CAPTURING UNIQUE TEACHING EXPERIENCES OF FIRST-YEAR SECONDARY MATHEMATICS TEACHERS TRANSITIONING FROM VIRTUAL TO IN-PERSON INSTRUCTION

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Abstract

This article reports on the findings of a study on the unique journey of pre-service teachers in a Teacher Preparation Program in 2020-2021 who then went on to their first-year teaching in person in 2021-2022. Secondary mathematics pre-service teachers who completed their clinical practice in a virtual learning environment due to the COVID-19 pandemic were followed throughout their first year of teaching in 2021-2022. Through interviews during their first-year teaching, these teachers' voices detail their journey from pre-service teacher to novice teacher in different modalities. The results of the analysis of the interview data hold many lessons for teacher educators that enhance our understanding of teacher preparation and inform topics for supporting new teachers during clinical practice and coursework during a Teacher Preparation Program.

Keywords: Secondary mathematics teacher education, pre-service teachers, clinical practice, early service mathematics teachers.

1. Introduction

Fittingly, much has been written in the research literature and the news about the impacts of the COVID-19 pandemic on K-16 students throughout the world (e.g. Mervosh, 2022; National Conference of State Legislatures, 2020). However, less attention has been paid to the huge impact the pandemic has had on Teacher Preparation Programs (TPPs). Secondary mathematics preservice teachers who went through our Teacher Preparation Program in the year 2020-2021 experienced a very different first year of teaching in 2021-2022 than any other novice teacher in the past. At the start of the 2020-2021 academic year, mathematics preservice teachers in TPPs across the United States began their clinical practice experience in a Virtual Learning Environment (VLE). This had never been done before on this scale and never at our institution. Faculty members in all disciplines in our TPP used the pause of summer 2020 to thoughtfully transition to an online delivery for our classes and support our preservice teachers (i.e. teacher candidates) who would be teaching in a VLE for the majority of the upcoming academic year. During our TPP in 2020-2021, teacher candidates' credential coursework and clinical practice experiences were completed in a VLE due to school closures.

The unique experiences and preparation of the preservice teachers in 2020-2021 thus differ drastically from previous and future cohorts (e.g. Choate et al., 2021; Cirillo et al., 2020). Years into the pandemic, mathematics TPPs continue to quickly learn and adapt to support preservice teachers in an evolving mathematics education landscape as it continues to be impacted by the effects of the pandemic (Chizhik & Brandon, 2020; Tsui et al., 2020). Since the pandemic created an unusual shift in the manner in which education was conducted, we wanted to examine some of the impacts that were felt specifically by teacher candidates who primarily learned to teach in a VLE. What challenges did they face going into in-person instruction in their first year teaching? What were they able to take with them from their experiences in a VLE and apply in the in-person classroom? Looking forward, how could our TPP learn from the rich experiences of these first year teachers to inform and improve our program?

This article addresses the following research question:

Research Question: What were some of the unique teaching experiences of teachers in our Teacher Preparation Program in 2020-2021 through their first year teaching in-person in the academic year 2021-2022 as reported by interviews?

Next, we continue with a brief review of research on the effects of the pandemic on many aspects of teacher education. Then, we provide background on the interviews with graduates of our program who were now first-year secondary mathematics teachers in 2021-2022. In the findings we give first-year teachers in 2021-2022 a voice by reporting the results of interviews throughout the year using the teachers' own words. Finally, we provide lessons for TPPs and mathematics teacher educators leveraged from the unique experiences of first-year teachers in 2021-2022.

2. Literature review

2.1. Coteaching

Our teacher preparation program uses a coteaching model of clinical practice in which one teacher candidate (preservice teacher) is paired with one cooperating teacher (in-service teacher) to engage students in learning (Tobin & Roth, 2005). This model seeks to increase the collaboration between teacher candidate (TC) and cooperating teacher (CT). It has been said that all teachers were essentially new teachers in the 2020-2021 academic year (e.g. Choate et al., 2021.) The closure of schools and pivot to online learning during the pandemic influenced the collaborative nature between teacher candidate (TC) and cooperating teacher (CT). As stated by Barnhart (2020), "One "rethink" the pandemic appears to have stimulated is a recognition of the skills and knowledge novices bring with them to classrooms. Though lacking in teaching experience, novices bring several assets to the fieldwork partnership with their mentors." (p.126).

