domains, training and instructions on e-learning methodologies, and lack of student preparedness for adaptation to new learning forms, several student-related challenges were faced, including a drop in participation, poor commitment and attendance, disruption, and no appreciation of their instructions (Ramli et al., 2020). Students often zone out during lengthy, non-interactive synchronous lectures or get irritated about frequent connectivity problems. The instructors' technology familiarity is an issue of the technology domain and an issue of the pedagogical and professional domain as it concerns their ability to develop and deploy learning resources and communicate online effectively. The advice and training offered in this transformation by non-academic IT departments have been a shortfall for many HEIs.

Issues related to course design—online course design demands consideration of several factors such as content development, multimedia integration, instructional strategies (Kebritchi et al., 2017), autonomy and control, interaction, social presence, access, and cost (Tamim, 2020). The task of generating new course material or tailoring the existing material for online mode is important (Kebritchi et al., 2017). The online teaching pedagogy is more complex than the simple copying of content to a new modality (Kentnor, 2015). The students' feedback from a large private sector HEI in Pakistan during the COVID-19 lockdown indicated the need to design online courses carefully. Moreover, while highlighting course design issues, several students preferred blended learning (a hybrid of synchronous and asynchronous learning) (Sadiq, 2020a, 2020b).

Issues related to the learner—like the instructors, transitioning to online education requires learners to make necessary adjustments. The problems with the learner during the online learning are often linked with the instructor and course design issues such as engagement, learning gains, satisfaction with teaching, social and

cognitive presence, comfort level with technology, learning preferences, and learner transitioning to an online environment.

Some other issues related to learners include low bandwidth due to increased work from home policies, electricity issues, unavailability of personal desktop/laptop and personal dedicated study room, balancing between family life and university, gender inequality and domestic workload, and a feeling of loneliness. Avoiding disruption or diversion of online participants' attention from family members (for example, unexpected appearance or interruption of family members) during the teaching or learning process has also been identified as an issue (Adedoyin & Soykan, 2020). The problem is more relevant for online learners in Pakistan, where families' social fabric is much denser and more intermingled than in Western societies (Sadiq, 2020a, 2020b).

4 Recommendations

The COVID-19 shutdowns have become a challenge to the students, academicians, and administration of HEIs in general and specifically in developing countries like Pakistan. During these testing times, all of them experienced an intense abnormal situation in HE while transitioning to digital platforms. The macro, meso, and micro-level issues discussed in this chapter showcases online education's complexity. Most of these components in the online education system are overlapping and interacting while remaining independent. Therefore, it is crucial to understand the interaction among these components apart from looking at them as individual objects. Several methods to improve online teaching efficiency and student involvement can be adopted. These involve specific instructions at the beginning of the classes, actively engaging students, breaking down long lectures into small and manageable sessions, integrating blended learning, providing students with access to online syllabus breakdown contents, etc. (Adnan, 2020). Government's support to provide access to the internet in remote areas will also improve online education efforts during such catastrophes. A systems perspective is one way to look at the interlinkages of online education components by developing the best strategy suitable to the local context.

Online education is transformative because it extends beyond technology to influence pedagogical patterns, teaching and learning methods, and managerial decisions. The existing solutions applied to the COVID-19 lockdowns are more of an emergency remote teaching strategy (Hodges et al., 2020). The effects of the pandemic are likely to last longer than expected. Therefore, HEIs need comprehensive measures to develop online education systems for long-term sustainability, especially in developing countries like Pakistan. Here, it is imperative to understand the interactions of various online education components and devise tailor-made solutions within the local context. A focused and deliberate effort to collectively address micro, meso, and macro-level aspects of online education, especially in the local context as highlighted in this chapter, could be beneficial and may lead to the desired results.

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Chapter 23
Moving Volleyball Coaches Education Online: A Case Study

Josef Buchner and Martin Plessl

Abstract Traditionally, volleyball coaches' education has been conducted physically in the gym and classroom, but due to Covid-19 and the actions needed to contain the pandemic, that was no longer possible in the spring of 2020. Instead of canceling the already planned course we decided to move the course online. The development process was guided by the question if we can teach volleyball-specific skills online. As a result, we designed a fully online blended learning course with a problem-centered approach and authentic video-based tasks. A total of 23 prospective coaches took part in the course. Skills acquisition was measured using a pretest-posttest design revealing a large effect of our design on skills acquisition. Additionally, we surveyed participants attitudes towards the learning design. The results show that prospective coaches were satisfied with the design and perceived the online learning course as useful for volleyball coaches' education. Based on the results, we can recommend the combination of videos and interactive content to provide authentic problem-centered tasks to facilitate skills online in volleyball coaches' education.

1 Introduction and Problem Statement

With the worldwide outbreak of the Coronavirus (Covid-19) at the beginning of 2020, national governments enacted restrictions to prevent the further spread of the virus in the population. Among others, social distancing regulations were imposed leading to a shutdown of places where many people meet each other in everyday life, including all levels of educational institutions (Bond, 2020; Delcker & Ifenthaler, 2021). These restrictions directly affected the profession of the second author, who is responsible for the education of future volleyball and beach volleyball coaches in Austria. The education program traditionally consists of face-to-face

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lectures, classroom activities and live demonstrations of volleyball-specific techniques and exercises in a gym. Typically, between 15 and 25 prospective coaches meet at a sports resort for several days with a training supervisor. The participants learn about the theoretical basics of volleyball and practice coaching skills that are important for improving the performance of their future players. Such skills include choosing and developing drills, giving instructions, demonstrating techniques, observing athletes, and giving corrective feedback (German Olympic Sports Confederation, 2017; Giannousi et al., 2016). The skill to see and correct mistakes of movements, for example of a certain volleyball technique, is mentioned by several authors as the main skill a volleyball coach should have. To foster the ability of correcting movements prospective coaches' need both knowledge about the right execution of the technique and the possibility to observe players during the performance. As a result, volleyball coaches can compare the observed movement with the desired one and provide helpful feedback and advice to improve the technique (Friedrich, 2014; Grgantov et al., 2013; Meyndt et al., 2010). In the Austrian volleyball coaches' education program, the promotion of this main skill is a central part in the curriculum. The prospective coaches traditionally practice the skill by observing each other while playing or carrying out drills.

In the spring of 2020, it became obvious that the already planned course for future beach volleyball coaches cannot take place in its usual form in the summer, as an end of the shutdown in Austria was not expected. Therefore, a decision had to be made: Cancel the course or develop a solution and use the pandemic as an opportunity for exploring new ways how to teach volleyball-specific knowledge and skills. As this chapter proves, the second author chose the latter and contacted the first author, who is a researcher in learning design and technology and a former graduate of the coaches' program. Together, we developed a fully online blended learning design that includes both the teaching of knowledge and the training of the practical skill of correcting movements. In the next section we present our learning design and the theoretical considerations that guided the design process. Afterwards, we report the results of the evaluation of the first implementation including learning performance and attitudes towards the design. The chapter concludes with lessons learned and practical implications for online learning in the field of sports education.

2 Designing for Online Volleyball Coaches Education

2.1 Didactical Analysis

In the first phase of the design process, we conducted a didactical analysis including the learners, the circumstances, and the learning objectives (Kerres, 2018). Regarding the learners, our group of participants consists of volleyball players that are interested in working as coaches. They already participated in other volleyball education courses, so they are familiar with the traditional concept including the

face-to-face lectures and the on-court training together in a group of other prospective coaches. Online learning was not included in these previous courses. As a consequence, we concluded that is important to design for social aspects in our course and to provide enough support on how to use the online learning platform. The circumstances are heavily influenced by the valid Covid-19 restrictions in Austria in the spring and summer of 2020: Meetings with more than two people were prohibited and sports resorts as well as beach volleyball courts were closed. As in many other countries, the only way to continue teaching was to move classes online (Bozkurt et al., 2020; Hodges et al., 2020). The learning objectives of the volleyball coaches' course contain knowledge and skills about certain volleyball techniques. In a first step, the prospective coaches learn in a lecture about the key aspects of the techniques, the ideal movement sequences and typical mistakes athletes make in the execution of the techniques. After the lecture, the training supervisor demonstrates ideal and non-ideal executions of the techniques. The participants replicate the ideal movements, observe each other, and provide corrections if they identify wrong movements. The challenge when moving a course with such learning objectives online is to provide learning tasks that also allow the improvement of the described practical skills.

2.2 Didactical Decisions

The results of our didactical analysis guided the further development of the instructional design leading to the following decisions:

First, only a fully online format was an option due to the circumstances caused by the Coronavirus and the restrictions to lower its spread.

Second, the inclusion of social aspects was important for us. On the one hand, to give the prospective coaches the feeling of belonging to a group of learners that share a passion, namely, to support athletes to become better volleyball players. On the other hand, peer-collaboration can promote deep learning by discussing and reflecting the content from multiple perspectives (Merrill, 2018). As a consequence, we decided to design a fully online blended learning course. Traditionally, blended learning is defined as a mix of online learning and face-to-face meetings (Kerres & Witt, 2003). However, in times of institutional shutdowns new solutions how to realize the blend are needed. We chose to conduct synchronous face-to-face meetings using web conferencing software and asynchronous learning phases realized through the learning platform.

Third, to address the learning objectives of the coaches' volleyball course, we designed a problem-centered instructional sequence with authentic learning tasks. According to Merrill (2018), problem-centered learning works best when a *Tell-Show-Do* sequence of learning events is used. *Tell* is necessary to present information of the topic, in our case knowledge about the techniques and the desired movement. *Show* is the demonstration of examples, in our case examples of ideal and non-ideal movement execution of the techniques. *Do* refers to the application of

the knowledge, in our case observing movements, comparing them with the ideal execution and correcting them if necessary. For the *Do*-learning event we designed authentic tasks (Teräs & Kartoğlu, 2017) by providing complex and real-life examples of beach volleyball movement executions.

2.3 Instructional Media

The implementation of our design was realized using the *Moodle* learning platform with the *H5P* plugin for creating interactive content. For the real-life examples of beach volleyball movements, we used videos and pictures that were recorded during tournaments or practices for analysis purposes by the second author. The videos were edited to allow the learners observing the movements several times and in slow motion. We combined the videos with the interactive content types offered by *H5P*, for example reflective questions or drag-and-drop elements. In addition, *H5P* allows adding text to the videos, what we used to scaffold the *Do*-phase. Figure 23.1 shows an example of a video-based authentic task. Interested parties can also enroll in a trial course and work on the tasks themselves. To do so, open the website **t1p.de/volleyball** and register as a guest (gray button on the right). After that you have access to the content. For the *Tell* and *Show* learning events, the trainer supervisor used previously developed presentation slides, videos, and image sequences.

2.4 Final Instructional Design for Online Volleyball Coaches' Education

Based on the design process outlined in the above sections, we present in Table 23.1 the final learning design for online volleyball coaches' education. This design incorporates the approved traditional stages of acquiring volleyball-specific skills and supplements them with additional opportunities to train these skills in greater depth. This last aspect is found in the asynchronous online phase, in which all participants practice the skill of analyzing and correcting movements over several weeks with the help of the video-based tasks. In the traditional format, intensive individual training of this skill is less pronounced due to a lack of time.

3 Implementation and Evaluation

The design was implemented in summer 2020 for the first time. A total of 23 prospective coaches were registered. They agreed to take part in the newly designed online blended learning format.

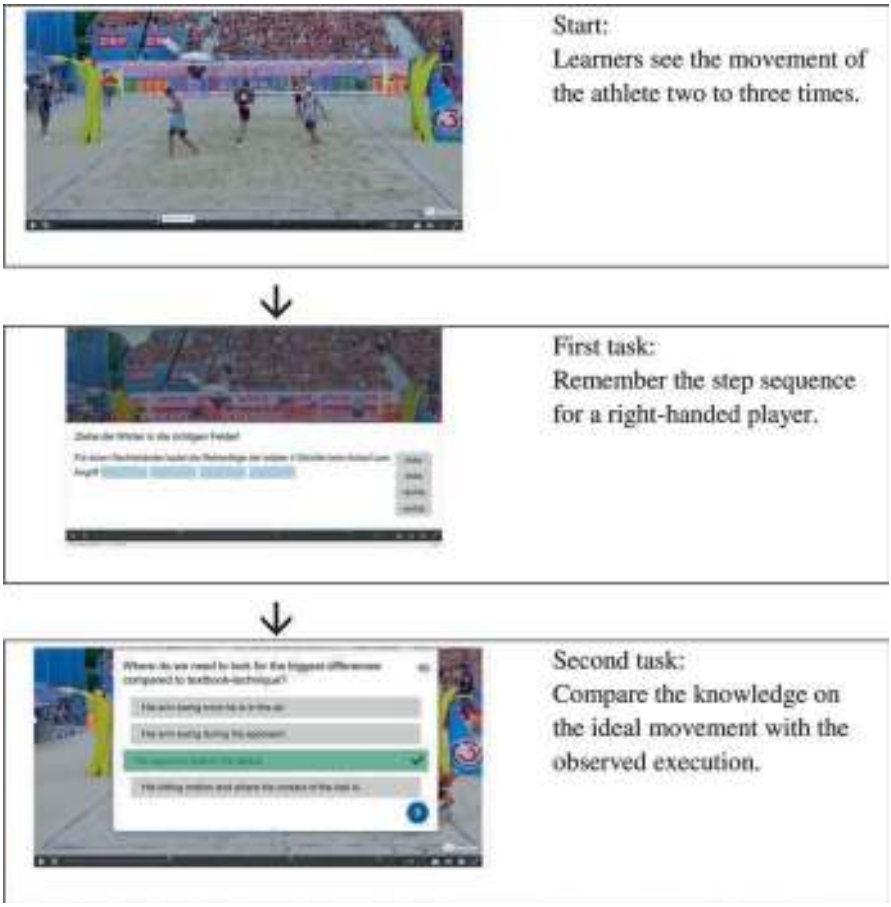

Fig. 23.1 Example of a video-based task; here the execution of the jumping and spiking technique

The evaluation of our design is guided by two questions:

First, does the design work to facilitate the skill of seeing and correcting mistakes in technique executions?

To investigate this question, we applied a pretest-posttest research design. To assess the skill performance, we again used the *H5P* plugin that enables automatic storage of the user's behavior while completing the video-based tasks. For example, after completing the two tasks in Fig. 23.1 participants receive a score that is saved and can be anonymously downloaded later for research purposes. In the pretest, the participants worked out four video tasks that were provided after attending the *Moodle* platform for the first time (preparation phase). The posttest was applied after the asynchronous online learning phase and consists of the four tasks from the pretest and four totally new video tasks. A maximum of ten points could be scored.

Table 23.1 Final instructional design for online volleyball coaches' education

Preparation phase		• Mail-invitation: Attend the *Moodle* platform • Getting-to-know the platform
	↓	
Blended online phase	1. Tell & show	• Synchronous web meeting • Trainer supervisor presents knowledge and examples of the volleyball techniques
	2. Do	• Asynchronous and individual processing of the video-based tasks available at the *Moodle* platform
	3. Reflection with peer-collaboration	• Synchronous web meeting • Asking and clarifying questions • Presentation of the results • Reflection on the problem-solving process • Discussion about the tasks and the solutions • Feedback
	↓	
Asynchronous online phase	Do (optional)	• Self-directed online skills training for 3 weeks • New video-tasks each week • Synchronous web meeting to clarify open questions on the tasks
	↓	
Graduation phase *(After Covid-19 restrictions)*	Do	• Live practice session • On-court • Demonstrating knowledge and skills

Second, what are the prospective coaches' attitudes towards the blended learning design as a possible solution to learn volleyball-specific knowledge and skills?

To explore the second question, we used three scales from the *Technology Usage Inventory* developed by Kothgassner et al. (2013): *Usability*, for example "Using the platform was easy" (Cronbach's alpha = 0.91, two items); *Usefulness,* for example "The content and tasks in the learning platform are useful for the training of future volleyball coaches" (Cronbach's alpha = 0.68, three items), and *Intention To Use,* for example "I would like to continue using the content and tasks in the learning platform" (Cronbach's alpha = 0.69, three items). The participants answered the items on a Likert-scale ranging from 1 = do not agree to 7 = fully agree. Additionally, we asked the participants to rate their satisfaction with the learning design on a scale ranging from 1 = not satisfied to 7 = very satisfied. Furthermore, the prospective coaches gave us written feedback. Data on the learners' attitudes towards the learning design was collected after the asynchronous online phase through online questionnaires provided via the *Moodle* platform.

3.1 Data Analysis

To analyze the effect of the design on skills training we downloaded the data generated automatically by the *H5P* plugin. All participants processed all video-based tasks, however, data from four participants was missing. Hence, to answer question one we included the data of 19 participants.

The posttest-questionnaires regarding the attitudes towards the learning design were answered completely by 22 participants. All calculations were carried out in SPSS 27.

3.2 Results

The descriptive statistics for the assessed variables are presented in Table 23.2.

As shown in Table 23.2, all participants improved their performance on the video-based tasks on the posttest ($M = 8.18$, $SD = 0.88$) compared to the scorings in the pretest ($M = 6.69$, $SD = 1.88$). A Wilcoxon signed-rank test revealed that this difference is statistically significant, and the explored effect size is large: $Mdn_{pre} = 6.50$, $Mdn_{post} = 8.20$, $z = -2.82$, $p = 0.01$, $d = 1.70$. Based on these results we conclude that our learning design was effective in the facilitation of one of the main skills volleyball coaches need. After the training the participants were better able to see and correct movement executions of volleyball techniques.

As also visible in Table 23.2, the participants report high positive attitudes towards the implemented learning design. The usability of the platform and the handling of the video-based tasks was perceived as easy ($M = 6.82$, $SD = 0.48$), the usefulness of the design to learn volleyball-specific knowledge and skills was rated as very beneficial ($M = 6.60$, $SD = 0.60$) and the intention to use the materials further is high ($M = 6.42$, $SD = 0.82$). Overall, the participants were very satisfied with the course ($M = 6.68$, $SD = 0.72$).

Table 23.2 Descriptive statistics for the assessed variables

Variable	*M*	*SD*
Skills performance ($N = 19$)		
Pretest	6.69	1.88
Posttest	8.18	0.88
Attitudes ($N = 22$)		
Usability	6.82	0.48
Usefulness	6.60	0.60
Intention to use	6.42	0.82
Satisfaction	6.68	0.72

The positive attitude towards the learning design is also reflected in the written feedback. A total of 11 participants used this opportunity to share their thoughts with us. For example, one participant wrote that *"I find it easier to analyze my players. The course helped me a lot."* and another one concluded that *"The videos provide a good comparison for illustrating movement actions."*. One participant pointed out that during the asynchronous online phase the optional face-to-face meeting was not enough support to solve all video tasks successfully. Two participants reported technical issues with the *H5P* videos, for example choices or comments were not displayed.

