MEASURING TEACHER CANDIDATE SELF-EFFICACY USING VARIED LEARNING ENVIRONMENTS TO IMPLEMENT EXPLICIT INSTRUCTION

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DEDICATION

To my mother, Kendal, who fought and survived bladder cancer throughout my dissertation season. Strong women raise strong women; I dedicate this to you.

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ABSTRACT

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The call for research in the special educator preparation community is needed to help provide successful strategies to support effective teaching and student learning (Brownell et al., 2019). The purpose of this study was to better understand the impact of a learning environment for pre-service educator self-efficacy and their implementation of explicit instruction. Through qualitative and quantitative investigation, this study provided a better understanding of alternative technology learning environments and how they impacted pre-service educator performance on expected assignments in their preparation program.

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CHAPTER I

INTRODUCTION

Developing and providing quality educator preparation programs (EPPs) for pre-service educators is essential to ensure that they have the skills to support the everyday challenges an educator might encounter (Billingsley et al., 2019). The many hats an educator wears, all while providing quality instruction, creates a need for a wide skill set to best support their daily tasks, their mental health, and student progress (Billingsley et al., 2009). It is up to the EPPs to ensure they are providing excellent instruction for pre-service educators of all domains. The EPP should be hopeful the education they are providing the pre-service educators instills confidence, practices research-supported strategies, and allows students to authentically experience what it means to be in the classroom prior to their first day on the job.

Educators are a necessary part of the economy, and it is essential that the State of Texas puts time, money, and effort into recruitment, development, and retainment of educators (Horn et al., 2021). EPPs, while diverse in their delivery method, train future educators to be the most prepared they can be prior to entering a classroom of their own. Texas has 129 EPPs, most of which are alternative certification programs (Van Overschelde & Wiggins, 2020). The platforms in which the EPPs provide instruction vary, so it is important to know what research says in relation to quality methods for quality preparation. While it is understood that preparation routes can impact retention and attrition (Horn et al., 2021), it is the EPPs responsibility to make sure their instruction is effective.

Ingersoll et al. (2019) stated that high-attrition rates impact the educator profession as a whole. Research is lacking in how EPPs impact retention and turnover in the teaching profession (Ingersoll et al., 2019). While there has been a growing understanding of the implications of

educator turnover, it is essential that researchers and higher education faculty understand the most effective and worthwhile way to support retention after the educators are long gone from their college classroom.

According to the Texas Education Agency (TEA, 2022c), there were almost 24,000 first-year educators beginning in the school year 2016-2017. Over the first 5 years of teaching for that group, approximately 30% did not keep continuous employment. Understanding why a large group of new educators is not staying is essential in knowing the need for more research in all areas of educator preparation. If EPPs have a better understanding of what best prepares educators to enter the field, retention rates might be higher for the schools, in-turn providing consistency, and positive outcomes on Texas education.

The field of special education specifically has been identified to be in an educator shortage since the early 1990s (Horn et al., 2021). In the 2021-2022 school year, approximately 6,500 of the 63,000 Texas teaching certificates were issued as special education certificates (TEA, 2022a). It is essential that EPPs provide quality and unique preparation for pre-service special educators to help support the diverse student needs that they will encounter in a special education role. A special educator is expected to go beyond what is expected in basic differentiation and provide substantial and specialized adaptations to meet a wide range of cognitive ability. It is also an expectation to monitor and assess each student on a deep and thorough basis through lengthy curriculum based assessments and individualized education program (IEP) goal progress monitoring (Katsafanas, 2006). Special educators struggle with greater issues defining their role (Billingsley & Cross, 1992), work overload, and nontraditional expectations (Katsafanas, 2006). With these challenges, special educators are more likely to experience stress, causing job dissatisfaction and job attrition (Adeniyi, 2010).

It is important to value the need for more research in educator preparation, specifically special educator preparation, and it is the role and responsibility of EPPs to do their best to prepare these future educators for the classroom. Understanding that there is a need for special education research, this study's intention was to help expand types of instructional strategies for instructors to use in EPPs.

Statement of the Problem

Brownell et al. (2019) discussed the need for research in the special educator preparation community to help provide successful strategies to support effective teaching and student learning. High quality EPPs that use research-based and high-leverage practices, provide better experiences for pre-service special educators (Leko et al., 2015). Therefore, the development of comprehensive and high quality EPPs to support the transition from pre-service to in-service is needed to equip new educators with the skills to support a classroom.