2.2. Relationships and socio-emotional health of students during pandemic

The literature offers some insights about the ways that teachers can encourage meaningful teacher-student relationships such as being authentic in the classroom, placing a focus on forming relationships in which the teacher learns about students' interests and shares some of their hobbies, likes and dislikes, and a valuing of students' socio-emotional health. During the pandemic, teachers and preservice teachers were encouraged by administrators, parents, and students to focus on building relationships with and among their students. Preservice teacher education was thus tasked with teaching preservice teachers how to form such relationships with their students during clinical practice in a VLE and beyond.

2.3. Classroom management and educational technology during the pandemic

First in Spring 2020 and continuing into the 2020-2021 academic year, teachers reported challenges in classroom management such as difficulties with communication or providing feedback to their students, and a lack of accountability structures, motivation, engagement and participation on the part of their students (e.g. Leech et al., 2022). For teacher candidates, learning to teach in a VLE during the majority of their credential program in 2020-2021 did not provide many (if any) experiences in managing a physical classroom and facilitating in-person instruction.

3. Method

3.1. Data collection

We followed five graduates from our single subject credential program in mathematics in 2020-2021 as they began their first teaching job in August 2021. We gathered data on their first year teaching experiences via three semi-structured interviews administered and recorded via Zoom during August 2021, October/November 2021, and May 2022. Transcripts of each interview were created for coding and data analysis. The interview protocol was developed in 2021 using a review of the literature out at the time about the impacts of the pandemic on education (e.g. Barnhart, 2020; Cirillo et al., 2020; Tsui et al., 2020).

3.2. Data analysis

Analysis of interview data involved a thorough reading of each interview transcript by both authors, separately identifying and making note of emerging themes. The authors then compared and contrasted themes to focus on commonalities between experiences of first-year teachers to develop codes. Both authors then extracted relevant interview excerpts for each theme. The authors wrote a description summarizing each quote and organized them by theme. The themes were cooperating teacher/teacher candidates (CT/TC) dynamic, relationships/Socio-Emotional Learning (SEL), classroom management, and technology. Qualitative coding was then applied to the transcripts of the interview.

4. Findings

Three main themes emerged from our data analysis as follows: cooperating teacher/teacher candidate dynamic, relationships/socio-emotional learning, and classroom management/technology. We discuss each below.

4.1. Cooperating Teacher/Teacher Candidate dynamic

"Yeah, I think that he was pretty open to trying new things, because I mean, I think it was just such a new environment, that he was open to whatever to have the most successful year."

The willingness on the part of the cooperating teacher to accept new ideas and allow opportunities for more creativity in teaching was a striking feature of the 2020-2021 academic year. Due in large part to the technical knowledge the teacher candidates had going into the program and the reliance on technology for remote instruction in Fall 2020, teacher candidates and cooperating teachers maintained this collaborative relationship which continued throughout the year, even as schools returned to in-person instruction.

Although the data suggest a more collaborative CT/TC dynamic for the year 2020-2021, when looking back at their time in clinical practice and comparing it to their in-person teaching experiences, novice teachers reflected on the fact that the relationship with their cooperating teacher was much more isolated or felt more isolating to them. This may have been due to the structure of online learning during that time period. To alleviate this issue for future cohorts, they recommended that teacher candidates go observe as many teachers as possible, ask questions to many teachers about classroom management surrounding homework, grading, absences, etc. For example, one novice teacher suggested, "Get ideas from everyone, even if it's just at their school site that they can go watch a period and just see. That's probably honestly, one of the things that I missed."

LESSON 1: The willingness of the cooperating teacher to include the teacher candidate's input early on in the year really set the tone for a collaborative and creative year where both parties were open to new ideas. This is something to harness and encourage for future cooperating teacher/teacher candidate dynamics.