4 Conclusion and Lessons Learned

In this chapter, we report the development process and the instructional design for a fully online blended learning format for volleyball coaches' education. Our design proved to be an effective instructional strategy to facilitate the skill of seeing and correcting movement executions of volleyball-specific techniques. In the literature, this skill has been called a main skill to promote in volleyball coaches' education (Meyndt et al., 2010). Before the course, we were confronted with some skeptical voices, doubting the effectiveness of online learning for skills acquisition. As demonstrated in this chapter, using a problem-centered approach with a *Tell-Show-Do* learning sequence is suitable to do so, even in sports coaches' education. A major factor in the success of the learning design are the video-based tasks. These provided the learners with authentic game situations with real athletes enhanced through practical tasks of seeing and correcting movement executions. Also, in other sports education programs the combination of video sequences and interactive content might help to facilitate specific skills. Additionally, the video-based tasks serve as a method to assess learning performance. This is of great significance when researchers are interested in learning outcomes beyond knowledge, for example the facilitation of practical skills like demonstrated in this chapter.

Furthermore, it is important to note that our design is a blended learning format in which the prospective coaches were accompanied in their facilitation of the skill by virtual face-to-face meetings. One great advantage of our design over the traditional one is that all prospective coaches can practice seeing and correcting. In previous courses, only two to three participants could actively engage in this task due the limited time and the number of participants. As a result, the video-based tasks will be used in future courses, independent of Covid-19, as an important extension of the traditional approach.

The participants were highly satisfied with the learning design and convinced of the usefulness for volleyball coaches' education. However, we learned that acquiring a complex skill like seeing and correcting movement executions needs more support from the trainer supervisor. As a consequence, we recommend including face-to-face meetings in an asynchronous online phase as an optional opportunity to

reflect on the tasks more often. From a technical perspective, we recommend testing the *H5P* content before the start of the course and regularly during the course.

To conclude, it is possible to teach practical skills in a fully online blended learning course in volleyball coaches' education. The *Tell-Show-Do* learning sequence with video-based tasks is a recommendable approach to promote coaching skills. The small number of participants is a limitation of the study. Future research should test if the approach works for other coaching skills in volleyball or other sports, including higher numbers of participants.

Acknowledgements We thank the Austrian Volleyball Federation (ÖVV) and the Federal Sports Academy (BSPA) Vienna for their support. We also thank the participants for their feedback and their willingness to answer our questionnaires.

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Chapter 24
Distance Learning and the Influence of Schools' Organizational Characteristics on the Students Perceived Learning Success

Jan Delcker and Dirk Ifenthaler

Abstract The project Check-up Distance Learning pursues the goal of developing a tool for school leaders to help them identify strengths and challenges of distance learning processes at their schools. The fast provision of an evaluation tool was imminent when school leaders were forced to make ad-hoc decisions during the COVID-19 pandemic. Additionally, the relationship between the organizational structure (flow and accessibility of information, rules for digital tools, regulations for assessment) and students' learner success (perceived motivation, perceived ease of learning, task achievement) is analyzed based on data collected from $N = 3872$ stakeholders at German vocational schools. Hierarchical linear modelling shows small effects for eight items characterizing a school's organizational structure, underlining the importance of school leaders' managerial decisions during times of crisis.

1 Introduction

In March 2020 state officials declared an end to on-site schooling throughout Germany as a measure to contain the COVID-19 pandemic. As a result, schools were forced to switch to distance learning methods. In schools of secondary education teaching was supposed to be conducted with digital tools, such as learning management systems and live video classes. Most schools did not have the technical

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_24

and organizational infrastructure to support such a rapid change (Delcker & Ifenthaler, 2020). Further, teachers and students did not possess the necessary competencies to learn and teach online (Howard et al., 2020; Huber & Helm, 2020). The situation changed gradually as stakeholders adapted to the new situation under the ongoing pandemic.

In response to the on-going crises situation at German schools, this project was conducted to examine how school development may facilitate online learning for students and teachers, focusing on the technological, personal, educational, organizational and cooperative domains of school development (Eickelmann & Gericke, 2018). One of the main issues for school leaders during the COVID-19 pandemic was a decision-making process which could hardly be based on past experiences at the respective school or at similar schools. While school leaders implemented rules for the usage of technology, set up guidelines for communication and tried to provide information for the different stakeholders to enable distance learning at their schools, their options to evaluate their managerial decisions with regard to digitalization in school development were very limited. At that time, school officials in Germany could not provide an appropriate tool yet. The resources of school leaders, especially the time and staff necessary to design, test and implement such a tool, were needed in other domains of the school to keep day-to-day operations running during the COVID-19 pandemic.

One of the main goals pursued by project was to develop and provide a tool for decision makers and school leaders at vocational schools to evaluate the status of continuous school development. School leaders are defined as the school managers of the participating schools. At most vocational schools these school managers are a single principal and a small team of deputies. The evaluation helps school leaders to use empirical evidence to reflect on managerial decisions which focus on the facilitation of distance learning. As a consequence, changes in already implemented rules, guidelines and processes can be made. In addition, school leaders are enabled to include data-driven considerations into their decision-making processes (Schildkamp, 2019).

The second objective of the project was to identify factors of school development which facilitate distance learning processes, shifting the perspective from a single school view to the group of vocational schools as a whole. Vocational schools in Germany are one of the two parts of the German dual vocational training system. While training companies provide practical competencies, vocational schools facilitate mostly theoretical knowledge to support students in completing their vocational training. Practical and theoretical training in the dual system always happens in conjunction: school attendance at a vocational school and a trainee position is mandatory to acquire a professional qualification for all professions, apart from the qualification through a university programme. The increasing demands of the workplace towards digital competencies require changes in teachers and students' digital competencies (Roll & Ifenthaler, 2021), and therefore further strategies to implement digitalization into school development (Delcker & Ifenthaler, 2020).

2 Theoretical Framework

Brindley et al. (2004) define Distance Learning (DL) as a superior construct, which includes various forms of media-based learning. The main characteristic of DL is the geographical separation between learners and educators, making it a major challenge for the involved stakeholder (Moore & Kearsley, 2011). The requirements for the integration of DL into schools and school development processes are very diverse, which makes a multidimensional perspective on school development necessary (Ames et al., 2021; Bellin-Mularski et al., 2016). This multitude of perspectives is reflected by the different stakeholders involved in school development processes, namely school leaders, teachers, students and parents (Harris, 2010; Ilomäki & Lakkala, 2018). At vocational schools, training companies have to be included as a relevant stakeholder (Delcker & Ifenthaler, 2020). Following the definition by Rolff (1995), school development is defined as processes within a single school and not the whole school system. The aim of school development from within the school as a single organizational unit is the improvement of students' subject-specific and interdisciplinary competencies. In his model, the multidimensional composition of school development is represented by the three different dimensions inside a school. These dimensions can be summarized under teaching (activities in the classroom), personnel (mentoring, teacher training) and organization (school agendas, school management). With regard to digitalization processes, the technical infrastructure of a school has to be added to the conceptual considerations of school development (Fraillon et al., 2020). Eickelmann and Gericke (2018) expand the model by Rolff (1995) by adding a technological dimension. Furthermore, cooperation is added as a fifth dimension in their model of school development. Namely, these five dimensions are Organizational Development (OD), Personnel Development (PD), Educational Development (ED), Technological Development (TD) and Cooperation Development (CD).

OD includes a school's agenda, it's mentality and beliefs towards communication and digitalization. The dimension PD covers teacher training and the onboarding of new teachers. ED subsumes activities in the classroom, such as the usage of learning tools and methods. TD consists of requirements regarding technological infrastructure and administration of systems. The fifth development dimension CD, which describes cooperation processes between the internal and external stakeholder of school development. The five dimensions (OD, PD, ED, TD, CD) are developed towards two goals. The first goal is the ongoing facilitation of students' digital competencies, and the second goals is teaching and learning with digital media.

A number of studies has shown the influence of the development fields on students learning as well as educators' roles and teaching competencies (Dirk Ifenthaler & Schweinbenz, 2013, 2016) The participation of students in the classroom and their ability to reach their educational goals can be increased through the organizational structure of schools (Alinsunurin, 2020; Maxwell et al., 2017; Sebastian et al., 2014). The cooperation between teachers with regard to curricular alignment

supports academic improvement (Bryk, 2010). If a school is well-structured and organized, it produces an academic climate that is "conducive to learning and high student performance" (Wang & Degol, 2016), while methods and tools used for teaching influence the learning experience of students (Stefanou et al., 2004).

The way school leaders manage and structure their schools impacts teachers' satisfaction and performance, which in return enhances classroom practices and school effectiveness (Mulford, 2003). Teachers are less likely to leave the schools when they perceive the school administration as effective leaders (Nguyen, 2021). The professional development of teachers is positively influenced by a school's agenda and the creation of learning opportunities within the organization (Huang et al., 2020).

Due to requirements of the modern working world, the integration of digital teaching methods and tools into school development is a necessity. Key digital competencies cannot be facilitated without them (Fraillon et al., 2020; Roll & Ifenthaler, 2020, 2021). The concept of media expansion plans (MEP) has been deployed in the German school system to help schools transitioning towards digitalization in school development. The MEP is a written document that contains important steps towards this goal. Within the MEP, a school can formulate different digitalization goals, as well as how and when they want to reach those goals. The MEP should include an analysis of the digital status quo at the school (Ifenthaler, 2019; Obermöller, 2019). Most importantly, schools are required to specify the financial resource they need to meet MEP-specific goals to be applicable for the biggest funding program for digitalization in schools in Germany, called "digital pact" (in German Digital Pakt) (km-bw., 2021). The MEP can be an important managerial tool for school leaders to analyze, plan and implement digital tools and methods into their schools. Currently, no published studies about the effects of the MEP exists, due to the novelty of the MEP and the relative short implementation time.

Two research questions emerge from the described problems at vocational schools and theoretical assumptions about school development.

RQ 1: What role do organizational factors play in the perceived learning success of students during distance learning in times of crisis?

RQ 2: Does the implementation of a media expansion plan influence the perceived learning success of students?

3 Method

3.1 Participants and Data Collection

A convenience sample of 14 vocational schools in the federal state of Baden-Württemberg, Germany took part in the project from November 2020 until March 2021. Each school could choose the starting date of the survey, to avoid conflicts with internal school constraints. In addition, schools could choose which stakeholder groups they wanted to survey, with students, teachers and school leaders

being mandatory choices. The schools were provided with hyperlinks to the online questionnaire, which were distributed by the schools through internal email addresses. At each school the data collection was conducted over a period of 4 weeks. The data collected from the three mandatory stakeholder groups consists of 2827 students, 444 teachers and 37 school leaders ($N = 3872$). After the data collection, each school was provided with an individual report that summarized the results of the schools.

3.2 Instrument and Analysis

The online questionnaire "Evaluation of Distance Learning" by (Balzer & Schorn, 2021) has been adapted to collect data from students, teachers, school leaders, parents and training companies at vocational schools. The items can be allocated to five scales, namely organization (orga), class activity (clac), teaching & learning (tl), social interaction (soci) and personal resources (perr) and are assessed on a Likert scale from 1 to 5 (totally disagree, partially disagree, neither nor, partially agree, completely agree). A small number of items to collect demographic data has been added to the questionnaire. The variable for the MEP (mep) contains different stages of the MEP. Schools currently either do not have a MEP (stage 0), the MEP is currently worked on (level 1) or the MEP is fully planned and integrated into the school (stage2). Additionally, schools might have already applied for funding (stage 3) or they have been provided funding based on their MEP (stage4). The questionnaires differ between the stakeholders to allow data collection from multiple perspectives. The longest questionnaire (66 items) was provided for the teachers, the shortest one (23 items) for the parents. Only a few of the questions were mandatory to answer to decrease the likelihood of dropouts. The Cronbach's alpha values of the five scales for the three main stakeholder groups are shown in Table 1.

Hierarchical linear modelling was used to examine the relation between the variables stated in the research question. Different variables have consequently been added to model to identify the one with the best fit. The conditions for HLM have been met (F. L. Huang, 2018). Student learner success (lsuc) is defined by a set of items which include questions towards their perceived effectiveness and their perceived learning progress while practicing distance learning ($\alpha = .71$). During the first and second lockdown, grading was not allowed except for final-year classes, so learner success could not be measured by grades. The students' perception of their

Table 1 Reliability scores (Cronbach's alpha) for the five main scales, the number in brackets shows the number of items per scale

Group	Orga	Clac	Tl	Soci	Perr
Students	0.83 (11)	0.77 (16)	0.77 (7)	0.56 (2)	0.54 (5)
Teachers	0.83 (9)	0. 66 (17)	0.69 (6)	0.81 (8)	0.74 (6)
School leaders	0.74 (6)	0.82 (17)	0.74 (10)	0.65 (2)	0.5 (4)

Table 2 Items for students' perception of schools' organizational structure (orga_st), $N = 1763$

Item	Description	Descriptive
orga1	Teaching adaptation to crisis	$M = 3.20$ $(SD = 1.17)$
orga2	Current school organization	$M = 3.17$ $(SD = 1.19)$
orga3	Clearness of procedure instructions	$M = 3.54$ $(SD = 1.31)$
orga5	Clearness of tools for teaching	$M = 3.56$ $(SD = 1.27)$
orga9	Tool competency of teachers	$M = 3.24$ $(SD = 1.11)$
orga10	Own tool competency	$M = 4.08$ $(SD = 1.03)$
orga12	Provided technological infrastructure	$M = 4.31$ $(SD = 1.09)$
orga13	General information flow	$M = 3.59$ $(SD = 1.27)$
orga14	Assessment regulations	$M = 3.23$ $(SD = 1.26)$
orga15	Single work assessment	$M = 3.21$ $(SD = 1.22)$
orga18	Fairness of assessment	$M = 3.35$ $(SD = 1.26)$

schools' organizational structure (orga_st) was measured with 11 items, which are described in Table 2.

In addition, the age of the students is used as a possible predictor variable on level 1. The mep variable was used as a predictor on level 2.

4 Results

Initial analysis on level 1 variables showed a significant medium effect of orga_st on students perceived learning success ($d = 0.69$). The age of students did not show a significant effect, therefor it was dropped from further analysis. To increase the accuracy of the model, the items of the orga_st scale where subsequently added to the model. In the model with the highest fit, 8 of the 11 items showed a significant effect on lsuc, ranging between 0.1 and 0.15. Mep didn't show a significant effect as a predictor on level 2. Although the low ICC values of the models (<0.1) across all the models indicates that students' perceived organization at their schools does not vary between the schools, the regression estimates of the HLM model is presented in Table 3, because the approach is more sensible and represents the nested structure of schools within education systems (Alinsunurin, 2020).

To answer Research Question 1, it can be stated that some parts of the perceived organization have an effect on students' perceived learning success. The parts of the organization that had the biggest positive effect were the clearness of procedure instructions and the fairness of the assessment. Secondly, the adaptation of teaching to the crisis, students' tool competency and the provided infrastructure positively influence student's perceived learning success. The results indicate that these organizational parts play an important positive role in the improvement of students' perceived learner success.

Table 3 Regression estimates for the model with the highest fit (** < 0.01, *** < 0.001), $N = 1763$

Item	Description	Estimates (Std. Error)
orga1	Teaching adaptation to crisis	0.10309 (0.09986) ***
orga3	Clearness of procedure instructions	0.149 (0.01438) ***
orga9	Tool competency of teachers	0.06918 (0.01744) ***
orga10	Own tool competency	0.10550 (0.01767 ***
orga12	Provided technological infrastructure	0.09859 (0.01646) ***
orga13	General information flow	−0.05017 (0.01551) **
orga14	Assessment regulations	0.08707 (0.01630) ***
orga18	Fairness of assessment	0.14884 (0.01626) ***
Intercept		0.4644 (0.09986) ***

Regarding Research Question 2, the stage of the MEP does not have a significant effect on the learning success, and adding the variable mep as an explanatory variable on level 2 does not improve the explanatory strength of the HLM. It can be stated that the implementation of a MEP does not influence the perceived learners' success.

5 Conclusion

The findings of the study show the importance of the organizational structure of schools for the learning success of students. Most importantly, changes to single parts within the development field of organization can help students to achieve their educational goals. Students rely on clear procedural instructions, more so when dealing with a crisis like the COVID-19 pandemic, because they create the necessary safety within the learning processes (Sebastian et al., 2014). Fair assessment of students' works encourages students to spend time and effort on submissions and tasks, which increases their chance of succeeding. The teaching processes have to be adapted for the crisis to be feasible and plausible for the students. For the realization of digitalized teaching processes, the students need the competencies to work with the necessary tools such as video conferencing tools and the learning management system of the schools (Olszewski & Crompton, 2020). School leaders can support the students by supplying them with appropriate digital tools (Bond, 2020), which is strongly connected to the development field of technology (Eickelmann & Gericke, 2018). While the effects of the single parts of organizational structure seem to be small, the combination of the diverse perspectives including information flow, communicated rules and the provision of tools that are easy to access shape the characteristic of schools' organizational structures as a facilitator for a successful school environment (Alinsunurin, 2020; Ames et al., 2021; Bryk, 2010; Mulford, 2003; Stefanou et al., 2004; Wang & Degol, 2016).

The analysis of the data suggests that the vocational schools and especially their students' perception of organization and learner success are not very distinct. The similarity of the challenges school leaders face admits a common crisis and the requirement for digitalization in school development underline the importance of improving the collaboration between school leaders (Ilomäki & Lakkala, 2018). The existence of a MEP does not have a significant effect on student learner success. This is an important finding underlying the necessity to evaluate the creation and implementation of MEPs on a more detailed level (D. Ifenthaler, 2019). In addition, the expressiveness of a MEP for the authorization of government funds has to be criticized.

The introduced evaluation tool is currently evaluated in cooperation with the involved school leaders, to enhance its capability as a managerial tool. One of the goals of the evaluation process is the optimization of the sample size, especially on the school level. To further examine the integration of the MEP, a refinement of the survey instrument is being conducted. This will improve the collected data and increase the benefit for the stakeholders involved in the digital school development.