EPPs are expected to train pre-service educators to be effective, high-quality educators who produce positive outcomes related to student progress (Beare et al. 2012). Stokes-Beverly (2016) stated that there was a positive correlation between successful educators and advanced teaching methodologies in teaching preparation. Understanding that advanced teaching methodologies in EPPs produce positive outcomes, it is essential that EPPs use research-based practices to support positive outcomes for education.

When looking at advanced teaching methods, technology has continued to become more innovative over many years and has been proven successful through research as a tool when educating future educators (Rieg & Wilson, 2009). Dieker et al. (2008) declared the benefits of technology and its positive impact on special education by providing many opportunities in the classroom. However, understanding how technology can benefit the classroom is essential in the

development of new and progressive ways to support skills necessary to be an effective educator in a classroom, which can allow for increased impact on student progress.

Purpose of the Study

The purpose of this study was to better understand the impact of a learning environment for pre-service educator self-efficacy and implementation of explicit instruction. Students enrolled in EDSP 4253, Instructional Strategies for Students with Disabilities, were expected to demonstrate knowledge of designing and implementing research-supported instruction for students with disabilities. Through activities and assignments assigned in the course and aligned research questions, this study provided a better understanding of learning environments and how they impacted pre-service educator performance. Dieker et al. (2008) discussed the potential implications of the use of a technology-based mixed-reality system in conjunction with education of pre-service educators. This study was intended to help EPPs better understand the benefits of the use of technology and a mixed-reality approach.

Hypothesis and Research Questions

It was hypothesized that simulated mixed-reality opportunities, that were video-recorded, would positively impact pre-service educators' self-efficacy and their understanding and application of explicit instruction.

RQ1. How does the use of a learning environment (simulated versus video-recorded) impact self-efficacy among pre-service educators?

RQ2. How does the use of a learning environment (simulated versus video-recorded) impact explicit instructional practice among pre-service educators?

RQ3. How do pre-service educators experience the use of a simulated learning environment (i.e., Mursion, a mixed-reality simulated learning platform)?

Terms

The following terms are defined for clarity:

1. *Educator preparation program (EPP):* A program designed to train future educators and ensure the education of professionals to improve student achievement (Heafner et al., 2014)
2. *Educator retention*: Educators remaining in the field of education to continue impacting student learning (Hughes, 2012)
3. *Explicit instruction*: A research supported practice including instructional behavior used to design and deliver instruction explicitly. Promotes student engagement, corrective feedback, and intentional responses to support long term retention (Hughes et al., 2017)
4. *High-leverage practices*: 22 critical practices that a special educator should be able to master and demonstrate to impact student outcomes (Council for Exceptional Children [CEC], 2023a)
5. *Learning environment:* An environment provided by an instructor with intention to teach skills with learning outcomes (Van der Kleij et al., 2015)
6. *Mixed-reality learning environment:* A combination of real and virtual worlds to simulate a typical environment with intention of learning (Dieker et al., 2014)
7. *Mursion*: A platform providing experiential mixed reality simulations for practice based on social instinct (Mursion, 2022)
8. *Pre-service educator*: Commonly referred to as students that are in an EPP prior to teaching in the classroom. College students in a course of study to prepare them to become educators (Richards & Schmidt, 2002)
9. *Self-efficacy*: The self-belief in one's own ability to complete a task (Bandura, 1997)

CHAPTER II

LITERATURE REVIEW

The purpose of this literature review was to better understand the need for innovative strategies in EPPs and the benefits of technology-based platforms in the college classrooms of EPPs using different technology-based platforms, such as GoReact, Mursion, and video analysis, as a way to provide opportunities to strengthen a pre-service educator's pedagogy prior to entering the classroom (Gundel et al., 2019).

The search for the articles for this literature review occurred through the online library at Texas Woman's University and Google Scholar. The library provided access to various online databases including, but not limited to, ProQuest, Education Source, Academic Search Complete, and Gale: Scholarly Resources. Articles included in the search were peer-reviewed and were located through search terms or ancestral searches of work cited. Search terms included: *educator preparation program, special educator preparation program, technology-based learning, video analysis, education, GoReact, Mursion, TeachLivE™, educator self-efficacy,* and *self-reflection in education.* Articles were also recommended from advisors and professors well versed in topics reviewed.

