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An Innovative Early Field Experience for Preservice Secondary Teachers: Early Results from Shifting to an Online Model

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The COVID-19-induced closure of schools significantly impacted the field experiences of students enrolled in teacher preparation programs. We addressed this ongoing challenge by adapting an early field experience model for secondary teachers that shifted online mid-semester. The University Teaching Experience model deploys a cohort of preservice secondary mathematics teachers to support instruction in an introductory university mathematics course. When the designated mathematics course moved online, the preservice teachers were able to continue their field experience by facilitating small-group discussions in virtual breakout rooms. To understand the perspectives of the stakeholders participating

in the online field experience, we conducted semi-structured one-on-one interviews with the preservice teachers, the mathematics course instructor, and the university mathematics students involved in this setting. Early results indicated that the preservice teachers were highly valued by both the course instructor and the undergraduate mathematics students. Additionally, the preservice teachers appreciated the opportunity to continue their field experience, albeit in the more limited format. We present themes which emerged from preservice teacher interviews and share guidance for teacher preparation program faculty interested in trying an online early field experience while access to K-12 classrooms is limited.

***Keywords**:* Early field experience, preservice teachers, secondary, mathematics, COVID-19

Theoretical Background

Field experiences, an essential component of teacher preparation (Zeichner, 2010), have historically included a range of activities related to teaching practice, such as microteaching to peers or teaching a stand-alone lesson or observing in K-12 classrooms. Concerns about these experiences include: lack of authenticity (Stroupe & Gotwals, 2018); potential risk to K-12 students attempting to learn from inexperienced preservice teachers (PSTs; e.g., Yoon, Joung, & Kim, 2012); and the potential disconnect between what PSTs see and experience in K-12 classrooms and what they learn about effective teaching in on-campus methods courses (Allsopp, DeMarie, Alvarez-McHatton, & Doone, 2006; Huling, 1998). Moreover, early field experiences typically occur in K-12 settings which, as observed recently, are vulnerable to closings due to extreme weather or community health crises like COVID-19.

An Alternative Early Field Experience Model. An alternative model of early field experience (EFE) offers a response to these dilemmas by providing PSTs with an opportunity to engage in the complex work of teaching in a closely supervised setting. This EFE, called the University Teaching Experience (UTE), precedes student teaching and involves PSTs observing and teaching in an on-campus undergraduate introductory mathematics course. In the UTE, a mathematics teacher educator teaches the methods course that the PSTs are enrolled in and also serves as the on-campus field supervisor for the UTE (for more information about the UTE model,

see Figure 1 and Bieda, Visnawathan, McCrory, & Sikorskii, 2019). The UTE requires a partnership between an instructor of record in the university setting and the methods instructor. Unlike school-based EFEs, where multiple teaching mentors are needed, the UTE was designed to take place in one common setting for all PSTs (i.e., one on-campus course). The typical UTE set-up includes a debrief discussion after each class session, which was designed to include features of lesson study (Lewis & Hurd, 2011). Our current research project explores the extent to which the UTE model holds promise for developing PSTs' visions of ambitious teaching practice (Lampert et al., 2013).