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Part IV
South-East Asian Region and Western Pacific Region

Chapter 25
Online Learning Environments and Student Engagement: Meeting the Psychological Needs of Learners during the COVID-19 Pandemic

Vo Ngoc Hoi

Abstract This chapter reports the results of a qualitative study on students' perception of the characteristics of the online learning environment and on how those characteristics affect their basic psychological needs and engagement during the emergency transition to online learning due to the Covid-19 pandemic. Semi-structured interviews with 24 students from a higher education institution in Vietnam revealed three main factors, including the instructor, peer groups, and technologies that either undermined or satisfied students' basic psychological needs and affect students' engagement in online learning. The findings shed light on the contextual factors that fulfill students' needs for competence, autonomy, and relatedness, thus the findings provide instructors, course designers, and institutional leaders with useful information for the manipulation of instructional strategies and online learning conditions that promote student engagement in online learning in time of crisis.

1 Introduction

The year 2020 witnessed the COVID-19 pandemic wreaking havoc on society and individuals throughout all aspects of life including education. As schools and universities in many parts of the world remained closed and classes were forced to move online, educators have been exploring new approaches and techniques as well as adjusting their instructional strategies to support students' online learning. A critical issue that has emerged out of the emergency transition to online learning is how to create an engaging online learning environment in which students actively participate in learning tasks and achieve expected learning outcomes. Since the emergency transition to online learning posts unique and unprecedented challenges

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_25

to all those involved, the endeavor to keep students engaged in the learning process requires timely reassessment and reconceptualization of the conditions under which student engagement can be fostered. To this end, this chapter draws on the development-in-sociocultural context model (Wang et al., 2020) to inform an empirical investigation into the environmental conditions that either drive or affect student engagement during transition to online learning.

2 Literature Review

The development-in-sociocultural context model (Wang et al., 2020) defines engagement as "the quality of students' interactions or involvement with learning activities, processes, and contexts" (p. 116) and conceptualizes engagement as a multidimensional construct consisting of at least three components: behavioral, cognitive, and affective engagement. Behavioural engagement refers to the observable behaviours while students are on-task including the degree of effort, persistence, and active involvement (Reschly & Christenson, 2012). Cognitive engagement is defined in terms of learners' mental investment in learning activities, including sustained attention, willingness to go beyond what is required, and self-regulated learning strategies to master complex concepts (Fredricks et al., 2004). Affective engagement refers to students' emotional reaction to learning activities, learning contexts, and their own participation in learning (Wang et al., 2016).

A defining characteristic of student engagement is that it is highly context-dependent and amenable to the learning environments (Wang et al., 2020). Therefore, to understand the nature of student engagement, it is important to determine what learning conditions foster or undermine student engagement and in what ways. In this regard, the development-in-sociocultural context model posits that engagement thrives in contexts where students' needs for competence, autonomy, and relatedness are fulfilled. Competence refers to the need to feel a sense of mastery, efficiency, and effectiveness in one's interaction with the social environment (Ryan & Deci, 2017). Students' need for competence is fulfilled when they know how to effectively manage their learning and achieve desired learning outcomes (Skinner & Belmont, 1993). Autonomy refers to students' need to feel a sense of volition, agency, and self-endorsement of their own learning behaviours (Ryan & Deci, 2017). Students' need for autonomy is satisfied when they are given choices in learning activities and perceive learning tasks as relevant and meaningful to their own life (Assor et al., 2002). Relatedness refers to the need to feel a sense of belonging and making contribution to the social environment (Ryan & Deci, 2017). Students' need for relatedness is met when they feel emotionally supported and cared for by instructors and peers in the classroom.

The abrupt transition to online learning as a result of the COVID-19 pandemic presents unique challenges to instructors and students alike, particularly with regards to student engagement. For example, Ali et al. (2020) found that students showed low level of engagement in emergency online learning due to frustrations

with online technologies, difficulties in making personal connections, and the distracting home environment. Khlaif et al. (2021) reported that factors such as local traditions and family norms, lack of technical facility and support, quality of digital content, digital privacy, and digital inequality negatively affect student engagement in emergency online learning. Contrary to those negative aspects of emergency online learning, studies have also identified positive factors that support student engagement during the transition period such as perceived instructor presence and interactive communication tools (El-Sayad et al., 2021), effective use of synchronous and asynchronous videos (Ali et al., 2020; Lowenthal et al., 2020), household materials, technological resources, and family social capital (Domina et al., 2021). Few studies, however, examine student engagement in emergency online learning through the lens of motivational theories, such as self-determination theory (Ryan & Deci, 2017). The current study extends on the studies reviewed above to contribute to the engagement literature in this time of crisis. Specifically, it draws on the development-in-sociocultural context model (Wang et al., 2020), exclusively focuses on the environmental conditions that affect students' basic psychological needs and engagement, and examines engagement in a higher education context.

3 Methodology

3.1 Background of the Study

As with universities worldwide, Vietnamese higher education institutions were also affected by the first wave of the Covid-19 pandemic. Almost half of the higher education institutions in the country (110 out of 240 institutions) changed from a traditional face-to-face to an online learning mode in an attempt to execute the stipulation of "suspending school, not stopping learning" by the Ministry of Education and Training (MOET). This abrupt transition presented higher education institutions (HEIs) in Vietnam with numerous challenges because online learning in higher education in Vietnam was neither supported by HEIs nor MOET before the pandemic (Pham & Ho, 2020). Therefore, various initiatives have been immediately undertaken to support students' and instructors' transition to emergency online learning, such as offering urgent training workshops for online learning and teaching, reducing tuition fees, supporting the purchase of laptops, and providing free broadband internet connections.

The higher education institution where the current study was conducted is located in a small province in central Vietnam. Due to its unique location as well as effective measures of the provincial government to contain the spread of the Covid-19, the province was immune to the pandemic throughout the year 2020 with not a single case detected. The institution, therefore, did not implement online learning during 2020. However, with the emergence of the Delta and Alpha variants, the new wave of Covid-19 pandemic has been going rampant again in Vietnam since April 2021.

Lockdowns, travel restrictions, and school closures with more stringent measures than ever before were implemented across the country. The province imposed similar measures, and the institution under study has been implementing mandatory online learning since June 2021. Compared to the other higher education institutions in the country, this institution seems to lag behind in terms of its technological and instructional preparations as well as experience in conducting online learning and teaching. Student engagement, therefore, is of immediate concern to both instructors and institutional leaders. This study makes contribution in this regard by exploring students' perceptions of the characteristics of the online learning environment and how those characteristics influence their basic psychological needs and their engagement during the emergency transition to online learning.

3.2 Participants and Procedure

Participants were 24 students enrolled in a broad range of academic disciplines at the university including foreign languages, business administration, accounting, instructor education, and social works. At the time of data collection, 11 students were in their first year at the university, 6 in the second year, and 7 in the third year. The university moved all traditional face-to-face classes to a fully online platform from early July due to the outbreak of the Covid-19 pandemic in the region. Google classroom and Google Meet were used as the main asynchronous and synchronous online learning platforms, through which learning materials, assignments, tasks, and video conferencing were offered. Semi-structured interviews were conducted with each of the individual participants through Google Meet – a free video conferencing platform. Participants were asked about the extent to which they felt a sense of competence, autonomy, and relatedness during transition to online learning, what characteristics of the online learning classes supported or hindered their competence, autonomy, and relatedness and how those characteristics influenced their engagement. The participants were encouraged to freely talk about their perception and experience of online learning in Vietnamese. All interviews were audio recorded and transcribed verbatim by a research assistant.

3.3 Data Analysis

Thematic analysis with both deductive coding and open coding was conducted. The deductive coding enabled the identification of relevant excerpts pertaining to students' satisfaction or frustration of the three basic psychological needs while the open coding allowed themes related to environmental factors that affected students' satisfaction/frustration of basic psychological needs to emerge from the interview

data (Braun & Clarke, 2006). The transcriptions were first read and re-read by a research assistant, and relevant segments pertaining to each basic psychological need and engagement dimension were extracted. Within each segment, initial codes that describe characteristics of the online learning classes were identified. The researcher then analysed the initial codes to generate themes. The researcher and research assistant finally met to review codes and themes and to reach agreement regarding grouping existing themes into larger ones. This process was repeated until the team was satisfied with the themes as well as appropriate naming for each theme.

4 Findings

The thematic analysis revealed three major themes related to characteristics of the online learning classroom that affected students' basic psychological needs and engagement, namely instructors, peer groups, and technologies.

4.1 Instructors

Instructors emerged as a salient factor that both supported and challenged student engagement during transition to the online learning environment through buttressing or undermining their needs.

4.1.1 Relatedness Support

Seventeen participants reported that the extent to which instructors showed their understanding of students' feeling during this difficult time and cared for their learning progress in online learning supported their sense of relatedness. Mary, for example, believed that instructors' care and understanding of their feelings and situations made her feel that she could establish a good relationship with the instructor: *"The instructor starts the course by asking how we feel, whether our family are affected by the pandemic and how we are coping with lockdowns. This makes me feel like … yeah … he cares about us ..."*. In addition, the instructors' warmth and care in creating a pressure-free and comfortable online learning climate also contributed to students' sense of relatedness, as commented by Christine: *"She's nice. She did not judge us by our mistakes and encouraged us to freely express ourselves in video conferences. I felt less anxious and intimidated as I did before the (online) course started."*

4.1.2 Autonomy Support

Unlike the instructor emotional support that buttressed students' feeling of relatedness in online learning, the extent to which the instructor supported students' autonomy seemed to be limited. One of the most salient instructor characteristics perceived by students to undermine their autonomy was the instructors' insisting on them turning on their camera during synchronous video conferences. Ivy, for example, felt uncomfortable when her instructor asked her to turn on camera during classes because she simply did not like everyone to see the background of her room: "*I feel really uncomfortable … like when my little brothers or mother accidentally open the door and everyone see that*". Similarly, Harper did not have a room of her own and had to sit in the common room where everyone in the family is there doing their own things: " … *my family are there and everyone in the class can see that"*. All these students believed that the extent to which they were engaged in the learning activities was not determined by whether the camera was on or off, and thus insisting on the camera issue gave them the feeling of being coerced and was not conducive to effective learning.

Another instructor characteristic that seemed to undermine students' sense of autonomy was their instructional practice. Several students think that instructors depended too much on the textbooks and prescribed activities without adapting them to suit the specific context of emergency online learning. This rigid dependency on textbook in turn made the lessons and activities less appealing and interesting to students. Thomas, for example, reported that some learning activities in the online classes were too time consuming and less relevant to their goals and interest: "*The instructor asked as to work in groups to prepare a presentation on our opinions about a (foreign) political issue ... It took us so much time to set up the groups in Facebook or Zalo (a popular social platform in Vietnam) and the topic was too difficult for us to talk about*". The comment above suggested that the students had little prior knowledge on this topic, which was from the textbook. To make it worse, the instructor did not make any adaption to the textbook to suit the specific students' interest and the Vietnam's context.

4.1.3 Competence Support

Similar to autonomy support, the extent to which instructors support students' need for competence was perceived to be under-expected. Seven participants reported that they felt uncertain and less confident when their instructors showed high expectations of their performance in the online learning environment from the very beginning of the course. This point was made clear in Jenny's comment: "*The instructor sent us a document which includes information about how to use the online learning system and a lot of expectations that we should meet. To be honest, I felt lost during the first few weeks of the course"*.

Contrary to instructors' communication of expectations, instructors' feedback behaviour was perceived by students to be a positive factor that gave them more confidence in their ability to gain success in the online learning process. Mary attributed this positive perception to the fact that the instructor provided feedback on her work through multiple channels such as in google doc during synchronous video conferences or in asynchronous google classroom platform in interactive manners: *"…before we had to wait until the next class to receive feedback. Now, we can get immediate feedback because everything is done online …oh and I like the feedback in the track change function … it's very clear and informative"*.

4.2 Peer Groups and Technologies

4.2.1 Relatedness Support

Peers are the immediate social agents with which students interact within the classroom. In the emergency online learning environment, peers were also a source of emotional support that helped students feel a sense of relatedness in the online learning environment. Nineteen participants reported that they felt less lonely and more connected to the classroom thanks to their friends' encouragement and support. The fact that students had been using social media regularly for communication and social relationships beyond the classroom, and that instructors had been using social media as a form of learning management system long before the pandemic had brought student closer together and reduced anxiety and loneliness during the emergency online learning. This point was made clear in Sophie's comment: "*We share the same difficulties, so we must help each other … we use Facebook for chatting and the discussion board in google classroom to interact over the lessons*".

In addition to peer communication and interaction, technologies also played an important role in supporting student relatedness. In this regard, all participants thought that Google Classroom and Google Meet satisfied their need for relatedness. Even though these were free online learning platforms, they incorporated essential functions for communication and organization of learning activities that, to some extent, provided equal learning experiences as they had in the traditional face-to-face classroom. Factors such as clear picture and audio quality (John), ease of use and quick access (Harvey), interactive discussion boards (Lily), and interactive visual aids (Olivia) were cited by the participants as positive learning experiences afforded by the online learning system.

4.2.2 Autonomy and Competence Support

In addition to improving students' relatedness, technologies were also perceived to afford their self-regulated learning experience and sense of competence. Twenty-one students believed that the clear organization of learning units and the incorporation of multimodal extra learning resources in Google Classroom enhanced their self-regulated learning experience and gave them clear ideas about what it took to achieve learning objectives in each unit as well as the whole course. For example, Frank reported that the extra learning resources in the forms of YouTube videos, websites, and blogs enriched his self-regulated learning experience: "*Sometimes, the YouTube videos help me understand a point that I could not when I read the materials … It's really convenient and informative*".

5 Conclusion and Implications

Engaging students in the emergency transition to online learning during the pandemic is a challenging job that requires instructors to be aware of the environmental challenges and support. Through the analysis of the interview data in this study, three salient lessons emerged.

First, the instructor emotional support and peer emotional support played a crucial role in keeping students engaged in online learning during the difficult transition period. The role of the instructor and peer emotional support were confirmed in previous studies on student engagement in face-to-face learning context (see, for example, Wang & Eccles, 2013) and were further consolidated in this study. Given that the Covid-19 pandemic has made significant impact on students' physical and psychological well-being, the shift from the traditional face-to-face learning mode to a fully online learning mode imposed further stress and anxiety on student educational adaptation. Therefore, in addition to the adjustment of instructional strategies and learning activities, the degree to which instructors offered emotional support and peers showed encouragement in the online learning environment was likely to help students bounce back from emotional distress and adjust to the new learning environment. The finding of the study, which indicated that the students felt emotionally supported by the faculty, seemed to contradict to the study conducted by Chiu (2021), who reported that students felt less emotionally engaged in online learning due to the perceived lack of emotional attachment and support from the instructors. Therefore, whereas the educational content, instructional approaches, technological support, and student preparedness are important elements to consider in emergency online learning, the emotional support offered by instructors and peers were determining factors that could help students with initial adjustment to and engagement in the new learning environment.

Another lesson that stood out from the data was the extent to which students' need for autonomy was supported. In this regard, the study participants had relatively negative perceptions about instructors' instructional practices, particularly the mandatory "camera on" policy and the rigid dependency on prescribed tasks in textbooks. While asking students to turn on their camera during video conferences had a number of benefits such as maintaining non-verbal communication, building instructor-student relationships, and improving instruction effectiveness, instructors should be mindful when implementing the "camera on" policy because it might not benefit students for reasons reported earlier in this study and in other research (see, for example, Castelli & Sarvary, 2021). More appropriate practices that took into account equity, inclusion, and diversity of the students and the situations the students found themselves in, such as offering alternatives, encouraging rather than insisting, offering rationales, addressing distractions, and giving breaks should have been adopted (Castelli & Sarvary, 2021). Instructors' rigid dependency on textbook activities also reflected the difficulties that students encountered during emergency transition to online learning. Lack of preparedness and experiences with online learning and teaching seemed to be the main reasons explaining unrelated, uninteresting, and thus unengaging tasks. Numerous studies in school-based contexts have confirmed the role of providing relevant and relatable tasks to students' personal goals and interests in supporting their needs for autonomy and engagement (Wang & Eccles, 2013). Therefore, the flexible adjustment of learning activities to be relevant, interesting, optimally challenging, and suitable for the online learning context should be exercised by instructors and online course designers during the emergency transition period.

Finally, high expectations for students' success might backfire on those who have low sense of competence. Clearly communicating expectations to students is beneficial to their sense of competence as reported in previous studies (see, for example, Hartnett, 2015), but it should be handled with careful consideration of the learning context and student academic levels. It would neither support students' competence nor engagement if we expect students to excel in the online learning environment amidst the various sources of stress, anxiety, and uncertainty induced by the Covid-19 pandemic, without giving them clear instructions on the strategic approaches and learning strategies to achieve desired outcomes.

Building on the initial evidence for an engaging online learning environment in this study, future research attempts can dig deeper into factors related to instructors, peers, and technologies that influence student engagement. In addition, future research can also examine questions on how those factors are perceived by students across contexts and cultures and explore instructional strategies and design practices that can be utilized to enrich students' online learning experiences.

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Chapter 26
From Emergency Remote Teaching to Effective Online Learning: A Teacher Professional Development Case Study from Higher Education in India

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Abstract This chapter describes the design and implementation of an educational solution to prepare teachers and instructors in India for various pedagogical and technological transitions during the pandemic. The goal was to move from an emergency remote teaching approach towards adopting effective online teaching strategies. This solution had to address the key challenge of remote professional development for the online medium while accounting for the diversity in the Indian educational context, taking into account varying needs of learners, teachers, institutions, geography, availability of technology, prior experience, and goals. The solution had two parts: i) a web-based repository for self-learning, consisting of research-based principles, pedagogical strategies and tools for effective design and development of online courses, and ii) synchronous interactive workshops to support instructors in practical implementation of the principles, strategies and tools to make domain specific instruction design decisions. Overall, emphasis was paid to learner engagement, diverse learner needs, peer learning, providing effective feedback and meaningful interaction. The resource repository and workshops guided instructors through making decisions and evaluating trade-offs in their context. This article also provides a brief analysis of the data collected from workshops on teachers' preparedness at effective integration of technology, and the impact of the OTeach resource repository, which can found at Google Sites and has 25,000+ visitors so far. The article concludes with reflections and recommendations based on our experience.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_26

1 Introduction

As a response to the COVID-19 pandemic, India went into a lockdown in March 2020 leading to a closure of schools and colleges. This lockdown was implemented with a very short notice, so educational institutions had to adjust quickly. Following government guidelines, emergency remote teaching was immediately adopted nationwide. This measure was initially accompanied with skepticism of the online format but was regarded as temporary, as exemplified by Hodges et al. (Hodges et al., 2020): *"[…] emergency remote teaching is a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances"*. By June–July 2020, it became evident that online teaching would be the norm for several months. Gradually the dialog shifted towards seeking systematic solutions for *effective online learning*, i.e. solutions that arise from carefully planned design, building on the affordances of the online medium and addressing the needs of the specific context.