The results of this literature review yielded information supporting research in EPPs using technology-based platforms to strengthen pre-service educators' pedagogical skills and social emotional health as a means to better retain educators once in the field.

Educator Preparation Programs

EPPs are challenged with supporting new educators learning to balance the classroom through behavior management, teaching, and planning (Beecher et al., 2022). Preparing future educators to provide successful learning environments was essential (Leko et al., 2015). Through

innovative strategies to teach crucial approaches to the classroom and intentional instruction on high-leverage practices, pre-service educators are given the opportunity to better succeed in the classroom through the acquisition of needed knowledge to survive in the teaching profession.

Texas supports four main avenues to become certified to teach, which include certification. Texas university undergraduate programs are the most common way to educate pre-service educators. An alternative certification program, a post-baccalaureate program, or an out-of-state certification program provide alternative avenues, rather than undergraduate studies, to obtain licensure (TEA, 2022a). The State of Texas supports the non-traditional routes of international visiting teaching certificates, intern certificates, probationary certificates, and emergency certificates. Several less common smaller ways over the past that have allowed educators to be certified, including the Jamison Bill and Career and Technical Experience Programs (TEA, 2022a).

For educators that were educated through a traditional Texas university undergraduate program and began their first-year teaching in the 2016-2017 school year, 5 school years ago, 68.5% were retained over the first 5 years of teaching (TEA, 2021). Compared to the alternative certification retention percentage of 59.9%, Texas university undergraduate programs have higher retention rates overall. Understanding that undergraduate programs have higher retention rates does not mean that under 70% retention is positive (TEA, 2021). It is essential for EPPs to understand why educators are leaving and what can be done to raise retention rates.

Texas EPPs have extensive requirements and a strong accountability system that is outlined by the State Board for Educator Certification (SBEC) and TEA. In these programs, pre-service educators are supposed to be trained to meet the requirements of being an educator. To earn a certification in the State of Texas, one must complete an EPP, pass state exams, and

clear a background/fingerprint check (Varela et al., 2020). After doing so, an educator is expected to fulfill the basic educator standards defined by the Texas Administrative Code. EPPs, while the largest part of the journey to a teaching certificate, are challenged with instilling the six teaching standards as defined by Chapter 149 of the Texas Administrative Code (TAC; TEA, 2023).

The first standard is to teach pre-service educators how to plan delivery of quality instruction. Educators are expected to design clear and concise lessons that are evidence-based, standards-driven, and are developmentally appropriate for its audience. Doing so allows for educators to help students connect to the content and gain a solid understanding. Providing information in a clear and concise way helps students build a stronger understanding through simple language. A strong explicit model of teaching embodies clear communication to the students through direct explanations (Archer & Hughes, 2011). It is essential that educators create lessons with the intention to encourage higher order thinking and collaborative critical thinking, all while monitoring progress and checking for understanding. Educators must plan quality instruction that meets the diverse needs of the classroom and ebbs and flows to support every student (TEA, 2023).

The second standard is the ability to gain knowledge of their students and ensure student learning is occurring. Understanding and truly believing that all students have the potential to learn, even at different rates, is critical in providing quality instruction. It is imperative that educators actively learn about students' backgrounds and history to better support the acquisition of new skills and the maintenance of previously learned skills. Connecting to the background knowledge allows students to put the pieces together and build new knowledge off of skills acquired (Owens & Tanner, 2017). Cultivating a culture of positive social-emotional health

allows students to acquire the necessary skills to learn. Through ensuring student learning is occurring, it is important to foster student social-emotional health with evidence-based practices (TEA, 2023).

The third standard ensures that the educator should have the knowledge and expertise of assigned content. This includes the knowledge and implementation of evidence-based practices, understanding of the vertical and horizontal alignment in relation to state standards, and the ability to understand the essential topics related to one's content. This standard ensures that the educator can teach the skills the students are intended to learn (TEA, 2023).

The fourth standard is the ability to create a positive learning environment. It is expected for an educator to implement routines and procedures that ensure a collaborative and safe environment for learning. It is essential that educators support active engagement in the content and that they foster an environment where students are open to learn the skills the educator is intending to teach (TEA, 2023).