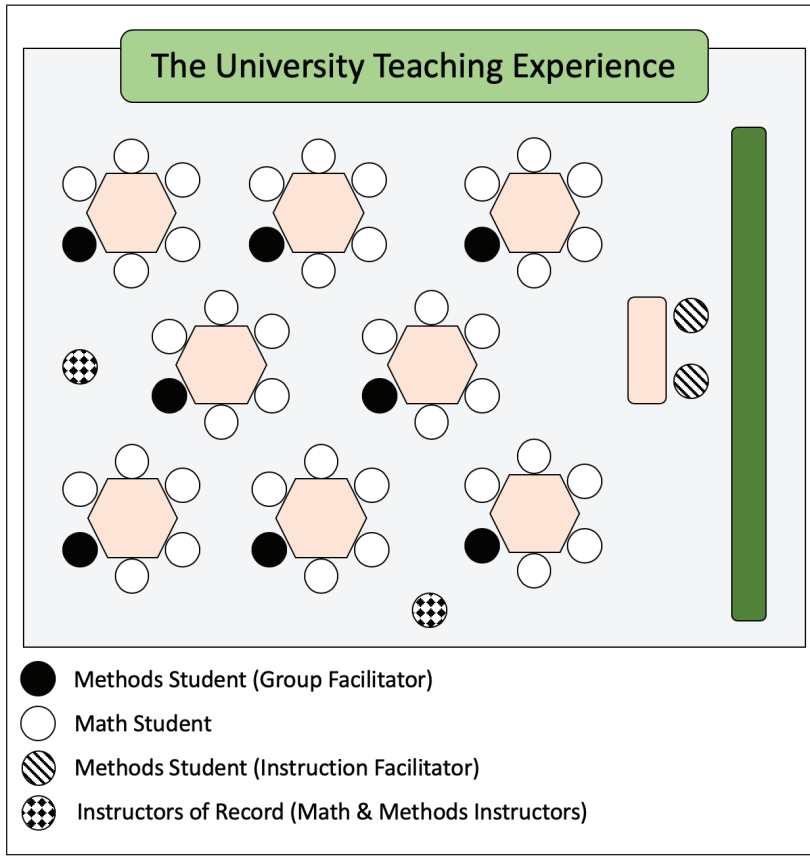

Figure 1. A diagram of the UTE classroom.

Process

In Spring 2020, secondary mathematics PSTs enrolled in the first of two methods courses were simultaneously participating in an on-campus EFE in a university precalculus course (i.e., the UTE model) in the mid-Atlantic region of the United States. Specifically, 12 students, divided into two groups of six, were assigned to attend a single section of precalculus on either Tuesdays or Thursdays. PSTs joined tables of five precalculus students (PCSs) to support small-group discussions during mathematical investigations. Simultaneously, PSTs were in the midst of lesson-planning for 15-minute whole-class activities to be taught under the close supervision of the methods instructor.

In response to the COVID-19 pandemic, in-person classes transitioned online in late March. This abrupt and unexpected shift resulted in changes to class structure and activities in the precalculus class and, consequently, the UTE. The PCSs were assigned to asynchronously watch instructional videos and were invited to attend optional synchronous "workshops," via Zoom (a cloud platform for video and audio conferencing) to work on mathematics problems in small groups (Zoom Video Communications Inc., 2016). To continue the EFE component of the methods course, PSTs attended these workshops and were assigned to Zoom breakout groups with PCSs. To support PSTs to continue working on their small-group facilitation skills in the new online environment, as well as to replace their pre-COVID-19 assignment to plan and facilitate a brief in-person lesson, PSTs were assigned weekly activities to explicitly practice and reflect on various discourse moves, such as posing assessing and advancing questions (Freeburn & Arbaugh, 2017). The methods instructor also joined Zoom breakout groups to observe and coach the PSTs. Additionally, because the Zoom interface allows users to video-record breakout rooms (with certain permissions), PSTs were able to reflect on their teaching by reviewing these videos and writing reflections on their facilitation after class (see Appendix A for a sample assignment). Following each workshop, the university instructors remained in Zoom with PSTs to debrief and answer questions about their work with PCSs, as well as to suggest additional pedagogical moves to address issues encountered that day.

The online UTE model, as a virtual early field experience, differs from other virtual field experiences discussed in the literature in important ways. First, in the online UTE model, PSTs and their methods instructor participated in the *same section of a single mathematics course*. This is important because some researchers have highlighted the importance of discussing and

reflecting on a *shared experience* (e.g., Heafner & Plaisance, 2012; Hixon & So, 2009). In contrast, other online or blended field experiences, such as online social networks (e.g., Krutka, Bergman, Flores, Mason, & Jack, 2014) or observing classes through video-conferencing software (e.g., Heafner, Petty, & Hartshorne, 2011), do not allow for such shared experiences among PSTs and their methods instructor. Second, in the online UTE, PSTs had opportunities to both observe synchronous online instruction and facilitate small-group work with students; other virtual field experiences only included observations of synchronous lessons (e.g., Compton, Davis, & Mackey, 2009) or tutoring of students (e.g., Chen, Liao, Chen, & Lee, 2011). Third, the online UTE allowed PSTs to interact with *real students* rather than simulations of students (cf. Amidon, Chazan, Grosser-Clarkson, & Fleming, 2017; Christensen, Knezek, Tyler-Wood, & Gibson, 2011; Milewski, Herbst, Bardelli, & Hetrick, 2018). The online UTE debrief also provided PSTs with opportunities to ask questions and reflect on the efficacy of their teaching strategies in the online platform.

In response to this opportunity, beginning in late-March, our team began investigating how the COVID-induced disruption impacted the UTE at one site. The research question is: What benefits are articulated by the stakeholders of an online early field experience for secondary mathematics teachers? We present data from one-on-one semi-structured interviews conducted with six participating PSTs, the precalculus instructor, and seven PCSs, with the greatest emphasis on PSTs' data.