LESSON 2: TPPs should be careful not to let the cooperating teacher/ teacher candidate dynamic be isolated or become isolating during a credential program, whether the instruction takes place in person or a virtual learning environment. Encourage novice teachers to collaborate with a broader group, such as with other teacher candidates, other teachers at their site, and their administration.

4.2. Relationship with students and socio-emotional health

A theme that was mentioned often during the interviews is the focus on building relationships with students and supporting their socio-emotional health. In 2020-2021, preservice teachers in our program were asked to prioritize students' well-being, lives, and interests. As new teachers in 2021-2022, they carried the lessons from clinical practice forward and thus were uniquely positioned to be caring, inspirational teachers that placed great value on their students' socio-emotional health as well as their mathematical growth. They went into their first-year with concrete plans to engage students, actively form relationships, and have socio-emotional check-ins. One novice teacher used a fun activity at the beginning of the 2021-2022 academic year to quickly build community and get to know her students: "We had kind of a fun activity that I did at the beginning of the year…but it was this giant like March Madness-style tournament of favorite candy bars in every class, and so it started with these like 64 candies and we finally got two winners in every class and, every day kids were, like, "Can we do the candy tournament today?" [...] things like that, that are just fun and not math related to try to get kids talking and talking with each other."

The focus on relationship building with students and daily check-ins with students continued throughout the year for all teacher candidates interviewed. One novice teacher directly observed the effects of intentionally building relationships when a student chose to confide in her about a very challenging situation the student was facing.

LESSON 3: The major lesson we learned about relationships and socio-emotional learning is that teacher candidates from 2020-2021 were uniquely positioned to be teachers who put relationships in the forefront due to their teaching experiences in the pandemic. This focus on relationship building with students and among students should continue to be a priority for teacher preparation programs and mathematics teacher educators.

4.3. Classroom management and technology

Another major theme that arose in our analysis is classroom management. Unsurprisingly, when interviewed, these first-year teachers who felt very confident about their plans and ability to form relationships with students, reported less confidence in their in-person classroom management proficiency. They were now finding out that classroom management in an in-person setting is more difficult than a VLE. Although all of them reported being extremely excited to be teaching in person after going through the majority of their TPP virtually, data from our interviews in September and November indicate it is evident these first-year teachers had been learning some classroom management lessons "on the job" so to speak, lessons that teacher candidates in the program before or after 2020-2021 would typically learn during their clinical practice experience.

A challenge these first-year teachers faced regarding classroom management revolved around establishing norms for classroom behavior. They reported more behavioral issues occurring in the classroom due to missed in-person interactions during online learning the previous year. One novice teacher shared their experience of learning to manage physical school supplies in the classroom as follows: "It sounds kind of crazy, but not having tangible things in front of them can help them in a way, if they're just doing things on a computer and, like their attention is just there because I've had my students glue things into their notebook and then they treat the glue stick like a toy and they started drawing all over the desk and I'm like, "Oh my gosh! I need to teach you how to use a glue stick now."

Since their students had been in a VLE for several years, there was a general consensus among the first-year teachers that they needed to provide explicit instruction regarding their expectations for student preparedness for class and managing supplies (e.g. having a sharpened pencil, a charged laptop, where to write their names on papers, how to take notes during lessons.)

During the interviews, we also asked the first-year teachers to describe the pros and cons of using various educational technologies to increase learning and facilitate classroom management. Having taught primarily online during their TPP, and in-person during their first year of teaching, these novice teachers could describe in detail the benefits and drawbacks of each approach. In general, they felt that the in-person teaching environment allowed them to check-in with students both emotionally and academically, helping them form better interpersonal connections with students. Many expressed delight in being able to obtain immediate feedback from students during lessons. They explained that in-person teaching allowed them to "read the room" and determine when to modify lessons or clarify a point in the moment, opportunities which were not available in the VLE. Here is an excerpt from an interview that captures novice teachers' discovery of the power to read the room: "When in person, I can actually see what they're doing and I can gauge like "Okay, they need a little bit more time" or it's kind of getting loud that means they're done, and they need instruction now. I definitely prefer in person instruction, because there's so much more that you can read in a classroom like from your students that helps you navigate how the lesson is going to go."