The fifth standard requires the full understanding of data-driven practice. Educators are expected to understand how to successfully implement formative and summative assessments and how the data they collect can be used for future decisions regarding lesson planning. Goal setting is a basic expectation for educators in the classroom. It is essential for educators to monitor and collect data to understand the process of learning. Educators are to use the data they collect to analyze their own instructional strategy and make changes as needed. Remaining reflective and flexible is essential in data-driven instruction (TEA, 2023).

The last standard requires a professional demeanor and presence. Educators must hold themselves to a high standard and remain with a growth mindset. It is imperative that educators

reflect with oneself and collaborate with others. In this standard, it also outlines the ethical and respect requirements to maintain a professional pedagogy (TEA, 2023).

All six standards are expected of teachers graduating from a certification program, by the State of Texas, to embody and implement in their profession. EPPs are challenged with the responsibility of preparing pre-service educators (Varela et al., 2020), so EPPs should be used to teach pre-service educators how to achieve all six of these standards. Creating meaningful opportunities for pre-service educators to learn these skills prior to their first day in the classroom could help reduce educator attrition.

Special Education Preparation

Understanding that general pre-service educators are expected to understand and implement the six educator standards as defined by Chapter 149 the TAC, becoming certified in special education adds a layer of difficulty (TEA, 2023). Katsafanas (2006) discussed how special educators have challenges in job design and when looking at the aspects of a special educator's job duties, it is important to remember that it takes more time and work to prepare an educator to be certified in special education in addition to general education.

Katsafanas (2006) defined the challenges that a special educator encounters as role ambiguity, role dissonance, role conflict, and role overload. Role conflict is defined as the inconsistent expectations of a special educator. This might look like being pulled in many directions defined by the unique eligibility and needs of each student. Many special educators also experience many agenda items at meetings not applying to their unique needs and general differences in their curriculum and instruction.

Katsafanas (2006) defined role ambiguity as the lack of information provided for an individual to complete their role. Special educators are given a lot of autonomy in planning for

their students. Without direction, special educators have greater room for discrepancy and inconsistency across the school or district. This creates more opportunity for special educators to make decisions, whether good or bad, that can impact student learning without guidance.

Role dissonance is defined as where a special educator's role is different from that expected of regular educators (Katsafanas, 2006). This might look like having less planning time, more non-traditional professional learning communities, and general alternatives to activities general education educators' encounter. Role conflict and dissonance creates uncertainty and the need for flexibility at a higher rate than general education educators.

Role overload is defined as the expectation of the role is beyond what is physically capable. Staff shortages, inclusion schedule of services, many goals to progress monitor, special educators are often understaffed with a high expectation to meet the legal and ethical requirements of what serves students best (Mathews et al., 2022).

EPPs are expected to train pre-service special educators to meet the diverse needs of students, while preparing them to overcome the challenges common to special education (Individuals with Disabilities Education Act, 2004). Pre-service special educators take courses during their time in an EPP that are intended to help them learn to teach specific content, manage behavior in the classroom, and understand general expectations of a special educator (e.g., planning, data collection, etc.; Beecher et al., 2022). McLeskey and Billingsley (2008) stated that EPPs also need to be responsible for teaching practices that help set up future classroom success to prevent special educator attrition. As special education preparation programs prepare future educators, researchers, faculty, and administrators are challenged with understanding successful ways to prepare educators to use high-leverage practices in the classroom.

High-Leverage Practices

High-leverage practices (HLPs) were developed by the CEC and Collaboration for Effective Educator Development, Accountability, and Reform (CEEDAR) Center (Brownell et al., 2019). HLPs have four domains (assessment, collaboration, social/emotional/behavioral, and instruction), which are inclusive of 22 different strategies (McLeskey, CEC, & CEEDAR, 2017). Billingsley et al. (2019) discussed how HLPs provide a promising framework for educators, especially special educators, and provide guidance on how to make sense of an educator's new responsibilities in providing content with a shared language for collaboration The collaborative approach defined by the HLPs serves as a foundation for practice-based approaches and provides pre-service educators with the tools they need to succeed in the classroom (Brownell et al., 2019).