1.1 Context

The design of such solutions had to prepare instructors for various types of transitions: moving from face-to-face teaching to online mode, adoption of new technologies, and importantly the pedagogical transition from lecture-based transmission to interactive and collaborative strategies. A solution for teacher professional development was needed, and it had to be conducted rapidly and in remote mode to begin with. An added challenge was due to the diversity in the requirements of the learners, their institutions and instructors, which is a key feature in the Indian educational context (Joshee, 2003). This diversity was seen in the subject matter taught, pedagogical strategies preferred, availability of technology, and instructors' prior experience in using tools and interactive learning strategies. On one end were schools and colleges in economically backward parts of the country where teachers were enthusiastic about teaching online but had limited access to technology, such as a desktop or sometimes just a basic smartphone. At the other end were faculty members from the top-tier universities with access to the latest technologies, institutional support for LMSs, and a workforce to manage such technologies. These instructors were eager to create high quality content and expected exposure to advanced tools and strategies.

The diverse needs of instructors led to a variety of perceived challenges that the solution had to address. Instructors who taught large classes felt daunted by engaging their class using technology. Others who were known to engage classes with a blackboard, were challenged by the online modality itself, and were expecting an approach that would allow them to replicate their in-class style of teaching. Many teachers and instructors were apprehensive about the technical expertise that would be required, or which tools to choose for their needs and how to customize them. Another issue was that the available self-help resources for a tool did not address

teaching-specific challenges, for example, existing video editing tutorials addressed a different purpose such as filmmaking. Further, many good quality resources were primarily in English which posed another challenge. Teachers were also struggling with pedagogical decisions, such as online strategies meaningful and specific to their domain.

The goal of this article is to describe the design and implementation of a solution that evolved from a rapid emergency remote teaching manual designed for a short period during online transition to now address the above needs with a focus on teacher professional development for a long run, and to analyze its impact. Use of varied, but relevant learning resources and activities, is one way to support different learning preferences (Bangert, 2004; Hew, 2016) hence this solution had to provide self-learning resources that could be contextualized and catered to diverse needs. At the same time, it was required to facilitate practical application of the principles, tools and pedagogical designs and support instructors with getting comfortable in their new role. Thus the solution had two parts:

(i) *OTeach resource repository:* The foundation was provided by a Google Sites based repository of principles, strategies and tools for quality online teaching and learning. This was structured in the form of a self-paced course called Online Teaching (referred to by its popular nickname '*OTeach*' henceforth) for instructors wanting to learn on their own. This is available on Google Sites https://sites.google.com/view/iitb-teachonline

(ii) *Interactive workshops:* The application of the principles and strategies was supported by synchronous interactive workshops and talks. These workshops facilitated teachers and instructors in identifying teething problems and specific challenges such as promoting peer discussion online, building a comfort level with their available or desired technology, and making domain specific instruction design decisions.

The team working on this solution included faculty members and graduate students in the Educational Technology department at the Indian Institute of Technology Bombay. The primary members of this team are the authors of this article. Section 2 describes the design and implementation of the OTeach resource repository and the corresponding workshops. Section 3 analyses the OTeach webpage statistics and data collected from workshops. It discusses the impact and findings in terms of teachers' preparedness and adoption of effective online learning strategies. The article concludes with reflections and recommendations based on our experience, in Sect. 4.

2 Design of OTeach Resource Repository and Workshops

The goals of the OTeach repository and corresponding workshops are:

- To help instructors who are familiar mainly with face-to-face teaching mode to get started in online teaching.

- To address various aspects of the teaching and learning process in the online medium, beyond content delivery.
- To highlight key principles, strategies and tools for effective teaching and learning in the online medium.
- To provide recommendations that are based on evidence from research and practice in online learning.

Overall, a guiding principle has been the metaphor of low-floor (low entry barrier for getting started), high-ceiling (providing resources for going to advanced online techniques), and wide-walls (indicating multiple options for achieving a goal) (Resnick & Robinson, 2017). The recommendations in the OTeach repository and workshops have been designed based on existing research on effective online teaching and learning (Baran et al., 2011; Means et al., 2014). A rapid, iterative and spiral approach was used, which allowed a certain degree of experimentation such as identifying which tools and strategies are easy for novices to adopt, which online pedagogical techniques are suitable in the given context, and so on.

2.1 Topics and Organization of OTeach

OTeach repository has nine primary sections with a tenth section of FAQs added later. It begins with a discussion on the challenges of teaching online followed by a discussion on factors an instructor may consider while making decisions. An important early section describes research-based principles in designing online learning experiences to promote learner engagement and learning (Means et al., 2014; Zhang et al., 2006; Shank, 2017; Rovai, 2007). Subsequent sections delve into the methods and tools for online teaching. The section on preparing content discusses strategies for curating content as well as creating one's own videos and learning-by-doing activities. It includes concepts of chunking and designing in-video interactions. This is followed by a section addressing the methods of sharing content via asynchronous and synchronous media. It emphasizes the need to make resources available to diverse learner needs. The section on interacting with students includes active learning strategies during live interactions, effective orchestration, and facilitating meaningful discussion and peer learning. The section on assessments discusses formative assessment and feedback, rubrics for peer grading, technologies available for online assessments and logistics. A section on the roles of teaching assistants in online courses is included. One can go in sequence or directly go to the sections of interest via the cross-referencing.

Each section begins with key concepts, followed by an in-depth dive via videos and text. Self-check questions appear immediately after the concept with customized feedback. Practical aspects such as how-to videos for tools and links for further exploration are provided. Each aspect of online teaching includes a toolkit for instructors to explore, compare and choose appropriate technologies, and make

decisions. For a given pedagogical purpose, OTeach provides information about a range of technologies, in order to address the diversity of platforms used and availability of tools for different instructors.

2.2 Workshops Design and Implementation

While the OTeach repository attempted to address a range of instructional needs, the diversity of queries received made it evident that a more customized solution was required. This was addressed by hands-on workshops. Table 26.1 provides a summary of the workshops and talks for different audiences. All workshops and talks were delivered in remote mode on an online platform.

2.3 A Walk-through of an Illustrative Workshop

The detailed example below describes the workshops in Row 9. Each workshop spanned over 5 days, with synchronous sessions on Google Meet of 90–120 min on each day. Sessions were centred around various topics in OTeach such as content design, advanced multimedia, active learning strategies in online synchronous

Table 26.1 Summary of OTeach-based workshops and talks

	Audience	Duration and mode	Participants
1	Faculty members at a top-tier research intensive STEM focused institute	2 h synchronous talk	200
2		5 day workshop, blend of synchronous + asynchronous	120
3	Video editing staff in the above institute	3 day workshop blend of synchronous + asynchronous	30
4	Graduate teaching assistants	5 day workshop, blend of synchronous + asynchronous	1000
5	Faculty members at research intensive, STEM focused universities	5 synchronous talks each of 2 h	540
6	Faculty members at a national engineering institute	2 day workshop, blend of synchronous + asynchronous	100
7	Training staff at a national bank	2 day workshop, blend of synchronous + asynchronous	60
8	Computer science college instructors at a professional society event	2 h synchronous talk	200
9	College instructors from various disciplines across India	4 workshops, 5 days each, blend of synchronous + asynchronous	290
10	Teachers from government schools, vernacular medium of instruction	3 workshops, 2 days each, blend of synchronous + asynchronous	300

Table 26.2 Assignments for instructors to create materials for their own online courses

Day 1	Apply chunking on your topic and prepare a 5-slide presentation on one chunk
Day 2	Use *draw.io* to prepare an illustration relevant to a topic in the Day-1 assignment. Update Day-1 presentation and include a slide containing diagram created using *draw.io*
Day 3	(a) Record a 2-min slidecast based on the topic of your choice using *OBSStudio*. Add two different video sources to the screencast. (b) Edit the video—trim the video as required using *OpenShot* and use *Handbrake* to reduce the size
Day 4	Prepare a mind map relevant to a focus question in topic of your choice. Use *VUE* for preparing the mind map
Day 5	Use h5P, to add interactive reflection spots at relevant places to the video you created in Day-3 assignment

sessions, communication, collaboration, instruction delivery and tools. Each session contained a warm-up activity based on the previous day's assignment, a session discussing principles and guidelines for effective online teaching, related tool demonstrations and a hands-on assignment for the next day. A crucial part of the workshop was providing instructors a set of tools and guiding them to select ones appropriate for their context. Open-source and simple to use tools were chosen in order to get instructors started immediately. This allowed installation and use of tools without worrying about license expiry and subscription cost. Troubleshooting assistance was provided to build confidence to explore advanced tools.

Moving to advanced online instruction methods would have been overwhelming for teachers who were used to classroom-instruction methods and had basic or no online teaching experience. To bridge this gap, assignments were designed to incrementally build on previous knowledge, thus helping participants to gradually transition from basic to advanced levels (Table 26.2). Participants were expected to create small and meaningful artefacts (for example, a recorded video with an in-video activity) for a topic of their choice by installing or configuring the technology. Feedback was given based on rubric-based evaluation criteria, aligned with best practices. This gave them the opportunity to make suitable corrections and improvisations in their work.

3 Impact and Findings

3.1 OTeach Webpage Statistics

The OTeach webpage was published on May 20, 2020 with an announcement of the launch on Twitter and Facebook. A total of 8000+ users were recorded in the first month. In a year's time the course had grown to 30,000+ sessions and 18,000+ active users. The current number of active users (as of September 30, 2021) are close to 25,000. 64% of active users accessed the course via direct links or bookmarks. We interpret these as users who are regularly accessing the course as a repository or a reference. 22% of the users visited from links inside our Institute's

network. 13% of the users accessed the course via organic search and 1% via social media. The most accessed section was *preparing content* among which *creating videos, chunking* and *curating content* were the most accessed subsections.

3.2 Data Collection and Analysis from Workshop

Data from one of the workshops were collected and analysed. Data sources included participant-created artefacts in hands-on assignments, results of pre-session and end of course quiz, workshop feedback form, and post-workshop emails. The post workshop feedback form included 17 questions to which 85 out of 114 participants submitted feedback. Select findings are given below:

- **Active participation**. 97% (111) participants attended all sessions and 89% (102) participants submitted all 5 artefacts as part of hands-on assignments. More than 70% have expressed interest in attending an elaborate version of the workshop.
- **Preparedness for using active learning strategies.** Participants displayed an increased awareness and reception for transition towards active learning strategies. 89% mentioned 'Adding interactivity to video' as the most useful topic and H5P for interactive videos was among the top three most useful tool. In the following quote, one participated described her experience of the transition: *"[…] students are disinterested if teaching is monotonous. Now, I would use the tools learnt in the workshop to break the monotony in my classes"*
- **Usefulness of hands-on assignments.** 81% of participants felt that hands-on assignments were useful to apply the principles and gain experience in using technology.
- **Preparedness and confidence in using tools**. 91% of participants found the tool sessions as the most useful component of workshop structure. The following two quotes are from participants who reflect on their experience with using technology:

  "*I have never tried so many tools in 5 days and due to assignments I downloaded all the tools on my laptop and make an attempt to use it on the same day. This gave me hands-on experience and confidence." "I have learned a lot from workshop which is going to help me teach my students. It has also polished my skills and built confidence to conduct online sessions for students in current situation.*"

4 Reflection and Recommendations

Based on our experience of designing the OTeach resource repository, conducting the workshops and response received, we synthesize our reflections and put forth the following recommendations:

- **Include resources for instructors at a variety of preparedness levels and needs.** We cannot expect all instructors to follow the same materials and strategies for teaching, hence provide resources at a variety of levels from basic to advanced. Also provide a range of options to cater to differing needs of instructors based on domain, learners, infrastructure etc. In workshops, bridge the gap between participants at different stages of expertise. Facilitate participants to work in their zone of proximal development. Incorporate measures such as discussion forums, buddy system and group mentors. Also reassure instructors that it is okay to start wherever they are comfortable and go up the levels gradually.
- **Provide support for teaching in synchronous as well as asynchronous online modes.** In an emergency situation, students need the comfort of synchronous interactions. Since many university instructors primarily use lecture method along with some discussion, they may find it challenging to move to an asynchronous mode. Also due to lack of time or issues of technology or perceptions, instructors may hesitate to focus on creating asynchronous learning materials. However, research studies and best practices of effective online teaching point to both well-designed asynchronous learning activities and actively engaging learners in synchronous sessions (Zhao et al., 2005). Hence support for both modes need to be provided, such as in the form of guidelines, design plans, teaching strategies, relevant tools and so on.
- **Contextualize the use of technology tools and pedagogical strategies**. While there exist several technology tools and pedagogical strategies for teaching online, instructors need help to use and apply them in their specific context. The context can involve knowledge about the learners, instructors' experience, domain (subject), available infrastructure, institutional culture etc. Hence it is important to understand the context of the instructor, test these tools and strategies in the given context, and create resources such as how-to videos, or guidelines so that are meaningful to the context.
- **Design opportunities for practice, and follow with self- or peer-assessment.** Practice and feedback lead to better application (Shank, 2017). Provide instructors with frequent activities for applying online teaching strategies or getting hands-on experience with tools. Instructors can be asked to create content videos, in-video quizzes, activities for synchronous interaction, discussion prompts, etc. Provide rubrics based on research guidelines for self- and peer-assessment, and ensure that the feedback is specific and actionable.
- **Be aware of the negative perceptions regarding online teaching and learning, and address the beliefs surrounding it.** There indeed are serious challenges in moving online, especially in an emergency. For example, preparing students and instructors, making infrastructure available, conducting labs, fair assessments and many others. These issues do need wide discussion and systematic studies. However, perceptions and incomplete understanding abound on online teaching and learning (Allen & Seaman, 2010). Some are related to the nature of online courses, such as conflating a temporary online shift in an emergency situation with planned online learning. Others stem from assumptions such as poor student engagement in online learning compared to face-to-face

classes. Predictions such as online teaching will lead to ill-prepared students and poor quality outcomes tend to be made. Beliefs such as online teaching is not 'real' teaching are expressed. All these need to be acknowledged and addressed. Some ways of doing so are to examine underlying assumptions on what it means to teach or learn, provide alternate solutions, disseminate research findings and share best practices from similar instructors. Overall, it is important that the support provided to instructors be motivational as well as practical.

The above points arise from our key learning, that for online education to be effective in a country like India, we need to design solutions situated in the diverse needs of the instructors. Solutions need to be designed to address instructors' cognitive, social and affective requirements first. Instead of a universal solution, we need a flexible and adaptive set of solutions which guide instructors towards options that cater to their expectations and facilitate the application of principles in their teaching context. An educational solution during an emergency situation will have a chance of succeeding when it manages to secure buy-in from students, instructors and administrators, individually as well as collectively. In our case, this led to efficient adoption and a more effective transition accompanied with good practices.

Acknowledgements We acknowledge the support of students, staff and faculty members from IIT Bombay who contributed to various aspects of the OTeach initiative. We thank Dr. M Sasikumar, CDAC Mumbai for his significant contribution in the CDAC workshop design. We also thank the members of Educational Technology Unit of CDAC Mumbai who contributed in workshop conduction and assisted in data collection.

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Chapter 27
Impact of the COVID-19 Pandemic on Education in Japan and the Role of the Japan Society for Educational Technology

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Abstract This chapter provides an overview of the strategies and responses to the educational challenges in Japan caused by the coronavirus disease (COVID-19). Systematic content analyses revealed an increase in the frequency of keywords (1) Global and Innovation Gateway for All (GIGA) school and (2) online education/online classroom in Japanese academic journals when the years 2019 and 2020 were compared. The GIGA School is a government-led project aiming to digitize education in primary and secondary education, and the promotion of the GIGA school project with infrastructure development as well as shifts to online education at all levels of education during the pandemic in Japan were found. Furthermore, the National Institute of Informatics has been hosting weekly online webinars to share the information pertaining to strategies and tips for effective online education, especially for higher education, since March 2020. In addition to government-led reactions, professional academic societies of educational technology have played an important role in maintaining effective education and learning, even during the pandemic. The case of the Japan Society for Educational Technology (JSET) has been presented to show the background of online education in Japan. The experiences of all researchers, practitioners, and students during the pandemic can provide an

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opportunity to upgrade our educational system for learning to be more effective and resistant to emergencies, regardless of the in-person or online application of the technology.

1 Introduction

Like other countries, the education system in Japan has been affected by the COVID-19 pandemic. This chapter provides an overview of the strategies and responses to the educational challenges caused by COVID-19 in Japan. The government is responsible for the establishment and implementation of an educational system and policies that depend directly on the national policy. Thus, on February 27, 2020, the Prime Minister announced a policy to request temporary school closures nationwide in coordination with the newly established Coronavirus Infection Control Headquarters. On February 28, the Japan Ministry of Education, Culture Sports, Science and Technology (MEXT) notified stakeholders (e.g., the superintendents of education for each prefecture and city board of education) schools would be closed 2 days later, on March 2, 2020. The first state of emergency was declared in seven prefectures on April 17, 2020, and nationwide on April 19, 2020. Overall, school closures affected a total of 20,349,962 learners at pre-primary, primary, secondary, and tertiary schools (UNESCO, 2020). The emergency was almost lifted on May 25, 2020, with approximately 98% of schools reopening as of June 1, 2020 (MEXT, 2020d). In addition, on June 5, 2020, MEXT introduced a comprehensive package for schools to ensure that students continued learning during the pandemic (MEXT, 2020a).

This chapter focuses on the educational changes that took place during the pandemic compared to the pre-pandemic period in Japan. First, to investigate the impact of the pandemic on education in Japan, a systematic content analyses of educational articles published in Japanese academic journals was conducted using the CiNii (Citation Information by National Institute of Informatics) database, one of the largest databases of academic articles, books, and dissertations in Japan. The results address the progress of the Global and Innovation Gateway for All (GIGA) school projects and an increase in online education/learning following the COVID-19 outbreak. Based on the results, the chapter will then introduce the GIGA school project for K–12 education and present the actual practices and innovations of online education in higher education by analyzing weekly nationwide webinars hosted by the National Institute of Informatics (NII).

In addition to government-led emergency acts, professional academic societies in educational technology began to provide effective and efficient online education and learning. In an emergency, expectations and responsibilities of expert groups are significant. The Japan Society for Educational Technology (JSET), one of the major academic societies in educational technology, works to lead society to accurately track the direction of the new phase for education and learning. Thus, the chapter reports the JSET contributions and practices during the pandemic. Finally,

the accomplishments and the challenges that JSET faces are summarized along with future plans to support the integration of technology in education to facilitate quality learning.

