Human-Centered Design as a Frame for Transition to Remote Teaching during the COVID-19 Pandemic

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Teacher education programs all around the world are challenged with the emergency transition to remote teaching due to the COVID-19 pandemic. Human-centered design can help generate creative solutions to the pedagogical problems that teacher educators face during this transition. In this paper, we present a case of the Principles and Practices of Digital Learning course offered to preservice teachers in the Learning Technologies minor program at a Midwestern university. Our human-centered design approach followed three premises: (a) Building empathy, (b) engaging in pedagogical problem solving and (c) establishing an online community of inquiry. We present our process and the results with a design frame that can be used in other teacher education contexts.

RATIONALE

The COVID-19 global pandemic has altered the design and structure of our traditional educational programs, and teacher education is no exception. Teacher educators need a design frame to guide their transition to online teaching, and to help preservice teachers gain competencies related to the use of learning technologies in their future classrooms. Human-centered design is a creative approach to problem solving that emphasizes empathy towards people (Luka, 2014). Implementing the human-centered design prin-
principles in teacher education creates opportunities for preservice teachers and teacher educators to practice design mindsets, such as risk-taking, empathy, optimism, embracing ambiguity, and learning from failures (Henriksen et al., 2018; Razzouk & Shute, 2012).

We used the human-centered approach to guide our practices during the emergency transition to remote teaching in the context of the Principles and Practices of Digital Learning course offered within the Learning Technologies minor program in the School of Education at a Midwestern university. The course covered a wide range of topics including managing technology in classrooms/schools, evaluating technology tools for learning, providing leadership around technology, and engaging in critical discourse around technology issues. During our face-to-face sessions, students explored the integration of various emerging technologies (e.g., Breakout EDU, 3D printers, games) into K-12 classrooms. We regularly invited guest speakers (e.g., teachers, administrators, technology coordinators) to our sessions to share how these tools were used in classrooms. During our shift to remote teaching, we conducted a needs analysis with students and adapted an asynchronous modular format that eliminated guest speaker sessions and the weekly schedule. Instead, students completed course activities and materials at their own time and pace. We used the tenets of human-centered design to address preservice teachers’ immediate needs, engage them in empathetic and human-oriented activities, and build a supportive online learning community.

**PROCESS**

Our human-centered approach followed three premises: (a) Building empathy, (b) engaging in pedagogical problem solving, and (c) establishing the online community of inquiry.

**a. Building empathy**

Empathy is crucial in human-centered design to gain a deep understanding of the people we design for and the problems they experience (IDEO, 2014). During our transition to remote teaching, as a first step, we engaged in an empathetic listening with our students to understand their needs and struggles as well as physical and mental states. In our last face-to-face class session, we brainstormed on potential class formats, communicational channels, and learning materials. Students shared their needs re-
garding connectivity and technology access. Our class community decided to shift the course format to a more flexible, asynchronous, and modular structure for the remainder of the semester. Students favored the asynchronous format due to the flexibility it allowed for limited Internet connection in rural areas. We switched from a weekly schedule to the modular format to give students more time to complete the course assignments and activities. Table 1 illustrates the previously planned weekly schedule and the new modular format.

### Table 1
Changes in the course schedule and format

<table>
<thead>
<tr>
<th>Previous Planned Weekly Schedule</th>
<th>New Schedule/Modular Format</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 10</strong> Augmented Reality and Virtual Reality in Education</td>
<td><strong>Module 1</strong>: Online Education in Time of Crisis</td>
</tr>
<tr>
<td><strong>Week 11</strong> Game based learning/ Gamification</td>
<td>Module 2: Accessibility and Universal Design for Learning</td>
</tr>
<tr>
<td><strong>Week 12</strong> Plugged into Social Media, Screen Time and Mental Health</td>
<td>Module 3: Open Educational Resources</td>
</tr>
<tr>
<td><strong>Week 13</strong> Funding and Grant Writing</td>
<td></td>
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<tr>
<td><strong>Week 14</strong> Open Educational Resources</td>
<td>Take-Home Final Exam</td>
</tr>
<tr>
<td><strong>Week 15</strong> Two phase final exam: Take-Home and in-class</td>
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We used empathy building not only to guide our transition process, but also to give preservice teachers opportunities to practice empathetic understanding for different groups of people. We implemented a set of empathy building exercises for preservice teachers to uncover the needs, emotions, and contexts of people (e.g., parents, administrators, teachers, students) in educational settings affected by the COVID-19 pandemic.

**b. Engaging in pedagogical problem solving**

Pedagogical problem solving was key to our transition as we tackled solving educational problems under unfamiliar and constantly changing learning environments (Tynjälä & Gijbels, 2012). To engage preservice teachers in real-life problem-solving scenarios, we designed course activities that focused on the current and relevant issues related to the use of
learning technologies for remote teaching during COVID-19 pandemic. We developed three modules: (1) Online education in time of crisis, (2) accessibility and universal design for learning, and (3) open educational resources (OER).

The three sequential modules were interconnected in the value and relevance to our current situation. Taking a human-centered approach to pedagogical problem solving, preservice teachers explored “how might we” questions during the problem-solving exercises, such as: How might we curate online learning resources for teachers and parents? How might we create accessible online learning environments to address the needs of diverse learners? How might we locate and evaluate OER? We also revised our final exam with take-home reflective questions related to the learning technology problems emerged during the COVID-19. Table 2 illustrates the final exam questions (Chun, 2020).