Roles of special educators have continued to grow in complexity. When looking at the four areas that HLPs define as main domains, special educators enact practices in all areas in reciprocal and integrated ways (McLeskey, CEC, & CEEDAR, 2017). The foundation laid by the HLPs provides a curriculum for pre-service special educators that allows cohesive content to support teaching practice (Leko et al., 2015). The four domains and their related HLPs defined in McLeskey, CEC, & CEEDAR (2017) are presented in Tables 1-4.

Table 1

Collaboration Domain of High-Leverage Practices

HLP	Skill
HLP 1	Collaborate with professionals to increase student success
HLP 2	Organize and facilitate effective meetings with professionals and families
HLP 3	Collaborate with families to support student learning and secure needed services

Table 2

Assessment Domain of High-Leverage Practices

HLP	Skill
HLP 4	Use multiple sources of information to develop a comprehensive understanding of a student's strengths and needs
HLP 5	Interpret and communicate assessment information with stakeholders to collaboratively design and implement educational programs
HLP 6	Use student assessment data, analyze instructional practices, and make necessary adjustments that improve student outcomes

Table 3

Social/Emotional/Behavioral Domain of High-Leverage Practices

HLP	Skill
HLP 7	Establish a consistent, organized, and respectful learning environment
HLP 8	Provide positive and constructive feedback to guide students' learning and behavior
HLP 9	Teach social behaviors
HLP 10	Conduct functional behavioral assessments to develop individual student behavior support plans

Table 4

Instructional Domain of High-Leverage Practices

HLP	Skill
HLP 11	Identify and prioritize long- and short-term learning goals
HLP 12	Systematically design instruction toward a specific learning goal
HLP 13	Adapt curriculum tasks and materials for specific learning goals
HLP 14	Teach cognitive and metacognitive strategies to support learning and independence

Table 4 Continued

Instructional Domain of High-Leverage Practices

HLP	Skill
HLP 15	Provide scaffolded supports
HLP 16	Use explicit instruction
HLP 17	Use flexible grouping
HLP 18	Use strategies to promote active student engagement
HLP 19	Use assistive and instructional technologies
HLP 20	Provide intensive instruction
HLP 21	Teach students to maintain and generalize new learning across time and settings
HLP 22	Provide positive and constructive feedback to guide students' learning and behavior

Collaboration, the first domain in the HLPs, discusses ways to facilitate the essential need to develop a collaborative environment for all stakeholders including in the decision making process. Creating strong lines of communication, intentional perspective taking, and teamwork help foster collaboration to ultimately benefit the students (McLeskey, CEC, & CEEDAR, 2017). Collaborative practices support social-emotional health among educators, students, and their community. Collaboration is essential when educators are expected to continuously monitor and

adjust their instruction and education plans to meet the needs of the students (McLeskey, CEC, & CEEDAR, 2017)

The second domain addressed in HLPs is assessment, which is imperative to students with disabilities due to the nature of understanding a student's patterns of strengths and weaknesses. This domain highlights the importance of an educator's understanding in the role of assessment, what assessments are needed, and how to meet student's needs through assessment and continuous monitoring of content learned (McLeskey, CEC, & CEEDAR, 2017). Information from assessments helps educators better understand how they can continue to support students and further develop their student's IEP with the support of other stakeholders. When continuing to assess learners, we use assessment to guide present levels of instruction. Through assessment, educators are able to confer with others about how to best achieve mastery and close gaps for learners with disabilities.

The third domain, social/emotional/behavioral practices, helps foster an ideal environment for students to succeed. Creating consistency, organized systems, and a strong sense of respect allows educators to encourage and support learning at many rates and levels in the classroom. The HLPs, under the third domain, help guide an educator in using responsive practices and intentional strategies to help students succeed (McLeskey, CEC, & CEEDAR, 2017). Strategies used in the classroom that support social, emotional, and behavioral needs are the starting point to strong instruction. Effective educators understand that instruction is best learned when in a safe environment (McLeskey, CEC, & CEEDAR, 2017). As an educator, developing a strong sense of community within the classroom is a strategy to help build the classroom culture. With a positive classroom culture, students are able to continue maturing and

continue learning due to being emotionally available. When applying different practices within the classroom, it is essential to make sure that students are ready to learn.