2 Educational Changes Between Pre- and during the Pandemic in Japan

This section presents the results of a content analysis using the CiNii database. Then, the concepts and practices reflecting the salient educational changes between pre- and during the pandemic will be explained, as well as the GIGA school and online education/ learning. The GIGA school is a government-led project that digitizes education for primary and secondary education. Then, another content analysis is presented to summarize actual practices and strategies used to solve challenges caused by the pandemic, analyzing simultaneously presentations of the weekly nationwide webinar series hosted by the NII.

2.1 Content Analysis of Academic Articles in the CiNii Database

NII provides one of the largest databases of academic articles, books, and dissertations in Japan: the CiNii database (https://ci.nii.ac.jp). To examine the trends in educational practice and research in Japan before and during the pandemic, the authors summarized keywords in the COVID-related articles on CiNii. All articles and reports published in 2020 with titles including the keywords "COVID-19," "new coronavirus," or "pandemic" were listed. Then, the overlaps and redundancies were removed. The total number of articles was 9116, of which 748 were related to education as of July 2, 2021. Higher education studies represented the greatest proportion (380), followed by online education (154). In addition, there were 71 social educational programs, including libraries, museums, cram schools, and community learning. Overall, the research and educational practices implemented during the pandemic have been widespread in both formal and informal education.

Table 27.1 presents the frequency of keyword use in studies on education that were conducted in 2019 (pre-pandemic) and 2020 to identify changes in educational research and practices throughout Japan. The keyword "e-learning" exhibited similar use rates in 2019 and 2020. Other keywords increased in use in 2020, with "online education/classroom" appearing about 50 times more frequently in 2020. The frequency of "distance education" was also three times greater in 2020. Additionally, the keyword "hands-on/practice" decreased in use during this period, reflecting a decrease in in-person education research. The keywords "GIGA school" and "one device for one student" increased in 2020, which indicates the progress of

Table 27.1 Frequencies use for keywords in education studies conducted in 2019 and 2020

Keyword	2019	2020	Difference (2020–2019)
e-learning	44	43	-1
Online education/classroom	6	327	321
Distance education	14	46	32
Hands-on practice	1488	1289	−199
1 device for 1 student	8	49	41
GIGA school	0	75	75

the GIGA school project and the infrastructure development at K–12 schools. The results of this content analysis show shifts from in-person practice to online and distance education. The digitalization of schools at the primary and secondary levels is also evident.

2.2 The GIGA School Program

The Global and Innovation Gateway for All (GIGA) school concepts was introduced in 2019, with MEXT, the Ministry of Internal Affairs and Communications, and the Ministry of Economy, Trade and Industry as observers. GIGA aims to develop sufficient infrastructure for information and communications technology (ICT) use at all schools, with the goal of having one device per student by 2023. Using their governmental supplementary budget, most local governments have already realized learning platforms and high-speed communication networks for each student.

The initiation of the GIGA school concept was based on the fragile ICT environment at schools, with four to five students on average sharing one computer and a huge gap in the infrastructure development among different prefecture-level local governments (MEXT, 2020b). The 2018 report by the Organization for Economic Co-operation and Development (OECD) ranked Japan second among 49 countries in terms of the teachers' degree of necessity for professional ICT skills. When COVID-19 began to spread in Japan, teachers' preparedness for ICT use was insufficient.

Due to the aforementioned school closures, teachers faced the challenge of using ICT to facilitate student learning, while protecting the health of staff and students. This, in turn, promoted the realization of the GIGA school program. The GIGA school program ensures "1 device for 1 student with a high-speed network in schools," thus providing optimized and creative learning for all students who will live in Japan's "Society 5.0" (MEXT, 2020c). Society 5.0 can be defined as "a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space" (Cabinet Office, 2020). The concept was named to illustrate the major transformation of society and education from being hunting based ("Society 1.0") to

information based ("Society 4.0"). The GIGA school program aims to optimize the learning abilities of teachers and students using a combination of available approaches. Professor Tatsuya Horita, JSET's ninth president, chaired the "Meeting of Experts on the Utilization of Educational Data" conducted by MEXT. He currently leads the initiative for ICT use to promote effective and quality learning in Japan, predicting that the data-driven education achieved through learning analytics will soon play a central role in the GIGA school program.

2.3 NII Webinar Series

Another content analysis was conducted, examining a weekly online webinar hosted by the National Institute of Informatics. This content analysis provides an overview of the actual practices and ingenious routes of various people engaged in emergency remote teaching, mostly at the higher education level. NII started the weekly webinar series called the "Cyber Symposium on Sharing the Status" on March 26, 2020. It is the largest webinar series to address COVID-19-related educational issues in Japan. The NII webinar began at the time of the school closures, which was right before the new academic year started in April in Japan. The analysis of the 294 presentations from the 30 symposiums (March 26, 2020–April 9, 2021) was conducted to determine what information and topics were shared and discussed during the pandemic among policymakers, faculties, researchers, practitioners, and stakeholders, mainly for higher education. From the analyses of the 1-year series, a shift in presentation topics is revealed, from the struggles, concerns, and trial-and-errors of the practices early in the pandemic to successful cases, student reactions, and effective design a year later.

Fukasawa (2021), one of the chairs of the webinar series, categorized all the topics of the webinar "at his personal discretion" (i.e., his arbitrary selection) and found that topics such as practical examples from universities/K–12 schools, ministry news, and overseas examples appeared throughout the year. In contrast, he reported changes in certain topics, such as solving technical problems, learning analysis, and student talk. He further suggested that the need for technical demonstrations decreased with time, and a greater need for reflecting on this emergency teaching using students' voices and data began to emerge.

By adapting Fukasawa's categorization, the authors re-examined the NII webinar series using the data of speakers and topics for the 294 presentations at the 30 symposiums during 1 year. Table 27.2 shows the 13 most frequent talk categories in this webinar series. The results indicate that various actors were involved in the improvement of education, including students and Japanese professors staying abroad as presenters. Regarding student voice, which Fukasawa pointed out was in high demand, the number of presentations by students was still small (4%) in comparison with the total number of presentations. However, it is noteworthy that the webinar series includes learners as presenters, and not only professors, which implies a partial shift in the perspective of learner-centered education. It is expected that there

Table 27.2 Thirteen frequent talk categories of the NII Webinar over 294 presentations (March 2020–April 2021)

Talk categories	*n*
Case report (university level)	101
Learning analytics	35
Overseas cases	28
Case report (primary/secondary)	21
Digital transformation	16
Ministry/government reports	14
Student support services	12
Student talks	12
Specific tools and technologies	8
Copyright issues	7
Education in general (proposal)	6
Government statistics and surveys	6
Instructional design	6

will be a further increase in student presenters in the coming year along with an increase in various other actors such as non-teacher staff of universities or teachers from primary/secondary education as the webinar presenters.

Case reports from universities were the most common topic. Case reports can be sub-categorized into online teaching practices, which were common in the early stages of the event; hybrid practices (blended and HyFlex learning cases), which increased in prevalence in the middle of the year, and the use of new technologies, which was a popular topic throughout the pandemic year. Although there were many case reports among the presentations, only six of the 294 presentations discussed the instructional design directly. This also indicates that a greater support for educational technology via instructional design is required for the post COVID-19 situation.

3 JSET Achievements during the Pandemic

This section illustrates the approaches and initiatives of JSET, an academic expert society focused on educational technology. JSET's activities included presenting at the Association for Educational Communications and Technology (AECT) 2020 panel discussion about emergency responses to education during the pandemic. In addition, this section introduces lessons learned during the pandemic and future paths to realize the goals of digital transformation and optimized learning for what the government of Japan calls "Society 5.0," as mentioned in Sect. 2.2.

3.1 Contribution: Sharing JSET Expertise

JSET made three major contributions to society during the pandemic: (1) It continued to conduct virtual conferences even during the school closures and other limited-time regulations related to COVID-19; (2) In cooperation with organizations such as NII, it disseminated its expertise on lesson design and ICT use in the context of emergency remote teaching; and (3) it provided recommendations to national authorities on political policies such as copyright law issues.

First, JSET conducted one of the earliest virtual conferences in the country, which was necessary for research, development, and information exchange. In 2020, JSET increased the number of scientific meetings to twice a year (in October and March). At the time of the first conference, in March, JSET announced the cancelation of an onsite conference, replaced with a trial of a virtual conference instead. Due to the efforts of the conference committee members, 116 of the 215 originally scheduled participants were able to deliver presentations via Zoom (JSET, 2020a). This trial was documented, with the results to be used as a manual for holding a virtual conference (JSET, 2020b), and it received high interest both from Japan and abroad.

The next virtual conference, which was not a trial but a fully planned event, was held in September 2020. It was comprised of 276 presentations and 677 participants—approximately 20% and 30% lower, respectively, than during prior years. When creating the program, JSET also succeeded in inviting guest speakers from overseas, including the AECT president (JSET Spring Conference Committee, 2020). The subsequent conferences in March and October 2021 were also virtually held.

Second, JSET provided helpful information regarding the integration of technology in education for teachers and other stakeholders, including through cooperation with the NII symposium. Katsuaki Suzuki, as the JSET eighth president, talked at the fourth NII symposium. Based on instructional design theory, he reported on the design of online classes as an "emergency bridge" before returning to normal times, not aiming for the exact same style of education but rather for providing the same level of education without exhaustion (Suzuki, 2020). In addition to this lecture, booklets, such as the "Practical Guide to Online Learning," were published thanks to the efforts of some of the special-interest JSET groups. The aim was to contribute to society at large by posting information on a page accessible to everyone, rather than on a page limited to members only. This provision of information represents a major JSET contribution.

Finally, negotiations with authorities could also be considered a JSET contribution. Before the pandemic, it was rare for a typical school in Japan to offer online classes. Thus, the Copyright Act and the School Education Act lacked considerations for online classes, and various other learning approaches that were used during the pandemic. In the case of the Copyright Act, even before the pandemic preparations of a new act for online classes had begun; however, at that time, the act was not yet in effect. In response JSET, as an academic society, made a request to

release the act earlier to the relevant ministries in cooperation with other academic societies. Consequently, a response to copyright guidelines was proposed as an emergency measure for online classes.

3.2 Challenges: Cooperation among JSET Members

Although significant contributions were made, as mentioned in the previous section, JSET needs to review the issues it was unable to achieve. JSET was unable to (1) effectively share the labor of the many members who worked hard to implement ICT at their schools; (2) organize hands-on activities for teachers, like AECT did; and (3) connect research and practice.

The first and biggest challenge that JSET faced was sharing and cooperating with too many teachers utilizing ICT in practice. Many JSET members played a central role in the use of ICT as a type of pandemic preparedness in various institutions (from K–12 to higher education). Although this system included a heavy workload for both teachers and staff, each school now possesses a manual regarding the ICT use, especially in the context of online classes. However, research collaboration originally thrived in JSET, with many practical research projects being conducted between middle- and high-school teachers and university teachers or via collaboration among university teachers, as well as with actors from other sectors. Such collaboration can be applied to educational practice and practical school management so that JSET members can reap the benefits of their membership in the future.

The second challenge was related to training. More JSET-sponsored hands-on training for teachers could have been held. To focus on situations in which collegiality among teachers was required in training, common challenges could have been addressed in the JSET-sponsored training, which would have generated a more effective pandemic response. With this regard, in terms of active AECT webinars, extensive JSET efforts can be made in the future. Moreover, continuous cooperation with other organizations, such as the NII symposium, could also help to address this challenge.

Finally, JSET could have made more efforts for paper publication related to the pandemic. By examining the papers in the CiNii database in Sect. 2.1, it is clear that several contributions have been made by JSET members; however, only a few papers related to the pandemic have been published. For experts in educational technology, online education is a research topic with a long history, so the publication during the pandemic has not increased. However, JSET is responsible for connecting scientific research and practice for successful education and learning. As a professional community, JSET has accumulated research findings and strategies for effective online education, online learning, distance education, e-learning, and learning support. Not only has it increased the number of publications, but it also translated the research findings into simple and easy forms to be applied in practice.

4 Summary and Conclusion

The pandemic has led to a revision of the definitions of teaching and learning, as well as a discussion on modified approaches and practices. It has also accelerated the use of ICT in schools, with various policies and guidelines implemented under the nation's state of emergency. During this time, JSET recognized its responsibility and role as a leader in the integration of technology in education. Consequently, related learning opportunities and approaches have become diversified and flexible, and preparations for individual optimization have advanced. As planned through the GIGA school program, to implement individually optimized learning, it is important to build an educational system well prepared for the next crisis, where all stakeholders, including society, professional groups such as JSET, and schools, can work in synergy. We have all witnessed the concept of education being reconsidered and the benefits of online learning, with students particularly learning new learning approaches. Overall, the dialog between students, teachers, stakeholders, and society regarding more effective, efficient, and enjoyable learning should continue to emphasize the benefits of the ICT use and make the best use of in-person learning in Japan.

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Chapter 28
China's Experience of Online Education during the COVID-19 Pandemic: Policies, Lessons and Challenges

Xiaoqing Gu and Ling Li

Abstract The COVID-19 pandemic brought severe, widespread disruptions to education worldwide. As the first country to encounter the COVID-19 outbreak, China has taken fast and decisive steps to mitigate the impact of the pandemic on education. Shortly after the outbreak, the Chinese government launched the "Classes Suspended but Learning Continues" emergency plan, which urged all schools to close and shift their teaching and learning activities entirely online. This chapter provides a critical account of the collective efforts made by different sectors across the country to maintain the continuation of education at all levels. These include: (1) a survey of the policies and measures introduced to facilitate the emergent transition to online delivery modes; (2) a reflection on the country's experience of successfully maintaining the provision of education for over 200 million students; and (3) an elaboration of the challenges encountered that suggest directions for future research. We hope that sharing China's experience in this chapter can contribute to the ongoing global conversations on how to better prepare education in times of crisis.

1 Introduction

The COVID-19 pandemic has been the worst shock to education systems in a century, with over 1.6 billion children and youth being unable to attend school for months, and many still not back in school today (UNESCO, 2020). To keep education going, schools across the globe were forced to shift their everyday teaching and learning practices towards remote, online modes of instruction. As the first country to encounter the COVID-19 outbreak, China has effectively battled this crisis, making a series of fast and decisive responses to minimize its impact on education. Shortly after the outbreak, the Chinese government launched the "Classes Suspended

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_28

but Learning Continues" emergency plan, which urged schools to close and shift their teaching and learning activities entirely online (MOE, China, 2020c). Yet the country faced a variety of difficulties in implementing the emergency plan given its condition: as the most populous nation worldwide, with 270 million students shifting simultaneously to online studies, how could it build and maintain the technological infrastructures to ensure the smooth delivery of online education at such as a massive scale? In the face of sudden outbreaks, how could it prepare teachers for urgent remote teaching demands and to ensure the quality of online education? As a developing country, with a few rural areas where students still do not have access to digital devices and Internet connections, how could it prevent digital inequalities from amplifying education inequalities when formal education could only be accessed online?

This chapter provides a critical account of how China overcame these difficulties and successfully continued education for students at all levels during the COVID-19 pandemic. First, the paper illustrates "Classes Suspended but Learning Continues" government emergency plan in detail, together with the various measures executed to support the smooth implementation of the plan. Second, the paper reflects on the lessons learned as the country navigated educational challenges and sought solutions amid the complex and uncertain pandemic situation. Third, the paper elaborates on the challenges encountered in this process and suggests directions for future research. As the COVID-19 situation appears to be stabilizing in most countries, systemic reviews are being undertaken worldwide to evaluate the types of education provided during the pandemic. We hope that sharing China's experience in this chapter can contribute to the ongoing global conversations on how to better prepare education in times of crisis.

2 Implementation of the 'Class Suspended but Learning Continues' Emergency Plan

In late January 2020, shortly after the COVID-19 outbreak, the Chinese Ministry of Education (MOE) issued a notice on postponing the start date of the spring semester and initiated the "Classes Suspended but Learning Continues" emergency plan, the latter urging all schools to close and shift their teaching and learning activities entirely online (MOE, China, 2020c). In response, schools across the country, including K–12 institutions, colleges, and universities, pushed back their spring semester start dates and switched to teaching classes online. To support the implementation of the emergency plan, the central government, local authorities, educational institutions, and enterprises made collective efforts to address the most salient needs; including enriching the provision of online learning resources, strengthening the supply of technological infrastructure, addressing digital inequalities, and training teachers for new modes of instruction. This section illustrates the key policies initiated and measures taken under the emergency plan.

2.1 Enriching the Provision of Online Learning Resources

What counts the most for continuing education during the pandemic is the access to and availability of quality online learning resources. A series of policies and measures were introduced to enrich the provision of such resources. On February 17, 2020, the MOE launched the "National Network Cloud Platform" online portal to host learning resources for primary and secondary schools (National Center for Educational Technology, 2020). The platform provided learning materials for schools to conduct teaching online, and is capable of supporting simultaneous usage by 50 million students. By May 2020 students and teachers from all 31 mainland provinces had visited the portal over 2 billion times (MOE, China, 2020a). Additionally, China Education TV launched a new channel to expand channels for disseminating courses and learning resources. Its broadcasts were able to reach the remote rural areas across the country where cable TV was not readily available (China Education Network Television, 2020).

For higher education, the MOE released its "Guidance on the organization and management of online teaching and learning in regular higher education institutions during the epidemic prevention and control period" on February 4, 2020 (MOE, China, 2020b). The document requested higher education institutions to adopt online platforms for supporting remote learning, recommending 22 platforms capable of providing 24,000 courses for free, of which most were built by top Chinese universities or enterprises. The course materials offered include massive open online courses (MOOCs), small private open courses (SPOCs), and virtual simulations covering 12 disciplines at the undergraduate level and 18 at higher vocational levels. Consequently, more than half of Chinese higher education institutions began the spring semester online using existing online course content and live-streamed classes.

Certain provincial-level education departments also made fundamental efforts in developing digital resources. For instance, the Shanghai municipal government built "Classroom in the Air", a large-scale learning platform for its primary and secondary students. Moreover, the Shanghai Municipal Education Commission organized over 1000 outstanding leading teachers from various levels and disciplines to form over 100 teaching teams. Based on curriculum standards and basic teaching requirements, over 5000 high-quality teaching resources for all disciplines, from the kindergarten to the senior secondary level, were developed and distributed to millions of students in Shanghai, as well as across the country through the Internet and television. Each of the "Classroom in the Air" courses started with a 20-min whole-class lecture, followed by 20 min of teacher-student interactions where teachers provided personalized guidance to individual students. These learning resources provided timely support for the continuation of primary and secondary education in Shanghai.