Early Results

All involved stakeholders, including PCSs, discussed the benefit of having the PSTs in the UTE-section of precalculus. For example, even though PSTs, Caylee and Emma, noted that the shift to online instruction created an "added barrier" and was more "socially challenging," they also said that the PCSs seemed to appreciate having the PSTs in the "safer space" of the breakout rooms to ask their questions. This sentiment was echoed by all PCSs, as each one indicated that they highly valued their interactions with PSTs, even after the online shift. Furthermore, claiming that she was "at a total advantage" in the UTE-section of precalculus, the precalculus instructor appreciated having PSTs in each of the breakout rooms because she knew the PSTs would support mathematical discussions among students while she visited other rooms. A sample of comments made by the instructor and PCSs about the benefits of having the PSTs in the online workshops

are included in Table 1. These stakeholders' comments provide evidence suggesting that the PSTs were engaged in "teaching" in meaningful ways.

Table 1

Sample interview comments about the value of having PSTs attending the online workshops

Stakeholder	Comments Made About the Benefits of Having PSTs in the Online Workshops
Precalculus Students	• Jenna: "Especially with the student teachers...they're even in breakout rooms 'cause usually in other [classes], there's no student teachers there. So we just kind of sit and wait for the professor to come and help us. But [the student teachers] are... walking you through [the math], so that's really good." • Brady: "[The PSTs] have been really helpful....I guess one of the things I was really mainly worried about [when we shifted to online instruction] was losing that interaction…[During online instruction] they share their screen if they can or they have a whiteboard, which is really helpful." • Jeremy: "I thought that the TAs did help a lot in the workshop. And so [they] let you grasp the concept and kind of walk you through it." Note: Some speech-fillers were removed to make the comments more readable (e.g. "like" and "yeah").
Precalculus Instructor	• Professor Dunham: "When I have breakout rooms, I can have a student teacher in every breakout room and so they can help. • So I'm finding…in my other class [without PSTs] that I'm also using breakout rooms, there are some rooms...you can go into the room and nobody's talking. • So they might be working on problems and maybe they eventually would talk. But I think a lot of times, they don't, so they're just kind of in this room awkward, lonely…..most of the time, none of them have their video on. So I had gone into rooms, [and] nobody had their microphone on. So clearly they're not working together. • ….So having a student teacher in every room is keeping that conversation going and forcing it and facilitating it and doing so much more than an instructor that's bouncing in and out of multiple groups can do, I think."

While the PSTs all noted features of in-person instruction that they were missing, such as the ability to easily see PCSs' worked-out solutions and the opportunity to develop relationships with students before class, all PSTs were able to articulate benefits of participating in the online UTE. Three themes related to PSTs' opportunities to practice pedagogical strat-

egies during online small-group discussions emerged from the interviews: (1) helping students who attended workshops to sort out learning difficulties; (2) engaging with student thinking; and (3) attending to precision in mathematical communication (see Table 2 for sample comments for each theme). With respect to Theme 1, PSTs noted that attending PCSs were actively engaged in online workshops and seemed motivated to engage with them during these sessions. Regarding Theme 2, PSTs realized that, compared to how they worked with PCSs in person, they needed to prepare differently for the workshops; the new setting gave them opportunities to work on anticipating student thinking, which is considered an important practice for teaching mathematics (Smith & Stein, 2011). Regarding Theme 3, PSTs recognized a need to attend to precision in their language by drawing upon the mathematics register (Herbel-Eisenmann et al., 2017) in ways that were not necessary during in-person instruction. These three themes were present across all PST interviews.

Table 2
Themes from PST interviews

Benefits of Teaching in the Online UTE	**Sample PST Comments**
1. Helping students sort out learning difficulties	Emma: "Students that come [to the workshop] - they're engaged, they have questions, [and] they're ready to understand stuff from the lecture that they didn't understand."
2. Engaging with student thinking	Joe: "I'm getting a sense of what it's like to prepare for a discussion...I'm looking at problems [ahead of class] and being able to see where would I ask a question."
3. Attending to precision	Ben: "[I need to] communicate better because it's not like talking face-to-face...so I have to be very specific when I communicate mathematically...it really helps me with my communication skills."