The last domain, instruction, defines the strategic mindset one must have to successfully instruct students with a variety of needs. Being well versed in the curriculum, and also ways to teach the content, is essential for student success. When looking at the instruction domain, this encompasses strategies in which students are to be instructed in a meaningful and effective way. The need to better understand how skills can be differentiated and vertically aligned and scaffolded to meet the needs of every student is essential when teaching students with disabilities. HLPs define how to teach by laying the foundation for instructional practices within its framework while providing a clear guide on quality instruction (McLeskey, CEC, & CEEDAR, 2017). To explicitly instruct is to provide quality, clear, and concise instruction with the intention of supporting students with skill acquisition.

Explicit Instruction

It is essential for educators to provide quality instruction for students with and without disabilities. The CEC partnered with the CEEDAR Center and developed a list of high-leverage practices that have a high potential for positive student outcomes (McLeskey et al., 2019). In the list of HLPs, explicit instruction falls under the instruction domain. Explicit instruction can be used to teach new content to students by showing and telling students what to do and think about the skill (McLeskey, Barringer et al., 2017). By using modeling and scaffolding, educators can explicitly teach skills to students while promoting independence (McLeskey, CEC, & CEEDAR, 2017).

When explicit instruction is used in the classroom, the clear and concise manner helps create more occurrences of academic learning (McLeskey, CEC, & CEEDAR, 2017). Explicit

instruction is a set of behaviors expected from the teacher to facilitate with learners. The students are to follow the simple model of explicit instruction. A common saying when expliciting instructing is "I do, You do, We do." Archer and Hughes (2011) stated that explicit instruction is a great method in helping educate students of a wide range of cognition.

There is over 40 years of research completed on explicit instruction (Archer & Hughes, 2011; Hughes et al., 2017). Explicit instruction promotes learning and an organized and efficient manner (Riccomini et al., 2017). Kamil et al. (2008) discussed the recommended use of explicitly instructing when teaching vocabulary. Explicit instruction provides a clear and concise way to teach students new content, regardless of diverse learning needs. Combining explicit instruction with other HLPs and evidence-based tools, allow for educators in the classroom to enact effective teaching.

Educational Technology

The use of emerging technologies for pre-service educators creates potential for strengthening their craft of teaching (Dieker et al., 2008). It is essential that EPPs focus on teaching and learning in the classroom by developing ways to creatively and effectively give pre-service educators experiences to be increasingly prepared for their future classrooms (Dieker et al., 2008) and can provide opportunities to experience situations that align with real-life scenarios.

Although the use of technology in the classroom can be difficult, it is advantageous (Andrei, 2019). When using technology in the classroom, it can provide opportunity for the student and educators to interact with the content in a new-age way. Technology has been evolving in the classroom over years. As more college courses are offered online or with a hybrid option, EPPs are required to keep up with meaningful technology in their curriculum.

Godber and Atkins (2021) stated that the COVID-19 pandemic brought many opportunities for education to expand their technology use. During the shutdown, schools were forced to use technology-based platforms to teach their students. Similarly, colleges moved most courses online. For teaching college and undergraduate EPPs, this created restrictions and limitations for school observations and non-traditional student teaching. University faculty members were expected to create meaningful and unique learning experiences for the pre-service educators to meet the "hands-on" expectations of an EPP. Zoom, mixed reality programs, and other technology initiatives have been called to support special education EPPs (Fraser et al., 2020).

Current curriculum in K-12 schools and higher education expect students to have digital literacy skills with an expectation that students are comfortable in a technology modality whenever they are acquiring skills, teaching skills, and completing daily tasks (Erwin & Mohammed, 2022). It is essential for educators to intentionally integrate technology in the classroom. A benefit to technology in education is that technology can bring authentic teaching experiences through technology applications (Ledger & Fischetti, 2020). With a push from today's digital age and an expectation for digital literacy, EPPs must provide varied learning modalities supported by technology to enhance pre-service learning.