Lastly, the People's Education Press opened its digital teaching resource library to all students, enabling them to access it for free. Certain large educational

institutions across the country also offered free digital resources for primary and secondary school students during the pandemic.

2.2 Strengthening the Supply of Technological Infrastructure

A smooth transition to remote online teaching also depends greatly on the availability of robust and stable technological infrastructure. Regarding Internet connectivity, the Ministry of Industry and Information Technology (MIIT) issued a notice on March 3, 2020 announcing plans to strengthen broadband coverage during the pandemic to support online education (Ministry of Industry and Information Technology, 2020). Soon afterwards on March 16, 2020 the MOE released guidelines pledging to better apply information technology in primary and secondary schools to ensure universal access to quality education (Xinhua News Agency, 2020). As a result of these policies, the home bandwidths of schoolteachers and students were increased free of charge. Certain provinces even subsidized their students' access to online education. For instance, Liaoning Province paid a total of seven million RMB in subsidies to around 20,000 higher education students, helping them pay for Internet access or digital devices (Liu, 2020).

2.3 Addressing Digital Inequalities

An important feature of China's educational policies during the pandemic was the significant attention given to poor areas and disadvantaged students. Although the broadband coverage is very high nationwide, with the Internet penetration had reached 70.4% (China Internet Network Information Centre, 2021), a few very remote areas remained where an Internet connection was not in place and students' families could not afford the appropriate equipment to access online learning resources. This digital inequality could hinder students from effectively carrying out online learning, in turn amplifying educational inequalities. To ensure that disadvantaged children could enjoy the same quality in educational resources, the Chinese central government gave priority to areas with urgent Internet needs by installing broadband networks and providing free online learning equipment (Xue et al., 2020).

2.4 Measures Implemented by Local Authorities

Based on the central government's emergency plan, each province and locality introduced corresponding measures and regulations according to local situations. For instance, the Shanghai Municipal Education Commission organized the

development of unified online courses for their "Classroom in the Air" platform, which teachers in different schools could then customize for their individual classes. Other provinces made specific regulations for the safe use of device screens and online tools to preserve students' health and wellbeing. For instance, the Provincial Education Department in Shandong recommended that the duration of individual teaching activities should be kept to 15–20 min for primary students and 25–30 min for junior secondary students. In addition, the total duration of online study should be no more than 80 min/day for primary students, 120 min for junior secondary students, and 180 min for senior secondary students.

3 Experiences

The policies introduced and measures implemented during the pandemic achieved positive results, successfully maintaining the provision of education for over 200 million students across the country. The following section describes the lessons learned as we reflect on our practices in response to this crisis.

First, reflecting on the nationwide endeavor to overcome the restrictions created by COVID-19, we found that an effective crisis response mechanism is a combination of an overarching plan by the central government and more subtle approaches by local governments. A top down-approach is needed in term of overarching plan and the management of the free flow of resources at the national level; then followed by more subtle approaches that balances a certain amount of top-down initiative at the beginning with larger amount of attention then being paid to local conditions. Across China, educational resources in different provinces vary with respect to the quality of teaching staff, the number of digital resources available, and the ability to produce digital resources. For example, Shanghai is outstanding in terms of the quality of its teaching staff and the strong executive power of the municipal education departments. The city was thus able to develop many high-quality online courses in a very short time, even considering the extraordinary period of the pandemic (Liu & Ye, 2021).

Second, there should be a sufficient number of digital resources, which are the very foundation of online learning. In China, the various types of digital resources available to students during the pandemic greatly supported the continuation of primary and secondary education.

Third, it is important to foster a culture of experimentation in which teachers, as frontline education providers, are encouraged to develop novel instructional approaches to meet their students' needs according to their local conditions. A teacher in Beijing shared in an interview: "Online teaching and offline teaching should perform their respective duties, and offline learning cannot be copied to online teaching. That is not effective. The function of live broadcasting should be to organize students' learning and make children learn better offline, rather than

dragging all the children online" (China National Radio, 2020). The teacher also noted that teachers should give fewer lectures and more guidance, especially on learning methods. In her opinion, teachers should spend time on communicating with their students, and also consider combining pre-recorded and live broadcasts when appropriate. Her personal approach also included organizing students into study groups and stimulate independent study. The successes of her experiences are worth learning.

Finally, shifting to online education created a substantial need for educational resources. It is important to encourage the active participation of different social forces and to pool various resources to ensure a sufficient supply of such resources. During the pandemic, people from all sectors across China paid close attention to education. Large educational institutions and enterprises provided students with free, high-quality educational resources. Additionally, collaboration and the sharing of resources across sectors are also important. During the pandemic, the online classrooms for each province were hosted on a single national network, enabling inter-regional communication and the sharing of high-quality resources.

4 Challenges

The major challenges China encountered while implementing fully online education include the following. First, online learning places a significant demand on students' attention, study habits, and autonomous learning abilities. How to transform students from passive learners into independent learners remains a huge challenge for online education. In a survey of over 70,000 primary and secondary students conducted by the Institute for Education Policy at Beijing Normal University, self-consciousness and self-discipline were found to be important factors affecting students' home-based online learning, with 37% of participating students reporting that they were "dissatisfied" or "very dissatisfied" with both (Wang et al., 2020). Preparing students to be independent and take responsibility for their own learning is therefore an important first step for quality online learning.

Second, while students learned at home during periods of social distancing, they did not have the engaging physical and social environments they experienced at school. The loss of a sense of community posed a significant challenge to students while they studied remotely from home. In our survey of over 12,000 students from 33 provinces across China about their online learning experiences at home and their evaluations of such experiences during the pandemic, 80% of participants were not satisfied with learning at home, and 80% thought that home was not as good of a learning environment as school.

Third, studying remotely and fully online was a sudden, novel experience for students. Although governments and teachers made enormous efforts to provide guidance and help, students found the support they received to be insufficient. In our survey conducted on student experiences of online learning, 76% of participants reported that they could not get enough timely help when they encountered difficulties in learning, and 72% indicated that they did not receive timely attention when they were under great psychological pressure (The Information Technology Education in Primary and Secondary School Professional Commission of Chinese Society of Education, 2020). Future research ought to be conducted to explore the types of support that should be provided from students' perspective so that we can know how to serve our students better during these extraordinary times when education is disrupted.

Finally, many teachers reported difficulties in engaging students remotely during online teaching. Due to the physical absence of their students, teachers had less observational or incidental information to identify and respond to students' learning issues (i.e., requiring feedback or clarification). Given that virtual learning environments differ greatly from physical classrooms, the pedagogical approaches that are effective should also differ between both (Moore & Diehl, 2018). As we have observed, teachers mainly used digital resources and tools to replicate the learning activities they experienced in classrooms as closely as possible, and thus encountered difficulties and limitations in the virtual environments. This issue indicates the research need of developing effective technology-mediated online pedagogies that can better engage students studying remotely. In addition, learning analytics techniques should be employed to help monitor students' learning process and identify struggling students for teachers' timely interventions.

5 Conclusion

This chapter has provided a critical account of the collective efforts made by different sectors in China to maintain the continuation of education at all levels during the pandemic, including (1) the major national policies initiated; (2) a reflection on the country's experience of successfully maintaining the provision of education; and (3) an elaboration of the challenges encountered. Although the COVID-19 situation is stabilizing in China currently, our work exploring the full potential of online education is ongoing. What has been made clear through this pandemic is the importance of sharing and disseminating experience across national borders and societies. We hope that the China's experience shared in this chapter can contribute to the ongoing international conversations on how to better prepare education in times of crisis.

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Chapter 29
Responsive Online Course Design: Microcredentials and Non-Linear Pathways in Higher Education

Keith Heggart

Abstract COVID-19 required educators to rapidly change their course programs and structures. Many courses in higher education moved from face to face or blended models to entirely online approaches, and educators were required to grapple with new technologies and, more importantly, new pedagogies to engage students through novel mediums. One key aspect of these emergency pedagogies is the need to embrace responsive approaches to teaching and learning, especially considering program and course structure, assessment and participation. This chapter will outline the pandemic-motivated development of the Graduate Certificate in Learning Design at UTS that made use of both the principles of a Hyflex approach within individual courses as well as microcredentialling and non-linear pathways within the program structure to encourage a self-curated, student directed learning experience. A crucial outcome of this approach is that such a model of course and program structure fits well with the principles of socially-just learning design. Students have more control over what they learn, but also how and where they learn it. This means that the course is more accessible and inclusive of diverse communities.

1 Introduction

The COVID-19 pandemic disrupted education providers around the world. Lockdowns and travel bans meant that many students were unable to access physical campuses, and social distancing requirements ensured that even those who were able to physically attend their institutions often did so in a way that was alien to their previous experience of university education.

Many institutions grappled with trying to find ways of providing effective and meaningful education to students who were trapped in a different country or for domestic students who were quarantined or locked down in their home cities

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_29

(Bhowmik & Bhattacharya, 2021). Often, this took the form of a 'pivot' (Nordmann et al., 2020) to emergency online learning via web-conferencing tools like Zoom, which was met with mixed reactions from students – and staff (Aristovnik et al., 2020). Furthermore, as the pandemic developed throughout 2020, universities were required to remain flexible and continually adapt their plans in order to address emerging issues, or new outbreaks.

In Australia, where the higher education sector relies heavily (Deloitte Access Economics, 2015) on funding provided by international students (many of whom come from countries like China and India), the effects of the pandemic were even more keenly felt, and will likely be felt for at least the next 2–3 years. While Australia itself has been relatively fortunate in terms of the number of cases of COVID-19, the effects of lockdowns and international travel bans have been particularly notable in the higher education sector, with numerous universities facing shortfalls in budgets and needing to make staff redundant due to these deficits (Zhou, 2020).

Designing educational opportunities within this context is a particular challenge. In Australia, educators were faced with four related challenges to navigate in the provision of their courses. Firstly, large numbers of international students were trapped overseas, and hence were unable to attend face to face classes (even when those classes resumed). Secondly, for students within China, access to online material was often severely limited by what was available through China's firewall. Thirdly, some students were in quarantine in a third country (i.e. not Australia or China) or in quarantine in Australia, so, while they were in the same country as their university – and perhaps even the same city, they were still unable to attend classes. In addition, in these settings, there were often issues with the bandwidth of the internet available to students, and the additional cost that might be related to that. Finally, there was the ever-present concern that, at any time, cities in Australia could be locked down in order to prevent the spread of any outbreaks – either on a suburb-by-suburb basis or on a greater scale, necessitating an immediate and possibly only partial change in the mode of provision, which would lead to teachers teaching both in a face to face manner and also online—at the same time!

This chapter explores the way these factors informed the emergency changes and ongoing design considerations of one program (the Graduate Certificate in Learning Design) at the University of Technology, Sydney, a large public university in Australia. In particular, the shift towards a more flexible course and program structure, modelled on the principles of the HyFlex approach (Beatty, 2019), the incorporation of microcredentials (Ralston, 2021), and the emphasis on providing a variety of access options with the aim of more socially just learning design (Heggart et al., 2020), is described.

2 Context

The COVID-19 pandemic, as it pertains to Australian institutions, has gone through two phases to this point in time. In the first phase, the focus was on managing the current enrolments especially as they related to international students. In the second phase, the focus shifted more towards designing courses for a 'new normal'—that is, education in the time of ongoing pandemics and the challenges associated with that. While these two phases are clearly delineated, the first informed the second, and that was the case with the Graduate Certificate in Learning Design at UTS, in that the principles and design considerations that were deployed in an emergency fashion in the first phase were evaluated, and where successful, were considered for use in the second phase.

In phase one, international students enrolled in Australian universities were unable to return to Australia in early 2021. Some international students had already left China before the international travel bans in Australia came into effect, and were able to undertake quarantine in a third country, before coming to Australia—in what became known as the 'back door'. At this point in time, classes in Australia were still mostly delivered in a face-to-face setting. In addition, domestic students who had undertaken an international study period in another country were also either unable to return to Australia, or required to spend significant amounts of time in quarantine before they were able to return to normal university classes.

The initial response from many academics was to move as much of their material online as possible. This was despite the fact that many of these academics had only limited experience in teaching in an online fashion (see, for example, Gülbahar & Adnan, 2020), and tools for online learning and teaching and web conferencing were foreign to both the educators and their students. While UTS (and many other Australian institutions) was well supported via different learning management systems and other online support systems, this solution had its own difficulties. The Chinese firewall blocked access to many different sites, including some LMSs, and many video resources used by academics as well. Eventually, a tunnel was negotiated that provided access for students in mainland China, but that took a significant amount of time. In a similar fashion, students in third countries, or even in quarantine in Australia, often had only poor-quality internet access, meaning that richer multimedia content was unable to be accessed, which limited the learning opportunities for students.

At this point, academics were often teaching two different classes at the same time: the first, a traditional face to face approach supported by content on a LMS, and the second a kind of online only experience for those students who could only access the material this way. While not sustainable in the long term, this approach was called for in the first stages of the pandemic. However, as the second phase developed, these two models became more closely aligned. In phase two, due to cases of COVID-19 extant in Australia, many universities in Australia closed their physical campuses, moving all their content to online models of teaching and learning. While still an emergency provision, there was more time and support provided

for academics in order to make this change, and in some ways, it was easier, as they were no longer teaching both online and face to face, but instead teaching one online only class. The concerns about access to material and bandwidth issues remained, however, as well as concerns about the student experience.

In addition, at about this time, concerned by the economic effect of the pandemic, the Federal Government released a training package for Australians. This took the form of short courses (at the level of Graduate Certificates) that were heavily subsidised to encourage a high uptake from potential students. As part of the requirements of the scheme, these courses need to be deployed in the second half of 2020, and they also needed to be delivered in an entirely online fashion. Finally, they were also only available to domestic (i.e., not international students). In this way, these short courses (or Higher Education Certificates [HECs]) were a trial model of future course offerings both during and after the pandemic. These factors certainly informed the way that the subjects within Graduate Certificate in Learning Design were developed; in fact, the HEC allowed for a period of trial of several practices that would later become a feature of the GCLD. These practices were developed firstly because of the constraints related to being part of the HEC, but also with a mind towards the future of higher education in Australia, where lockdowns and ongoing quarantine and international travel bans were likely to be regular occurrences. These changes needed to be implemented in a much shorter time scale, too. Whereas the GCLD, in its original format, was planned to be deployed in 2021, this timeline was advanced by 6 months to fit it within the requirements of the HEC.

3 Approach to Design

The design of the GCLD therefore reflected a mix of careful planning (for the elements that had been already considered before COVID-19) and responsive design, considering the challenges presented by the pandemic. The term responsive is more appropriate here than flexible, as the design in question was developed in response to the demands of the COVID-19 pandemic, rather than being designed purely from the start with flexibility in mind. However, this responsive design ultimately meant that the final design for the structure of the GCLD was significantly more flexible than the original design, and for this reason, many of the emergency elements originally conceived in response to the pandemic will be included in future offerings of the course.

Firstly, the design of the GCLD was based on careful user-centred design principles (Hernández-Leo et al., 2018). Eleven stakeholder interviews were conducted in a range of industries, including healthcare, defence, finance and different levels of education. In addition, further interviews were undertaken with potential applicants to determine what the possible ‘pain points’ might be that would prevent them either enrolling or successfully completing the course. The findings from these surveys largely mirrored extant literature, both about the development of learning

design courses (York & Ertmer, 2016; Tripp, 2008) and the experiences of Australian university students (Bradley et al., 2008). Stakeholders indicated a desire to have job-ready graduates from courses such as the GCLD. They noted that other, similar courses often favoured theory at the expense of practical experience, meaning that graduates took a long time to 'get up to speed' in the workplace. However, the potential students indicated their concerns about time constraints, and the challenges of undertaking study (either full time or part time) while maintaining their work or family commitments. They also indicated a concern with previous online experiences – 'too dull' or 'not engaging' were the terms commonly used. Thus, any program of study would need to be both industry focused and flexible—and flexible at both a macro (i.e course structure) and micro (i.e. subject) level.

The arrival of the pandemic meant that changes needed to be rapidly put into place, especially if the GCLD was to be part of the Federal Government's HEC program. The largest change was the need to move from a blended mode of learning (a mix of online and face to face elements) to one that was entirely online. This was a requirement of the government program, and was achieved by re-designing the block sessions to work via web conferencing tools. Originally, the GCLD was intended to be delivered in 2021; however, that timeline was advanced so that the first subjects were offered to students (with more than 50 students enrolled) in mid-late 2020.

Another consideration that was part of the design process was the realisation that the pandemic was not necessarily going to be short term. In Australia, there remains (as at June 2021) only limited take up of vaccinations amidst confusion about access, and so the likelihood of future lockdowns is quite high—indeed, in June 2021, Melbourne, Australia's second largest city, entered lockdown for the fourth time. This means that the emergency interventions put into place in response to the first wave of the pandemic need to be kept in place in order to manage future waves and lockdowns. This informed the design of the GCLD as well.

Taking into account these constraints, the decision was made to ensure that the course was informed by the principles of socially-just learning design (Heggart et al., 2020). This idea draws from Fraser's (2003, 2007) work on social justice, and especially its relationship to education as described by Hocking (2010). This approach combines Fraser's three dimensions of social justice (redistribution, recognition and representation) with Meyer et al.'s (2014) work on Universal Design for Learning through the lens of Wiley's (2014) open education principles (Retain, Revise, Remix, Reuse and Redistribute).

4 The Final Design

The final design for the Graduate Certificate in Learning Design (GCLD) operated on both a whole-of-course level and also an individual subject level. Principally, to meet the requirements for responsiveness and inclusivity, the course was offered in a non-linear fashion. In other words, students could complete the eight subjects that

comprised the course in any order they choose. This was primarily to allow them to take those courses (in a part time study mode) at times that were suitable for them. This did provide some challenges, especially with Work: Learning Design Subject, which was nominally a capstone work-integrated learning (Doolan et al., 2019) subject. In this instance, students were strongly advised to do it last—advice which students thus far have heeded.

In addition, the subjects were also (with the exception of Work: Learning Design Project) offered as microcredentials external to the course. Again, this was designed to provide an access point for potential students concerned about their ability to complete a full certificate. This meant that students could take on a much smaller challenge—e.g. enrolling in a microcredential rather than a full award course—and should they successfully complete it, they would be able to receive credit for that particular subject towards the GCLD. At the time of writing, the Design: Designing for Learning and Predict: Current and Future Trends in eLearning have been particularly popular, and numerous participants in these microcredentials have used it as stepping stone to enrol in the full GCLD.