Table 2
Final exam questions

<table>
<thead>
<tr>
<th>Designing a Response to Covid-19 for K-12 education with Learning Technologies</th>
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</thead>
<tbody>
<tr>
<td>The COVID-19 global pandemic is altering the design and structure of our traditional educational programs, and teacher education is no exception. In these uncertain times and constantly changing circumstances, our existing struggles in educational systems have become more visible, such as access to quality learning, digital equity, emergency management, health, and well-being of students and teachers. Below are three “How might we” questions. Choose one of the options below, and generate solutions by analyzing different experiences, feelings, challenges, sharing inspiring examples in the time of physical distancing, and reflecting on the critical role of learning technologies during COVID-19 pandemic.</td>
</tr>
<tr>
<td>The questions below are retrieved from <a href="https://dschool.stanford.edu/news-events/designing-a-k12-response-to-covid19">https://dschool.stanford.edu/news-events/designing-a-k12-response-to-covid19</a>.</td>
</tr>
<tr>
<td>- How might we build empathy with students?</td>
</tr>
<tr>
<td>- How might we help educators build connections between one another?</td>
</tr>
<tr>
<td>- How might we help families (that are now taking on the role of educators) to provide powerful learning experiences at home?</td>
</tr>
</tbody>
</table>
c. Establishing an online community of inquiry

Establishing and sustaining an online community of inquiry was vital to our emergency transition to remote teaching. We used the CoI model to create “a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements – social, cognitive and teaching presence” (Garrison, 2011, p. 15). Teaching presence was ensured through sharing short instructor videos that presented highlights from the previous module and reviewed the new module activities (Baran, Correia, Thompson, 2013). We also did individual check-ins with the students via personalized emails to receive updates regarding their health, needs, and well-being. To establish the social presence, we incorporated several asynchronous activities, including online discussions and peer feedback (Lowenthal & Snelson, 2017) on Canvas and Padlet. To sustain a healthy classroom climate, we opened discussion forums for students to share the changes they experienced during the pandemic, resources they found helpful, and the tips that worked for them to cope with the challenges they faced. Recognizing that each student had a unique transition context, our modular flexibility allowed adapting the course content to the specific needs and circumstances. Cognitive presence was established through providing specific guidelines and clear expectations (Hosler & Arend, 2012) for each activity, while maintaining the modular flexibility. Table 3 presents example activities within each module that were guided by our human-centered design approach.

<table>
<thead>
<tr>
<th>MODULES</th>
<th>Module One Online Education in Time of Crisis</th>
<th>Module Two Accessibility and Universal Design for Learning</th>
<th>Module Three Open Educational Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN APPROACH</td>
<td>Students explored the challenges different people faced during their transition to remote teaching and learning.</td>
<td>Students examined the needs of diverse group learners to ensure equitable access to learning materials.</td>
<td>Students analyzed the needs of a group of students and selected an OER for their learning contexts.</td>
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**EARLY RESULTS**

The early results of our case revealed that our human-centered design approach not only helped our classroom community shift to remote teaching smoothly, but also encouraged preservice teachers to practice design mindsets (e.g., empathy, creative thinking, collaboration, and embracing ambiguity) during the transition. For example, the empathy exercises helped preservice teachers analyze how different people in the educational community faced new and unprecedented challenges (e.g., food insecurity, Internet access, engagement in remote learning/teaching, homeschooling, and isolation), and how learning and digital technologies could address some of these issues. Examining the accessibility and universal design features for different online learning resources, preservice teachers generated solutions to the problems faced by different groups of people. The OER module helped preservice teachers explore the value of creating and sharing OER with quality standards and the Creative Commons licenses.
Establishing the online community of inquiry was key to supporting teaching, social, and cognitive presence through various activities, including instructor videos, online discussions, and resource sharing. The asynchronous modular course format allowed preservice teachers access the course modules at their own pace and convenience (Cuthrell & Lyon, 2007). Online discussions provided spaces for students to engage in collaborative discourse around the role of learning technologies during the transition to remote teaching, understand how others in educational settings experience the shift, and generate solutions while maintaining an optimistic mindset during the COVID-19 pandemic.

IMPLICATIONS AND FUTURE RESEARCH

Our human-centered design approach prioritized human needs as the foundation for both our transition to online teaching and preparation of preservice teachers for effective technology integration in their future classrooms. We recommend practicing empathy and care through similar human-centered approaches while prioritizing students’ changing needs, contexts, access to resources as well as their safety and well-being (Bozkurt & Sharma, 2020). We created an open online resource that includes the activities we used within each module following the human-centered design approach: Human-Centered Design in Teacher Education: Activities and Online Resources (Baran & AlZoubi, 2020) (https://bit.ly/35qNl0z). As we continue building on this open resource, teacher educators can adopt/re-vise/remix these activities for their contexts. Future research can investigate how human centered activities in online courses impact preservice teachers’ preparation for effective technology use in their classrooms. Researchers can look at ways to immerse in-service teachers in the design of online learning experiences for their students following the human-centered models.

References


Lowenthal, P. R., & Snelson, C. (2017). In search of a better understanding of social presence: An investigation into how researchers define social presence. *Distance Education, 38*(2), 1-19. doi:10.1080/01587919.2017.1324727