Mursion

In the 1970s, technology-based simulations integrated into EPPs (Cruickshank & Armaline, 1986). Before technology-based simulations, pre-service educators were expected to practice their skills by roleplaying, watching videos, reading case studies, or playing games (Landon-Hays et al., 2020). Technology based simulations allow for pre-service educators to interact with students while practicing the skills they have learned in their college courses and

provide opportunities for the improvement of academic and behavior management strategies through rehearsal and reflection (Landon-Hays et al., 2020). The intention of the mixed-reality program is to recruit, train, and retain educators through virtual classroom experiences during pre-service training at universities (Dieker et al., 2008; Dieker et al., 2015; Hudson et al., 2018). There is immense benefit to using technology-based virtual simulations to a pre-service educator's pedagogical practice (Landon-Hays et al., 2020). Mursion has been a successful technology-based virtual simulation learning environment for pre-service educator candidates in EPPs to practice teaching evidence-based practices (Dieker et al., 2014). The original technology was created out of University of Central Florida, known as TLE TeachLivE (Dieker et al., 2008). Dieker et al. (2008) reported that the intention of the TeachLivE technology was to strengthen educator training and support retention. TeachLivE was commercialized into another company, named Mursion (Hudson et al., 2018).

Both Mursion and TeachLivE are full-immersion virtual simulations and are the most sophisticated of their kind (Landon-Hays et al., 2020) and have provided support for educator education by providing a teaching classroom environment by providing scenarios for an immersive role-playing experience (Hudson et al., 2018). This type of environment provides different opportunities that are less game-like, and more realistic to provide an authentic experience (Landon-Hays et al., 2020).

Mursion provides the opportunity for participants to interact with a small group of classroom avatars that can range in age from elementary through adult with each avatar created through research and that represent a wide variety of demographics and personalities (Peterson-Ahmad, 2018). Avatars can be selected prior to the simulation based on the intention of the lesson.

The mixed-reality classroom simulation creates an immersive learning environment for the pre-service educators to apply and transfer college coursework they have learned into the program (Peterson-Ahmad, 2018). During the simulation, avatars provide real-time verbalizations of practice-based interactions, and their complexity can be controlled to help support targeted skills for the pre-service educator, which allows for individualization in the refinement of skills through repeated practice (Landon-Hays et al., 2020).

Mursion scenarios are built for pre-service educators to target specific skills learned during their time in an EPP. Skills they could target are explicit teaching, differentiation, or basic lesson design (Dawson & Lignugaris/Kraft, 2017). Mursion provides a teaching experience for students in EPPs that has the intention to better prepare them for future in-service teaching situations. Mursion can serve as an alternative or an additional practice method for pre-service educators (Hudson et al., 2018). Mursion has allowed pre-service educators to feel more confident in the classroom, while providing real-time experiences in a simulated classroom. HLPs can be taught through EPPs, and with Mursion, pre-service educators can practice the HLPs with a mixed-reality experience. Virtual simulations have the potential to change pre-service educator training and how repeated practice can help strengthen skills needed for the classroom (Peterson-Ahmad, 2018).

Pre-service educators can benefit from classroom-like experiences in the mixed-reality simulated classroom during their EPP. Through varied learning environments, pre-service educators can gain experience managing behaviors and teaching lessons using various strategies. Research is needed to better retain, train, and prepare future special educators for the field, and continued research over technology-based platforms to support pre-service educators is essential for success in the classroom.

Video Analysis

Video analysis, a well-studied technology-based platform to support pre-service educators, allows for review of digital footage to unpack learning opportunities (Mohr & Santagata, 2018). It allows the pre-service educator, who is rewatching their video, to review their experience, analyze their teaching practice, and synthesize specific examples (Rich & Hannafin, 2009). The use of video analysis is a powerful tool in field placements due to the ability for an instructor to provide feedback on captured moments, supporting reflection, and growth in the pre-service educator (Gale et al., 2010). Nagro et al. (2017) stated that the use of video analysis and reflection has demonstrated to be a beneficial tool in improving skills during teaching. When looking at video analysis and its continuous impact over time, regular detailed use of explicit instruction builds a detailed understanding of moment to moment. The isolation of individual moments of excellence allows pre-service educators viewing the video the opportunity to analyze and replicate best practices (Gale et al., 2010).

Video analysis has been a necessary tool to keep up with the increase in online courses in EPPs. Video technology allows instructors in EPPs to remotely view pre-service educators teaching lessons. This saves time and cost for EPPs to ultimately guide pre-service educators to graduation with evidence-based video analysis as a key tool in educator preparation (Gale et al., 2010). Many video analysis programs exist, however, video analysis platforms, such as GoReact, provide many opportunities for video analysis to provide comprehensive reports for pre-service educators to analyze.

