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Abstract: Due to the nature of in-person K-12 classrooms, opportunities for PTs to engage in a cycle of teaching, reviewing/reflecting, and reteaching is limited. Teaching simulations, unlike live K-12 classroom clinical experience, allow for PTs to practice their teaching, with the potential for repeating that experience once or multiple times to advance effectiveness. Repeating teaching simulations can be a repeat of an exact lesson taught with necessary modifications made or can be a new lesson, but with a focus on the successful implementation of a selected instructional strategy. In the repeated teaching simulations, PTs have an opportunity to practice teaching content and skills, reflect on their performance and then practice again, making necessary modifications to content and/or delivery (Arsal, 2015, Yoon, et. al, 2017). With advancements in technology, coupled with the necessity to find alternatives to traditional teaching methods due to restriction of the pandemic, virtual teaching simulations are becoming an option for teacher preparation programs and offer benefits that traditional in-personal K-12 classroom clinical experiences and peer teaching simulations cannot. This best practices presentation discusses how to implement virtual repeated teaching experiences into teacher education methods courses.
Keywords: virtual teaching,simulations,repeated teaching,teacher education,teaching methods

Introduction

Historically, teacher education programs provide pre-service teachers (PTs) clinical experiences over several courses spread across the teacher preparation program. These clinical experiences happen through diverse teaching

involvement, content areas, and settings. Some clinical experiences occur in the K-12 classrooms, while others are conducted through micro-teaching simulations with peers during methods courses. The continuity and quality of these experiences vary by institution and program, as does the level of reflection on teaching practice. Due to the nature of in-person K-12 classrooms, opportunities for PTs to engage in a cycle of teaching, reviewing/reflecting, and reteaching are limited. However, some research indicates that opportunities for PTs to review their teaching and then repeat the experiences (focusing on the same lesson) positively impacts the PTs' effectiveness in the field (Ward, Chen, et al., 2018). Further, the opportunity for deliberate practice of part or whole lessons can aid in the practical development of a growth mindset (McClendon, Neugebauer, et al., 2017). This mindset may, in turn, help future teachers deal with persistence in adversity and retention (Hochanadel & Finamore, 2015).

Unlike live K-12 classroom clinical experience, virtual teaching simulations allow for PTs to practice their teaching, with the potential for repeating that experience once or multiple times to advanced effectiveness. Repeating teaching simulations can be a repeat of an exact lesson taught with necessary modifications made. In the repeated teaching simulations, PTs can practice teaching content and skills, reflect on their performance and then practice again, making necessary modifications to content and/or delivery (Arsal, 2015, Yoon, et al., 2017).

Virtual Classroom Simulations in Teacher Education

With advances in technology and a need for the non-traditional in-person experience, virtual classroom simulations have emerged as an alternative option for PTs to engage in clinical fieldwork. In the virtual classroom, PTs are met by a classroom of avatar students who are able to engage with the PTs as would live students in a K-12 classroom. The virtual classroom simulation used in this research consisted of five avatar students. The students could be made to simulate any grade level and were able to engage in any content taught by the PT. Avatars could raise their hand, engage in real-time discussions with the teacher and other students, and solve problems. While not intentionally utilized in this study, avatars can be made to simulate several different learning and or behavioral differences. An "actor" controls the avatars' movements and discussions in class. Lesson plans were submitted 1-2 weeks in advance to allow time for the "actor" to familiarize themselves with the content.

For this research, a re-teaching cycle was utilized. PTs started by creating a lesson plan using a template provided by the institution. The content and grade level was determined based on education course requirements. Lesson plans were submitted to the simulation host institution 1-2 weeks before teaching. During the simulation, PTs taught a 15-minute portion of the lesson plan within the virtual classroom. The teaching simulation was recorded and sent to the PTs and the university faculty, who watched and evaluated the teaching. PTs evaluated their teaching using a self-reflection form which required them to use time-stamped evidence for areas of strength and need for growth. They also were required to create an improvement plan. Faculty evaluated the teaching simulation using a lesson observation rubic developed by the institution.

Using both the self-reflection form and the lesson observation rubic, PTs made adjustments to their lesson plans and preparation and re-submitted the lesson to the simulation host institution. PTs implemented their revised content and/or teaching strategies during the second simulation attempt. Thie second simulation was again recorded, and both PTs and faculty watched and evaluated the recorded simulation using the self-reflection and lesson plan rubic.

Discussion of Results

Data was collected in the form of lesson observation rubric scores, self-reflection form qualitative anaylsis, and field notes. Scores from the lesson plan indicated statistically significant improvement in three of the ten lesson observation rubic categories (Learner Development and Learning, Subject Matter, and Assessment). It should be noted that some of the ten rubric categories were excluded from data analysis due to "not observed" marks being used. This is a product of PTs only teaching a 15-minute section of a full lesson plan.

Data from the self-reflection form resulted in 4 thematic areas of strength and four areas that required growth as self-identified by the students and evidenced with time-stamps from the recording. Results from the two evaluations were correlated in two areas: Assessment (rubric) and Feedback/Affirmation (self-reflection), as well as Learner Development (rubric) and Application (self-reflection).

Themes from Self-Refection Form

Areas of Strength	Areas of Growth
• **Application** – Including students in class discussions and incorporating student interest into real-life examples. • **Feedback / Affirmation** – Creating a positive learning environment and valuing all student input. • **Comfortability** – PTs felt more natural and comfortable engaging with students in the second round. They demonstrated more professional dispositions in the second round. • **Introduction of the Lesson** – The lesson introduction and drawing on previous knowledge was the lesson plan area that PTs felt most confident in their teaching.	• **Classroom Management** - Students were sleeping or texting, and one student possibly had ADHD. Not knowing the students in the first round made planning for these occurrences difficult. • **Content Knowledge** – PTs felt the need to be better prepared, have more examples, rehearse, plan materials, and gain confidence in content. • **Differentiation** – Balance the participation and provide for the academic needs of varied student abilities and engagement levels. • **Pacing/ Time Management** – Achieving objectives in the time allotted for the lesson while not going so fast that depth was achieved.

The faculty have found that virtual classrooms allow for micro-teaching experiences that are low risk of detrimental student impact and allow for reteaching opportunities. They also provide a more realistic environment, with PTs approaching the teaching opportunity in a more professional and intentional manner. Field notes and class discussions suggest this may be in-part due to the students' belief that the "actor" was an experienced teacher.

Virtual simulations also provide a seamless way to record teaching experiences to be potentially reviewed by the PT and university faculty. There is no need to gain student consent, and the video quality is consistent. The recording allows for self-reflection and creates accountability to identify areas of strength and need for growth in an evidenced-based manner.

Conclusion

While in a traditional classroom, PTs only have one chance to teach a lesson, the benefit of the simulation becomes that students can reteach the same lesson as many times as needed to achieve the desired outcomes. PTs are afforded opportunities to practice and re-practice teaching skills in a realistic environment without risk of disruption or confusion of actual student learners. Practice is a critical component of the teacher preparation experience as cited routinely in research, and virtual simulation classroom gives teacher preparation programs and their PTs potentially unlimited opportunities for such practice (Boerst et al., 2011; Walshaw & Anthony, 2008; Council of Chief State School Officers, 2013; Teaching Works, 2019; Association of Mathematics Teacher Educators, 2017; National Science Teaching Association, 2013).

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