While first-year teachers largely preferred teaching in person over a VLE, they did identify some benefits to teaching in a VLE. Classroom management was easier online (i.e. use of mute button) and the ability to put students into groups efficiently and quickly via breakout rooms. They were able to do quick check-ins on Desmos, easily do one-on-one check-ins with a student in a separate, private, breakout room, adapt instruction for students who finished assignments early, easily incorporate technology into instruction, and facilitate submission of homework assignments. Of particular note, one novice teacher explained that her students felt more comfortable asking questions and developed more confidence while learning in a VLE due to the anonymous identifiers utilized in online learning platforms such as Desmos. This teacher was now thinking of a mechanism to anonymize questions, at least some of the time, while teaching in person.

However, novice teachers also listed multiple drawbacks to teaching in a VLE. Having spent time teaching in an in-person setting, first-year teachers recognized challenges to student engagement and participation, a lack of hands-on learning experiences, and difficulty making connections with students when teaching online. They noted that since it was harder to see students' work online, they relied more on direct instruction instead of an inquiry-based method when teaching in a VLE. The following quote elaborates on these ideas: "In a virtual setting, I think we relied a lot on the direct instruction, and so I feel like presenting material from a direct instruction sort of lens, I feel comfortable with. And I don't want to use it all the time, because I know that that's not beneficial."

While completing their credential program, teacher candidates had extensive time to learn how to use new programs and applications, as well as determine their usefulness during instruction. Now, having experienced both remote and in-person teaching, first-year teachers are realizing that student retention of concepts is different when using an online tool vs in-person interaction. They notice these differences even when utilizing technology in the in-person setting. In addition, when using online tools in the classroom, they can be enhanced with other supports, such as guided notes. The following quote elaborates on these realizations: "I use a document camera for showing my kids how to use a calculator…but I found that I

really need worksheets to go alongside them or something that they have to do in their notebook, because they weren't actually retaining the stuff that they did on the slides because they wouldn't write it all out or they wouldn't draw the triangle, or whatever. That's something I wouldn't have realized last year with my virtual teaching."

However, first-year teachers also recognized the value of the recorded videos that teachers made in 2020-2021 which now may be integrated into current instruction. The videos can be made accessible and available to students for review and preview as one novice teacher explained as follows: "We've talked a lot about the types of videos the other teachers made last year, like the lesson I just did today: Oh, I have a video on that and they recorded videos for all their lessons and so all of them were saying wow I'm really glad that I have those now."

Having experienced teaching in both the in-person setting and a VLE, first-year teachers expressed the desire to strike a balance between the benefits and drawbacks of each modality (i.e. VLE and in-person). In certain situations, tactile, tangible tools such as Algebra tiles, counters, and number lines may be more effective than a technology simulation in an in-person environment. At other times, the integration of technology in the in-person setting may be a better choice. However, they also highlighted the importance of face-to-face instruction for hands-on learning and the development of social skills.

LESSON 4: Teacher educators should become familiar with the benefits and drawbacks to teaching in a virtual learning environment and integrate this knowledge into credential coursework. Future teachers should continue to learn about relevant educational technology in their credential programs (e.g. coursework and clinical practice) even if they are teaching in person. They should be encouraged to consider adapting the pros of a VLE (e.g. anonymizing questions, space for shared work) while in-person teaching.

5. Conclusion

Teaching in a virtual learning environment during clinical practice in 2020-2021 provided novice teachers with a unique set of teaching skills such as a fluent use of educational technology, a nuanced understanding of the benefits and drawbacks of the different modalities, and a deep appreciation of the importance of building relationships with students. By relying on each other's expertise, the power dynamic of the coteaching pair shifted and they were able to create and teach innovative, engaging lessons for their students. Teacher preparation programs can capitalize on these lessons learned during the pandemic and apply them to future credential coursework and clinical practice experiences.

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