As described above, the course and subject design was inspired by the principles of student choice and multiple means of accessing content present in the Hyflex model. However, time, technological and budgetary constraints ultimately meant that the model of learning was more of a hybrid nature (Roseth et al., 2013) than a strictly Hyflex model, especially at the individual subject level. This was a practical consideration based on the limited time and resources available, and it is this design that separates the approach used in the GCLD from more common applications of HyFlex. This was expressed in the different pathways that students could use to navigate (and ideally successfully complete) the course material. Each subject had multiple avenues for students. These avenues included the 'online, all the time' pathway, where students could complete both the asynchronous course material, take part in various activities and class discussions and most importantly attend the live sessions in real time with their peers from around Australia. Should that not be feasible, students could undertake the 'async' option, which was similar in terms of the asynchronous engagement, but the difference was that the live sessions could be viewed at a time that suited students (as these were recorded). Of course, in such an instance, students might miss out on the interaction that came with the synchronous sessions. However, the students themselves remedied this, by forming independent study groups that viewed the videos together and undertook the activities—in effect, they organised their own, student-led synchronous sessions. Finally, there was the low-bandwidth option, which was designed for students who had limited internet availability or low bandwidth. In this avenue, students could engage in class discussions, complete the readings and other activities, but there was no requirement to either participate live or asynchronously in the live seminars. Importantly, students could select whichever option best suited them at that particular time. This became important for student who were required to travel for work – for example, one student who was normally 'online, all the time' was required to travel to remote Australia for 2 weeks during one of the subjects; during that time, he switched to a

low bandwidth option, which meant that he was still able to take part in learning, and not fall behind his peers.

This approach also necessitated reconsideration about how to structure and sequence learning materials within individual subjects in order to prioritise multiple means of engagement. The decision was made to reduce the amount of face to face hours and instead replace it with more asynchronous content. In practice, this meant that the nominal three hours per week was reduced to only 90 min; however, the total indicative hours of the subjects remained the same (75 h for three credit points) as the remainder was made up through other modes of delivery. An 'async-first' methodology was adopted to developing this material as it was expected that all students would, at least, access this much of the course. Much of the content was made up of open educational resources, especially in the form of open textbooks. Content was foregrounded early in each module (each subject was made up of 6 week-long modules), and the live sessions became more focused on 'deep dives' into the practical application of that content, rather than lectures or seminars. A good example of this was in the development of 'Expression Sessions'. These were the final live session in each subject, and took the form of a learning designer, or someone in a learning design adjacent role, presenting the students with a practical workshop and design scenario that they worked through over the course of the session. This idea also specifically addressed the concerns about the gaps between practice and theory in many ID courses (Gray et al., 2015), and also instituted what was almost a design studio (Lowell & Moore, 2020) approach to the development of learning designers, as well as offering opportunities for representation.

5 Future Considerations

There were a number of lessons learned as part of this course design process, as well as recommendations for future course development. Some of the learning, while new for the course design team, are already well understood in the field of online learning. These are briefly documented here. This course design provides benefits for both domestic students as well as international students by allowing them to access the course in a mode that was possible and even preferable to them. The restructuring of the course meant that the face to face time was used for different purposes: there was more opportunity for facilitating, mentoring and coaching, rather an instructing or delivering content. This also allowed for a wider range of experts to be involved in the expression sessions, drawing from a national and even international pool. However, this was also a concern related to the course design. This extra time necessitated educators within the course needing to devote extra time to preparation and planning of materials, in a 'front-loaded' manner to ensure that the content was ready.

Another aspect that was interesting to note was that the pandemic itself provided educational aspects to this course. The course as a whole was about learning design, so the sudden move towards more online and remote approaches to learning

provided students studying the course with a lot of material to examine. In fact, many students chose to base their assessments upon their current context, which was often related to their employer needing to move materials that were previously delivered face to face into an online format. A key aspect here was recognizing this and building in flexibility to allow it to take place. With that in mind, the assessment tasks in the GCLD were often quite open-ended, often referring to a 'design problem within your own professional context' as a starting point, and encouraging students to make it their own, rather than using a scenario provided by the educator.

However, the most significant learning is that this approach to course design showed that socially just learning design could function in online as well as blended learning environments. In some ways, this design served as a trial of some of the key features of socially just learning design, and the success of the course indicates that by using the principles of socially-just learning design, it is possible to develop an online learning environment that is inclusive and diverse by design.

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Chapter 30
Emerging Reform of Higher Education in Post Pandemic

Insook Lee, Yoonil Auh, and Eunbae Lee

Abstract The COVID-19 pandemic highlighted the reassessment of the potential transformation of digital education, thereby fueling the discussions on the need to rethink the future direction of higher education. Converting courses online was just one step toward a transformative paradigm. Further reexamination and drastic resetting of current education practice may be required, which can only be achieved with unprecedented levels of collaboration and open-minded innovations among stakeholders in education. Several practical recommendations were drawn from a case study based on the performing arts education (PAE) in the Korean higher education. They are, creating a platform for scalable innovations through the implementation of the right measure of technologies (learning technology innovation); advancing the effectiveness of technology integration in the non-traditional learning environment (pedagogical innovation); and promoting the cost efficiency of education (community knowledge construction innovations). This chapter explores and discusses the adaptation in educational / pedagogical technologies and suggests the building capacity for the future of PAE in the post-pandemic era.

1 Introduction

The COVID-19 pandemic had led to an abrupt shift to online teaching and unprecedented campus lockdown. Korean universities have attempted various approaches to continue educational business as usual. Brick and mortar university professors are the first generation to conduct all classes remotely via available technology.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_30

Students have had to rely on their own digital devices and resources at any means to continue learning. As emergency remote teaching unexpectedly has prolonged, concerns have arisen about the inequality of learning and the academic gap due to differences in personal and social conditions. Various studies have confirmed the seriousness of this gap and the needs for new learning and instructional approaches (e.g., SERII, 2021; KSET, 2020).

The threat posed by the pandemic has meant that university performing arts faculties in Korea sought optimal ways to support learning beyond the classroom walls. All music instructors were called upon to not only instantly formulate the transition pathway of their classes to online delivery, but also to provide their students with emotional and social supports during the COVID-19 crisis.

While there are innumerable resources and guides on best practices for online education, those pertaining to Performing Arts education (PAE) are singularly limited. Teaching classical music involves private lessons, chamber music ensemble, masterclasses, and orchestras. Following the continuing tradition of European music schooling for the past three centuries, these classes have been exclusively taught face-to-face. The structure of teaching classical music involves private lessons, chamber music ensemble, and masterclasses and have therefore required real-time and participatory learning. Not all traditional structures may translate well online, and certainly the PAE classes are high on the list among these.

2 Conceptual Framework

Korean universities are currently facing the challenge of self-innovation in order to cope with the crisis. Universities have been preoccupied with reorganizing their soft and hard services, including instructional delivery, technology infrastructure, professional development, and even working cultures. In all aspects, the global pandemic forcefully redirected the rules of learning; that is, connectivity through technology to technology, technology to end-users, user to user, and the end-users to technology (Carreño, 2014; Bell, 2011); collaboration and trust (Hattori & Lapidus, 2004); flexibility and virtual cooperation (Martínez-Sánchez et al., 2019; Allwood, 2001)—and open-minded innovation (Xu, 2010).

2.1 Flexibility, Innovation, Connectivity and Collaboration

Online learning requires an extended and flexible concept for instructional time and places. This concept requires innovative transformation in the overall educational system. Taking into account faculty members' lack of knowledge and experience in using online technology and resources and pedagogical knowledge of teaching online and students' online learning self-regulation are crucial to online learning. It

calls for an organizational support system to respond to professors' and students' competencies for teaching and learning online.

Individual university's role may be redefined as each campus might function as a hub of learning community, where seamless blending of online and offline modes of delivery and the blending of curriculum and contents provided by partnering colleges and universities. Infrastructure such as cloud infra-based, shared, intelligent, and customized platform provide reliable learning management systems.

Teaching and learning systems based on cloud computing and advanced teleconference platforms are an essential component. Those systems are critical for stable sharing of contents, communication and feedback, collaborative learning activities. Not only that, but the benefits of shared platforms and learning designs should be considered to enable fluent connection, collaboration, and communication among professors, students, and other related bodies.

The Korean Ministry of Education recently established ten regional distance education support centers in order to run well digital and distance learning and instructional services in higher education. Regional centers will support universities to share online content and develop collaboratively, and manage the quality of online learning. Educational practices through collaborative production of content, sharing of content, and collaborative teaching seem inevitable for future education.

3 Literature Review

3.1 Challenges of Teaching Performing Arts in Online Environment

Music is taught largely within its tradition, personal judgement, and other influences therefore teaching methods have changed little over the centuries. Due to the nature of learning activities involved in PAE, these classes require a personal one-to-one interaction - multisensory instructional approach. This level of sensitively tailored education is not commonly practiced outside PAE. Therefore, unlike large lecture-based courses, teaching activities in music revolve around individual or small groups with tightly interwoven relationships between teacher and students. Music faculty are considered experts at being attentive to personal growth of the reluctant and yet-to-be performers through tailored teaching, which consists of advancing students' self-awareness, self-concept, and self-perception, which are the keys to gaining an understanding of the musical repertoire and molding of an artist. PAE simply cannot be pre-planned and packaged. Therefore, migrating course content and shifting teaching activities to online can be a complex process posing a great challenge.

During the campus lockdown, music instructors migrated their activities to a network in one or more delivery formats: distance learning (DL), remote learning (RL), and social distancing class (SDC). While these learning modalities are often

discussed interchangeably, they differ markedly and are used for specific instructional purposes. DL often omits the use of real-time interaction; however, the content incorporates well-designed multimedia interfaces to promote a specifically aimed learning experience, and related assessment tools. RL is used for knowledge specific learning and focuses on the accomplishment of one or two learning goals. Historically RL was used as a tele-learning format in the military, medical, and engineering sectors for sharing expert knowledge among institutions via exclusive communications channels conducted in real-time (Holmberg, 2005). SDC is a format that began during the outbreak of SARS in 2002 (Adarkwah, 2021), where the primary objective was to simulate a learning environment in a confined space while maintaining a specific distance between the learners.

4 Methods

Semi-structured interviews were used as they can be an effective tool for gaining in-depth data of participants' perspectives and make sense of their lived experiences (Balushi, 2018). Using interviews, this study discusses music instructors' innovations in technological, pedagogical, and community knowledge construction that could influence their pedagogical approach in the post-pandemic campus.

Interviews were conducted one-on-one with music faculty and adjunct instructors ($N = 14$) from five universities in Korea via video-conferencing about their experience shifting their courses to online and the teaching modality they selected. Of this sample, 11 instructors (80%) had experienced teaching hybrid online courses, and all had taken one or more online courses within the past 18-month period through their university's required workshops (e.g., campus emergency respondent, cybersecurity, sexual harassment awareness).

Samples questions include: *"What works for music courses online?" "How were your content and teaching activities changed from in-class to online teaching?" "What were the opportunity and challenges of teaching music classes online?"*

Thematic analysis through the constant comparison method as well as open coding and categorizing were used in order to identify key themes and patterns from the collected data (Corbin & Strauss, 2008).

5 Findings

5.1 Faculty's Revelation on Technological, Pedagogical, and Community Knowledge

Interview analysis revealed performing arts instructors' revelations in pedagogical, and community knowledge building during emergency online teaching. Table 30.1 displays the categories, codes, and excerpts from the interviews.

Table 30.1 Performing arts faculty's pedagogical, and community knowledge building during emergency online teaching

Categories	Codes	Excepts
Technological knowledge	Technology literacy	I learned more about integrating technology during lockdown than in my entire life. It opened my eyes and I am still learning more each day.
	Learned to use technology	I was skeptical and reluctant to use technology at the beginning and hoped the pandemic would go away. However, I was cornered, and it left me with no choice but to use technology to teach the students. It was a difficult transition. Teaching face to face is best for me, but I guess knowing something about technology uses for teaching is a gain.
	Needs for technology professional development workshops	I was both very delighted and embarrassed that my students were technology-savvy and had no difficulty with the learning activities online while I was clueless with the technology—Stumbling, panicked, confused, and overwhelmed. A mandatory educational technology workshop should be developed specifically for the performing arts faculty
	Realizing about various information on the internet and sharing it with students	I knew there were tons of information on the internet but never in my dreams that it had "that" much information to select from and use. Instant access to a bottomless sea of information was mind-boggling. Visiting virtual museums, music education games, Google's education tools, and so on…, I am determined to make my students learn using this vast amount of information.
Pedagogical knowledge	Adjusting to teaching online	At the time of lockdown, I was clueless, lost, and frightened by all, and never thought about teaching individual music lessons online in real-time at any point in my career. Now, it feels like a major hurricane passed and the teaching experience gained through technology is like a second life and career.
	Thinking structurally and goal-specifically	I learned that teaching the topics that were not so great face to face is disastrous when migrated online. I thought it would improve since there were already mounds of available information on the web, but was I wrong. I learned that teaching online makes me think structurally and goal-specifically. The bottom line is that teaching online (music class) improved my teaching.

(continued)

Table 30.1 (continued)

Categories	Codes	Excepts
	What it means to be engaging in teaching music	In music studio teaching, the pedagogical phrase "engaging learning and teaching" often understood as being involved in teaching emotionally and to coerce students to be competitive and practice as many hours as they possibly can. From teaching online, I have gained new insights altogether into the meaning of engaging. You cannot simply get emotional or scream at the student in a remote learning environment. It doesn't work because the student will simply lower the volume from another side. I felt stupid and changed my view about all aspects of teaching.
Community knowledge	Learning about students	I thought I knew my students well. To my surprise, I learned more about my students during the lockdown. That is, how they want to learn, what they like to learn and why, what intrigues them and motivates them, what discourages them, and their strengths and weaknesses that had never surfaced before the pandemic crisis.
	Lack of understanding of students' styles and interests	From shifting my teaching to online, I realized that teachers need to have a greater understanding of students' learning styles and their diverse interests. It seems like we the teachers have been living and teaching in silos for too long in a rapidly changing world.

5.2 Multisensory Learning Approach and Evidence-Based Instruction

The details of interviews pointed out that the effectiveness of the multisensory learning approach is much subdued when learning takes place in a virtual space. Performing arts are multisensory by nature, and teaching the subject involves engaging more than one sense at a time. Therefore, evidence-based learning enhances the shortfall on the receiving end by offering clarity and self-explanation, which are critical for maximizing the student learning experience in remote learning.

Demonstration of techniques and musical expression via musical instruments is an example of evidence-based instruction, e.g., a teacher's demonstration of playing expressive *legato* bowing on a stringed instrument. Another instance of an evidence-based element would be an excerpt of Brahms' or Beethoven's violin concerto performed by well-established violinists, such as David Oistrakh. While some teachers used the live demonstration of instrument playing, the interviewed teachers have all shifted to an evidence-based teaching strategy, such as YouTube, for its effectiveness. The instructors interviewed suggested that optimal online learning can be best served in multiple media platforms to increase dynamism for the effectiveness of

communications. Using multiple channels, instead of video conferencing only is highly suggested.

6 Discussion

The next session discusses teaching techniques that were utilized to extend students' multisensory through multiple modes of technologies as well as promoting learning via offering interrelated elements of activities that are focused on goal-based and objective-driven teaching. The interviews identified six instructional strategies. They are (1) the presence of an instructor in remote learning, (2) content modularization, (3) student support, (4) active learning outside class, (5) virtual office hours; and (6) collaborative teaching.

6.1 Connectivity: The Presence of an Instructor in Remote Learning

A remote learning format has been the optimal choice for music teachers during the pandemic. The presence of the host in remote learning played a critical role in promoting spontaneous facilitation and ensured that the class held students' attention. Instructing performing arts relies on play-and-feedback constructive routines; therefore, real-time feedback is the key. Interviewed members of faculty had made themselves available in front of the camera at all times and observed the students' attentiveness at all times. Data from among the interviews includes: *[…] a learning experience was gained during the remote teaching… generated the 'organic social media' effect [during the teaching session] that all students were sharing information [...knowledge] on their feeds. This teaching experience was just as effective as face-to-face teaching but better because it can all be recorded therefore providing the flexibility to review the content at their own pace."*

6.2 Innovation: Content Modularization

According to the U.S. Centers for Disease Control and Prevention report (CDC, 2021), students worldwide had similar experiences-challenges with concentration and weakening mental health - due to shifting most activities to online learning and self-isolation because of the campus lockdown. To help students focus and avoid mental fatigue, teachers modularized content and integrated frequent discussion

sessions and game-based quizzes at the end of each topic to ensure students had comprehended the learning objectives as well as a means to promote socialization online. In detail, activities of 15-minute real-time instruction and 20-minute self-regulated study—working on their own or with others from the instruction material uploaded in advance. Then, the students returned for 15-minute discussions of their understanding with the rest of the class. Strategic content breakdown into short achievable goal-based learning or modularized teaching methods had promoted students' motivation for learning. Most importantly, it held the class altogether throughout the fifteen-week semester. Data from among the interviews includes: *[…] "Visiting [the parts of] virtual museums, music education games [online free apps], Google's education tools, and so on…, I am determined to make my students learn using this vast amount of information. […] I think I will retire from teaching lecture format from now on".*

6.3 Flexibility: Extending Student Support

Some instructors had additional help from graduate students who served as teaching assistants and offered students online support outside the hours of remote learning classes. This motivated the students to learn and gain insights into learned material throughout the semester. The assistants also assisted both the instructor and the students with technical needs because classical music faculty are often insufficiently trained in using technology in their teaching, and the support from teaching assistants was found to be critical. Data from among the interviews includes: *"I learned that teaching online makes me think structurally and goal-specifically. The management of modularized student support was a great idea… It created a new form of synergy in the department. The bottom line is that teaching online (music class) improved my teaching."*

6.4 Connectivity and Innovation: Promoting Active Learning Outside Class

Some classes had no choice but to conduct face-to-face sessions during the campus lockdown. The SDC was applied to conduct ensemble classes (i.e., piano trios or string quartets), performance classes. Coaching took place in a fully ventilated lecture hall where a few students sat a distance apart wearing face masks. Some students uploaded their playing on YouTube as an assignment so other students could critique and discuss it via RL. Data from among the interviews includes: *"From shifting my teaching to online, I realized that teachers need to have a greater understanding of students' learning styles and their diverse interests."*

6.5 Connectivity and Flexibility: Virtual Office Hours

Through the application of the communications technology that was available (e.g., Google Hangout, ZOOM), teachers were able to easily arrange virtual meeting hours with the students, giving them flexible hours to offer extended help or counseling, which was difficult to schedule before the pandemic. Such communications activities had contributed to promoting good mental health for the students as well as motivation and self-efficacy. *"To my surprise, I learned more about my students - how they want to learn, what they like to learn and why, what intrigues them and motivates them … that had never surfaced before the pandemic crisis.[…thanks to technology]"*.