Implications

The ongoing pandemic may require shifts in teacher preparation, including finding alternative approaches to EFEs. The online UTE offers one such alternative that could be carried out with prospective secondary teachers. Because an overlap between content offerings in high school and introductory college courses often exists (e.g., precalculus is offered for credit in both settings), the UTE has the potential to provide secondary PSTs with

opportunities to practice teaching while access to public schools is limited. Both in-person and online versions of the UTE allowed PSTs to work with students in small groups, experiment with discourse moves, and attend to student thinking - activities considered critical for facilitating productive discussions in mathematics classrooms (Smith & Stein, 2011) at any level.

Additionally, some scholars have recommended that given the growing number of students attending virtual schools or taking online classes (even pre-pandemic), PSTs should complete an online field experience. For example, Kennedy & Archambault (2012) argued that because all 50 states offer K-12 online learning opportunities, 21st century educators must be prepared to teach online. Kennedy and Archambault's (2012) survey participants identified multiple reasons for including virtual online field experiences in teacher preparation, such as preparing graduates to teach in a variety of settings and providing more student interaction for PSTs "no matter what the forum or medium" (p. 195). The UTE-study presented here, therefore has implications both for the immediate future, during a time of drastic disruption to education, as well as for the longer-term future, given the growing number of K-12 online learning experiences occurring in hybrid and fully online formats. Additionally, depending on how long the pandemic lasts, PSTs may find themselves student-teaching or teaching online as they begin their careers.

Future Research

It seems likely that the need for K-12 online teachers and teaching will continue to rise. Consequently, teacher education programs need to recognize this need and prepare PSTs for the learning environments of the future (Kennedy & Archambault, 2012). More research is needed to better understand the dispositions and skills needed to do this teaching effectively as well as how to best prepare PSTs to be ready for this environment. Additionally, more research is needed to better understand the benefits and residue of participating in the in-person versus online UTE. What kinds of things do PSTs learn about teaching in the online environment that are different from engaging in in-person instruction? What are the affordances and constraints of hosting an EFE in these two environments? What aspects of online learning theory are critical for PSTs to understand when they are teaching online? The COVID-19 pandemic has created many opportunities to examine, critique, and question the status quo, including in education and teacher preparation. We can learn a great deal by taking advantage of this unique opportunity.

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APPENDIX A: SAMPLE ONLINE-UTE ACTIVITY (COVID-19 VERSION)

Assignment: Asking Assessing Questions to Explore Student Thinking

Directions for each Assignment
For each assignment you will make a concerted effort to practice the specified discourse move(s) during your teaching in Math 1XX, as you work with students in small groups through Zoom. Using the Zoom application, you will record your work with students in the breakout sessions and retrieve the video file. [Math 1XX students have agreed to being video-recorded.] Then, you will write a 2-3-page reflection about the experience, using evidence from the video of your teaching. Reflections must be written in double-spaced, Times New Roman, 12-point font and include citations and references following APA format.

Assignment 3: Asking Assessing Questions to Explore Student Thinking

Freeburn and Arbaugh (2017) discussed three teacher moves that support students to engage in productive struggle: Assessing Questions, Advancing Questions, and Judicious Telling. Advancing Questions and Judicious Telling are familiar to teachers as they help move students toward the learning goal(s). Assessing questions, in contrast, do not directly move students toward the learning goal(s) but, instead, provide teachers with information about students' thinking that helps the teacher decide what to do next. Assessing Questions can be challenging to formulate, because they require teachers to come from a place of seeking to understand student thinking, rather than a place of steering students toward a correct answer. Hence, you will focus on practicing Assessing Questions this week.

Your goal is to assess what your students currently know throughout the lesson.
When asking Assessing Questions, it is crucial to remember that your goal with the question is *not* to move the student toward the goal, but to *learn* about the student's thinking. This non-goal is what makes Assessing Questions challenging! As teachers, we constantly want to help students move forward. However, you will have to consciously put that goal aside while you ask questions to learn about the student's thinking. Students are very perceptive, and, as soon as the student recognizes that you are trying to move them forward, they might start guessing at what you want them to say rather than sharing their authentic thinking. Before you attend the workshop, you should review the lesson and brainstorm Assessing Questions you can ask as well as benchmarks of student behavior that will indicate you are asking good Assessing Questions.

For your reflection, answer the following questions:

1. In what ways did you prepare to ask Assessing Questions?
2. What questions were successful? How do you know they were successful? Provide evidence from the lesson to support your claims.
3. What questions were not successful? How do you know they were not successful? Provide evidence from the lesson to support your claims.
4. What did you learn from this experience? (This response can include surprises, reflections, general principles, issues that emerged, or ideas you have for next time.)