Developing Infrastructure to Support Teacher Candidates during Emergency Remote Clinical Experiences

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The Association of Mathematics Teacher Educators' (AMTE, 2017) *Standards for Preparing Teachers of Mathematics* describes standards (e.g., P.4. Opportunities to Learn in Clinical Settings) that support teacher candidates (TCs) in becoming effective teachers. Clinical experiences provide TCs opportunities to develop their instructional craft (AMTE, 2017) and implement effective teaching practices (NCTM, 2014). In Spring 2020, the COVID-19 health pandemic disrupted clinical experiences in teacher preparation programs (TPPs) nationwide. Specifically, K-16 schools transitioned classes to "emergency remote teaching" (Hodges et al., 2020; Zimmerman, 2020), where brick and mortar classrooms migrated to remote instruction involving both synchronous and asynchronous delivery. Remote instruction prompted TPPs to reimagine supports offered to TCs and their cooperating teachers (CTs), who were suddenly and unexpectedly navigating remote experiences. In order to document these experiences, we asked mathematics teacher educators and coordinators to respond to eight open-ended questions via email April 1-7, 2020, focusing on the extent clinical experiences were being enacted online, policies influencing decision making, practices being encouraged, differences between face-to-face and online instruction, the extent diverse needs of students were being met, factors being considered in online settings, challenges, and the extent co-planning and co-teaching were being utilized. The eight TPPs that responded were from five states in the U.S. They are members of the Mathematics Teacher Education-Partnership (MTEP) and are committed to implementing programmatic changes to support the aim of exhibiting effective teaching practices, and utilizing the clinical experience research action cluster (CERAC) driver diagram to guide clinical experience improvements (AMTE, 2017; NCTM, 2014; Strutchen, Sears & Zelkowski, 2020). To promote privacy and confidentiality of institutions navigating the new terrain of clinical experiences offered remotely, we refer to the institutions as University A-H within this study.

The findings of the questionnaire show TPPs built the infrastructure for remote clinical experiences during emergency remote instruction in order to ensure TCs graduated in a timely fashion while achieving important learning outcomes. TPPs had to establish a shared vision of the goals and expectations for remote instruction, consider the interdependency between methods courses and early field experiences, and consider means to address equity in remote settings, which are primary drivers in the MTEP CERAC driver diagram (Strutchens, Sears, & Zelkowski, 2020; Zelkowski et al., 2020). Below we specifically describe how the eight secondary mathematics TPPs developed an infrastructure to support TCs and CTs in their respective programs during clinical experiences. We also identify a factor, attention to equity, which impacted the infrastructure.

Developing Infrastructure

Despite variance in programmatic support for facilitating clinical experiences online, when it comes to developing infrastructure, an awareness of school district instructional options, a desire to address credentialing and professional expectations, and the use of co-planning and co-teaching strategies, were viewed as essential.

Awareness of district instructional options

Notably, TPPs agreed there are differences between facilitating clinical experiences remotely and in traditional brick and mortar settings, and being responsive to districts' different ways of delivering instruction is key. For instance, University C noted,

> We recognize that face-to-face teaching and online teaching are very different, especially for students in the 6-12 classroom. Our instruction for our TCs is very differentiated based on the requirements that have been set by the district. Some districts are conducting online instruction; some districts are completely closed without instruction for a period of time. With this spectrum of experiences… we have had to be very individualized for our TCs during this time.

Address credentialing and professional expectations

TPPs considered differences in teacher certification requirements, instructional strategies, and TCs/CTs roles when developing infrastructure to support TCs for remote clinical experiences. To meet accreditation expectations, TPPs identified cross-course objectives, the jurisdictional minimal hours required for clinical experiences, and the critical tasks TCs must complete to be proficient. For example, University C noted, "We are doing all that we can to ensure that TCs get the contact hours and required number of observations to successfully complete the semester/program. We are also encouraging our TCs to be creative in completing the requirements for the [state exam]."

TPPs used a variety of approaches in supporting TCs' professional growth. University D gave "students classroom videotapes to review and critically assess based on observation protocols… to develop a critical lens for good and effective teaching". At University H, students were encouraged to engage in Zoom lessons and co-plan and co-teach lessons (Sears et al., 2017) using an online learning management system, and participate in virtual professional learning communities. University G analyzed videos using the Mathematics Classroom Observation Protocol for Practices (Gleason et al., 2017), Mathematics Teaching Practices (NCTM, 2014), and the Standards for Mathematics Practice (NGACBP & CCSSO, 2010). University G encouraged students to create artifacts to assist with asynchronous instruction such as "voice-over PowerPoints… for class assignments". Universities C and F developed websites that housed videos, instructional resources, and links to instructional suggestions for clinical experiences in an online setting for TCs/CTs to support their remote instruction.

Use of co-planning and co-teaching strategies

The findings show that the use of co-planning/co-teaching strategies was encouraged as a means of supporting TCs/CTs. For example, University F acknowledged:

> There is teaching that is happening in both directions when it comes to the technology and best practices for distance teaching. For co-teaching… while one co-teacher is actually teaching, the other can be monitoring the chat. For those with more sophisticated knowledge of the video conferencing systems, the students can be broken up into small groups so that parallel teaching can occur.

Universities C, D, E, and H shared similar sentiments, though the frequency with which various co-planning/co-teaching strategies were used was not documented. However, there was some variability within this view due to challenges caused by the COVID-19 health pandemic, as University D acknowledged the need to be flexible with the expectations placed on the collaborative pairs during clinical experiences. University D noted:

> We have always encouraged co-teaching/co-planning. However, in this environment, we simply asked CTs and TCs to do what works in their individual cases. There were some CTs who did not want to continue working with their assigned TC because they felt they were learning for the first time how to deliver online learning. Because most of our TCs were completing edTPA commentary, and CTs were learning how to deliver online learning for the first time, it made it all the more stressful/difficult and unlikely there would be a successful collaboration/co-planning/co-teaching taking place.

In supporting TCs' implementation of co-planning/co-teaching strategies during clinical experiences, mathematics teacher educators consulted the literature on stress management (Gul & Pecore, 2020), teachers' technological skills, and digital agency (Pepin, Gueudet, & Trouche, 2017) to develop the infrastructure. Our study found TPPs reviewed their curriculum, ensured accreditation expectations were met, encouraged the implementation of effective practices, and addressed challenges faced by the collaborative pairs with sensitivity.

Attending to Equity: A Factor Impacting Infrastructure

To develop the infrastructure to support TCs/CTs during clinical experiences enacted in remote settings, our findings suggest that TPPs considered factors that impact what is ultimately viable, such as "equity issues" (University C). Digital inequities limited some TCs' access to resources and amplified potential gaps in their technological skills (Mysore, 2018). TPPs also raised concerns about students' access and the nature of the mathematics that students experienced (AMTE, 2015). For example, University H questioned "who will purchase and maintain the computers and pay for the internet for low-income families". Thus, TPPs reflected on means to address equity during remote instruction, while also seeking to support TCs contributing optimally to their learning environments.

Concluding Remarks

The findings of the questionnaire show that TPPs developed infrastructure to support TCs during remote clinical experiences. TPPs ensured accreditation standards were met,

provided instructional resources, and encouraged co-planning/co-teaching strategies. Furthermore, TPPs' decision-making was influenced by their desire to address inequities that exist. Admittedly, the variance across programs to support clinical experiences in online settings suggests guidelines are needed for TCs to exhibit proficiency to be deemed effective in clinical online remote spaces. Therefore, future studies that examine the nature and impact of remote clinical experiences are warranted due to its implication on teaching and learning.

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