6.6 Collaboration: Online Collaborative Teaching

Collaborative teaching surfaced through remote learning. During the campus lockdown, research-related writings were assigned more than at any time in curriculum history, and writing techniques for performing arts majors were popular activities for collaborative teaching. Such was not commonly practiced for performing arts majors. This assigned work was formidable and intimidating for many, but it opened a groundbreaking learning experience for many others. Most of the interviewed teachers offered writing classes by collaborating with the writing department and inviting guest lecturers. *"A mandatory workshop for educational technology and teaching techniques should be offered for the performing arts faculty"*.

7 Conclusion

The aforementioned six instructional strategies and techniques are not new and have been widely practiced in other disciplines (i.e., Biology, History, Science). However, much of the required mindset for conveying the online instruction here has been distant and seemed rather new for the PAE in the university. Mixed modalities of instructional delivery for engaging student learning offered an opportunity that had not been considered for music teachers prior to the pandemic. Nevertheless, simply thinking the work lies in translating class material online may be overly optimistic. Considerations for preserving the foundational strengths of the in-person experience during the migrating process for the virtual learning activities are the core lessons learned from this study. In spite of all, the real need may be to review and update the existing curriculum, which requires expanding the learning content for inter-collaborative department teaching and hearing opposing viewpoints, different perspectives, and ideas of innovations and engagement for PAE. Replicating the

residential in-class learning experience in a virtual environment should not be the goal, but rather capitalizing on learning experiences that can be enhanced.

8 Reflections and Future Directions

State of the Future 2021 (Park & Glenn, 2020) predicts that 'in the long run, the world will combine the advantages of traditional and cutting-edge digital learning' and 'the era in which artificial intelligence, updated daily, is far superior to the knowledge of university professors.' Considering the experiences so far and the reflections of key stakeholders, it seems that fundamental changes in higher education are inevitable.

Our experiences during the COVID-19 imply the demands for connectivity, collaboration, flexibility and innovation 'in order to adaptively respond to the changing needs and environments of higher education. This requirement is at least in the areas of instructional delivery, curriculum management, professional development, government policy on education, and even working cultures. Education in the post pandemic is going to be different from the pre-COVID-9 in many ways.

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Chapter 31
Evolution of Clinical Education under COVID-19 Pandemic: Blended Clinical Education

Alexander Woo and Shirley Ngai

Abstract Clinical education is traditionally face-to-face and includes hands-on experience with patients. Under the pandemic, all clinical practice in various settings were suspended because of the safety concern of students, patients and clinical educators. Under the pandemic, the demand of the healthcare professionals for acute management and post-pandemic rehabilitation was increased. The suspension of clinical training delayed students' graduation which was especially undesirable because of the insufficient manpower in society and the healthcare system. With limited knowledge on the transmission, management and post-COVID health impact, strict rules of infectious control have been executed. When considering the resumption of clinical education to students, the issue of everyone's safety, students' learning experience, fulfilling the intended learning outcomes, and most importantly, meeting the criteria of professional licensure registration must be balanced. Given the urgency, the clinical education team had reviewed the key intended learning outcomes of clinical education in the existing curriculum and revamped the content by including concepts of effective learning and blended strategies. A new model—"Blended Clinical Education"—a combination of face-to-face and online modes was established. To ensure successful launch of the new model, numerous briefings with students, clinical educators, faculty members and licensure registration board were organized for easing their stress. With all colleagues' efforts, students finally graduated in time and joined the healthcare system providing urgent supply of manpower.

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V. Dennen et al. (eds.), *Global Perspectives on Educational Innovations for Emergency Situations*, Educational Communications and Technology: Issues and Innovations, https://doi.org/10.1007/978-3-030-99634-5_31

1 Clinical Education in Physiotherapy

Clinical education is an essential and compulsory component in physiotherapy education. Benchmarking with the international standards, the contact hours of clinical placements is more than 1000 hours contributing to around one-fourth of the core curriculum of our physiotherapy programme. All clinical placements are delivered in Face-to-Face (F2F) format where students integrate the principles of physiotherapy practice learnt from the University and applied into practice in hospitals, and/or private settings, and/or non-government organizations under the supervision of clinical educators. As the study year progresses, the standard of assessment increases which further hastens the development of students' professional demeanour and acquisition of clinical skills.

2 Development of COVID-19 in Hong Kong

COVID-19 was first reported at the end of 2019, and it spread around the world rapidly. The pandemic impacted all sectors globally. In Hong Kong, there were fluctuations in the number of confirmed cases since January 2020 (Wikimedia Foundation, 2021). The number of cases reached its record high in March 2020, July 2020 and Dec 2020, respectively (Wikimedia Foundation, 2021). Under the pandemic, policies of social distancing, home-based work, mask wearing, and infectious control were put into place. In January 2020 teaching formats were swiftly changed from F2F to online (asynchronous or synchronous) format. For clinical education, all F2F direct hands-on contact and interaction with patients was suspended at once.

3 Impact of COVID-19 to University Teaching and Clinical Education

While the pandemic imposed a huge impact on university teaching and clinical education, nevertheless, crisis always brings opportunity. For instance, the pandemic and subsequent policies for infection control and social distancing hastened the shift from traditional F2F teaching to online teaching adopting various technology enhancement tools. The development of online teaching and learning has enhanced significantly and swiftly in terms of pedagogical, technical, psychological and economical perspectives.

A majority of the university programmes could be completed on time under the shift to online synchronous and/or asynchronous teaching. Healthcare related programmes like physiotherapy, however, had delayed teaching progress because of the suspension of the inevitable F2F hands-on practical components and clinical

placement. Traditionally and theoretically, hands-on practical components and clinical placement must be F2F. With the current technology, teachers can demonstrate the hands-on practical techniques through video demonstration where students can show the skills to teachers through the same channel. However, F2F is still the preferred way for accurate, efficient and immediate feedback to students.

After the first confirmed case in January 2020, owing to uncertainties in route of transmission, infection control and social response, all F2F clinical education and classes were suspended at the University. The entire teaching schedule of each subject was re-arranged. Lectures and tutorials which could be arranged through online channels were moved to the beginning of the second semester to buy time and wait for better control of the pandemic. The original plan definitely aimed to avoid any delay of the study progress in the second semester and keep the remaining schedule for the F2F hands-on practical sessions. Finally, this target could not be accomplished owing to the second wave of the pandemic in March 2020. The practical sessions were then delayed until Jun 2020 after the second wave died down and all sessions luckily finished before the third wave in July 2020. The F2F practical test was resumed and completed in early October 2020. With the issue of pre-requisite of certain subjects, extra approval and administrative procedures were required to allow students progressing their studies smoothly. With the effort and coordination of all colleagues, students advanced to the next year of studies without delay of study progress.

For final year students who needed clinical placement in early 2020, the impact was even stronger. Originally, their clinical placement was scheduled from January to early May 2020, but was halted and only resumed again in June 2020. Under the third wave of the pandemic in July 2020, clinical placements were again put on hold. After a series of negotiation and rearrangement as well as the kick-off of Blended Clinical Placement, the F2F clinical placement resumed at the end of August 2020 and students ultimately graduated at the end of September 2020, a delay of 4.5 months.

4 Blended Clinical Education

As the number of confirmed cases and the cumulative number of COVID-19 survivors was kept on a rise, the demands for medical services at critical care, in-patients, out-patient and community settings substantially increased. As aforementioned, the delayed teaching and study progression as well as the suspension of hands-on practice during clinical placement postponed graduation and further delayed the supply of healthcare manpower to meet with the increased societal needs.

With the limited knowledge on the transmission of the coronavirus, acute management of patients with COVID-19, management of post-COVID health impact, strict rules of infectious control have been executed. Concerns of society and government; university and teachers; clinical settings and educators; and students created hesitation from the resumption of clinical placement (Fig. 31.1).

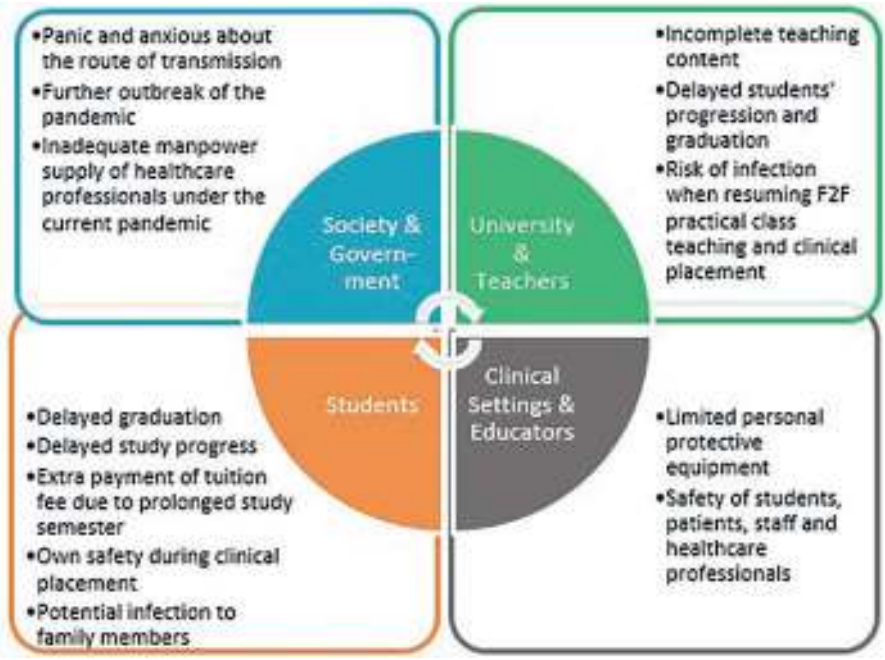

Fig. 31.1 Concerns about the resumption of clinical placement

Taking into consideration of the societal needs, market demands in hospitals and other clinical settings, prevention of further delay of graduation of the final year students (i.e. year 4 student), prevention of the delayed clinical placement vacancies for students in other following cohorts (i.e. year 2 and year 3 students) as well as other concerns described in Fig. 31.1, timely and safe resumption of clinical education was an urgent need.

In view of this, the programme leader and clinical coordinator explored the potential alternatives to support students' learning. The team reviewed the key intended learning outcomes of clinical education in the existing curriculum and integrated the concepts of effective learning (Merrill, 2002), blended strategies and technology enhanced tools (Rowe et al., 2012; Tuttle & Horan, 2019). Finally, a new and alternative clinical training strategy, "Blended Clinical Education," was created and adopted.

4.1 Contingency Plan under Pandemic—Set-Up of Blended Clinical Education

The hands-on assessment and treatment procedures could not be applied directly to the patients through the online mode (i.e. in the Blended Clinical Education), all other essential learning objectives including application of knowledge, physiotherapy skills and professional behaviours as well as enhancing students' clinical reasoning and patient management using real patients' cases were maintained.

To prepare for the "Blended Clinical Education", our team set up an e-platform, a quality assurance system and an intensive training to students and clinical educators. A number of meetings and briefings were hosted by the programme leader and clinical coordinator to students, clinical educators, licensure registration body as well as the managerial levels of clinical settings and university, with the aim to explain the purpose, content and rationale of Blended Clinical Education for easing the stress. The logistical details were elaborated and discussed in each session. All of the parties accepted and understood the urgent need to proceed with the Blended Clinical Education after each session (Fig. 31.2).

Since the clinical placement was suddenly withheld in July 2020, preparation of online clinical placement required time and resources to establish. In order to allow one to two-week time for preparation, an online case platform was adopted to continually train students' clinical reasoning. Blended training with virtual scenarios has been proven to systematically improve students' clinical reasoning skills especially on recognition abilities of clinical patterns and decision-making process (Torres et al., 2020). Studies also found case-based databases could help students bridge between theory and practice (Fiddler et al., 2016).

Fig. 31.2 Development of Blended Clinical Education

To formulate the problem list and treatment plan, students needed to go through detailed subjective and objective examinations. Students were required to complete 6 musculoskeletal, cardiopulmonary and neurological cases during the set-up period of their online clinical placement.

Under the pandemic, to ensure the safety of students and patients, students were refrained from practising in some high-risk settings (e.g. day centres providing chemotherapy or radiotherapy for cancer patients, palliative care outreach team, etc.) or undergoing aerosol generating procedures (e.g. suctioning technique). In addition to the online case platform, a Massive Open Online Course (MOOC) (Fig. 31.3) was added to enhance the multidisciplinary training and rehabilitation for in-patient settings and cardiopulmonary specialty. More than 14 hours of online lectures were created and launched. Full attendance was mandatory and a score of 70% in online quizzes had to be obtained to guarantee the quality of students' learning.

To simulate the F2F clinical placement, teaching faculty of the university and clinical educators worked together to develop banks of online case scenarios with details of bed notes and investigations, findings of subjective and objective assessments. All information simulated the F2F clinical placement and allowed students to formulate the problem list and treatment plan through clinical reasoning under the guidance provided by teachers or clinical educators.

Fig. 31.3 Interdisciplinary management for cardiopulmonary diseases

4.2 Online Case Discussion with Teachers or Clinical Educators

During the preparatory stage, teachers and clinical educators used real musculoskeletal, cardiopulmonary and neurological cases with bed notes, investigations, photos and videos. Cases treated by students before the suspension of clinical placement or other cases with appropriate diagnoses were included.

After reviewing case information, students formulated the physical diagnosis and problem list. Active and detailed discussions between students and teachers or clinical educators confirmed and modified the conclusions. This logistics was the same as the F2F clinical placement. The discussion was much more interactive and in detail because of the more flexible arrangement in the online mode. The ability of retrieval of information, clinical reasoning and documentation could be assessed as in the F2F mode.

After discussion, prognosis and treatment plans could be formed finally. Students demonstrated the treatment techniques and exercises via self-production of video either synchronously or asynchronously. Video demonstrations simulated the tele-rehabilitation and students' treatment skills could be assessed.

Cases with more complicated conditions and diagnoses could be incorporated into online case discussion. Relevant tutorials for various special topics followed right after the online case discussion. More in-depth tutorials and discussions facilitated students' exposures and understanding of assessment and management of complicated conditions.

4.3 Supervised Tele-Rehabilitation with Real Patients

Under the pandemic, the concept of social distancing was promoted and the F2F contact of real patients for all clinical settings were affected. To provide continuous care for patients in-need, tele-rehabilitation through online platform have been widely implemented. Tele-rehabilitation was also adopted in clinical education under the "new normal" situation.

There were two ways to apply tele-rehabilitation in clinical placement. The first one was the same as the normal routine of clinical settings. Students and clinical educators met the patients online separately. All of them were housed in their own locations throughout the process. Another set-up would allow patient and clinical educator in the same location while students at another location could assess the patients online. This set-up was even better because clinical educators could assess the patient f2f more accurately according to the students' suggestions of the objective examination.

Through these two paths of tele-rehabilitation, except for students' hands-on techniques and experiences, all components have been achieved as the F2F clinical placement.

5 Evaluation of Blended Clinical Education

Under the reformed rubrics for Blended Clinical Education, overall, students' performance and academic result were comparable to the F2F mode. To further evaluate the effectiveness of the Blended Clinical Education as part of the quality assurance purpose, mixed modes of qualitative and quantitative methods were used.

To examine how Blended Clinical Education would affect learning of students and teaching of clinical educators, online survey and focus group interviews were organized with the key questions focusing on the learning experience and outcomes. All students were invited to join the online survey. Twelve final year students and five clinical educators were invited to join focus group interviews. Students were randomly selected and they were divided into two groups according to their allocation and settings of clinical placement. Clinical educators were selected according to their specialties.

In general, students reported improvement of clinical reasoning and better understanding of various special topics in Blended Clinical Education, although the online mode could not include any hands-on experience for learning. Students reported being exposed to more varieties of cases with higher levels of complexity when compared with F2F clinical placement.

All students and clinical educators treasured and rated the Blended Clinical Education very useful and successful under the pandemic. When discussing the future direction and "mode of delivery" of clinical education, both groups did accept the online clinical placement under similar situations like the current pandemic. Nevertheless, all of them showed preference of F2F mode for clinical placement under normal circumstances. Through F2F clinical placement, in addition of what they can learn in online mode, students could better develop communication skills with patients, patients' family members and other professionals. Students could also practise their hands-on skills on patients instead of their classmates. Students developed various skills including clinical reasoning through comparison of and reflection on different reasoning approaches observed in clinical educators (Wijbenga et al., 2019).

6 Lessons Learnt from the Blended Clinical Education

Blended Clinical Education was a totally new initiative under the pandemic which persisted longer than expected. Resistance to change has been recognized for a challenge in all organizations (Schiffer, 2011). It is expected to be even more challenging for a well-established F2F model of clinical placement used for the past 50 years. Resistance were expected from all involved parties—students, clinical team members, university teaching colleagues, clinical educators, future employers and licensure registration board of physiotherapy.

When introducing any "new" or "alternative" mode of teaching method, the focus should not be limited to content development but also consider quality assurance, ensure the teaching quality, as well as attain students' learning experience and standard of learning outcomes. With the swift change of delivery mode in teaching, and to lower the resistance, students, teaching faculty (at university) and clinical educators should have clear and thorough understanding of the rationale and background for the change. The objectives and expectation of learning, assessment rubrics and ways of assessment must be clearly explained and elaborated to ensure aligned learning objectives and fair assessment. Thus, a comprehensive design of education framework incorporating content development, quality assurance, teaching pedagogy and technological approach is necessary.

7 Conclusion

COVID-19 has been lingering longer than anticipated. The crisis has been successfully turned into opportunity and evolution of clinical education. A brand-new model, Blended Clinical Education, has been established and implemented. With positive feedback collected from the evaluation, this new model can be used again and promoted to other institutions if the pandemic worsens or similar situations occur in the future. Further research and refinement can be made to improve the clinical education model and incorporate it into the clinical education under normal circumstances.

Acknowledgements We wish to thank the Head and the Senior Management Group of Department of Rehabilitation Sciences for their trust of the new model and prompt approval of all financial resources. All efforts from clinical educators and clinical team members are greatly appreciated.

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