GoReact

GoReact is a video analysis platform that allows instructors to annotate videos and provide organized and synchronized feedback to a pre-service educator (Ardley & Hallare,

2020). Ardley and Hallare (2020) discussed how feedback is an essential part to learning and how in the past, feedback was given through written correspondence or conversation. GoReact as a video analysis tool to annotate videos can provide a seamless platform for watching, assessing, and monitoring skills, supporting the distance learning that occurs in educator education (Ardley & Hallare, 2020). As an instructor, the use of GoReact in combination with reflection over the annotated video analysis creates opportunities for self-driven learning for pre-service educators.

Self-Reflection

Self-reflection encompasses many behaviors and beliefs (Desautal, 2009). As far back as the 1990s, Schultz and Delisle (1997) encouraged reflective learning through written and verbal recollections of experiences. Desautel (2009) defined self-reflection as the use of metacognition to make formerly unconscious and reflexive experiences explicit. Flavell (1971) described metacognition as the awareness of oneself. It is the intent that through metacognitive processes of self-reflection, self-reflection can be useful to professions.

Self-reflection has long been a part of the classroom (Desautel, 2009). Kilgour et al. (2015) used self-reflection in the classroom to track educator attitudes towards learning, and better understand the student's investment intentions in learning. A sustained use of reflection allowed for the instructors and investigators to understand learning perspectives through a historical approach. Better understanding the use of self-reflection on teaching practices can help instructors support the use of strategies in EPPs that pre-service educators are invested in. Nagro et al. (2017) mentioned the benefit of using self-reflection for educator strategy acquisition. When reflecting over one's actions, one is able to synthesize the information more clearly. When looking at self-reflections of pre-service educators in EPPS, researchers may have a better understanding of how oneself beliefs and personal goals create an investment in their learning.

Self-Efficacy

Efficacy beliefs are understood as “self-beliefs” (Klassen, 2004). Understanding that self-efficacy encompasses influence of perseverance, resilience, and task choice (Bandura, 1997), self-efficacy is a great predictor of motivation and performance (Pajares & Graham, 1999). Self-efficacy is defined as ‘‘beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments’’ (Bandura, 1997, p. 3). Barni et al. (2019) discussed how understanding self-efficacy in the teaching profession has gained an important role in school psychology. With a better understanding of self-efficacy in education, there have been positive implications of teaching effectiveness, instructional practice, and student achievement (Klassen, 2009).

Aloe et al. (2014) discussed the impact educator self-efficacy has on the prediction of outcomes. Zee and Kooman (2016) stated that self-efficacy has a great impact on classroom processes, student academic adjustment, and overall educator well-being. When looking at self-efficacy and one’s belief in themselves, educators greatly make an impact in the classroom through decision making, concerns, and perceptions of what they are doing (Güngör & Yayli, 2012). An educator's personal values impact their ability to teach (Barni et al., 2019). Educators with a stronger and higher sense of self-efficacy believe their impact on students with disabilities to be positive (King-Sears & Strogilos, 2020). When looking at self-efficacy in a pre-service teacher, Tschannen-Moran and Woolfolk-Hoy (2001) stated that confidence within student engagement, instructional strategies, and classroom management is essential. Understanding educators' self-efficacy can have immense benefit in their performance outcomes as classroom educators. Further, understanding how pre-service educator self-efficacy changes in response to

EPP curriculum and teaching environments/platforms allows for researchers and instructors to best support students in the EPPs.

CHAPTER III

METHODOLOGY

Research Design

This study used a mixed method research design with an experimental component to better understand how pre-service educators experienced varied learning environments and how they impacted self-efficacy and explicit instruction practice. Mertens (2012) stated that mixed methods allow for the development of trusting relationships based on ethics and repeated exploration of topics critical to the community. Using a mixed methods research design, this study was able to systematically collect and analyze data related to differing learning platforms of participant groups and the platform's impact on the participants implementation of explicit instruction and self-efficacy. Mixed methods methodology allowed the study to analyze both quantitative and qualitative data, between two groups, to answer the research questions. The research study was intended to establish the purpose and meaning behind the opportunity chosen (Campbell & Stanley, 1963). The opportunity given to the treatment group was access to the Mursion mixed-reality platform to complete their lesson assignments in an EPP versus the control group which just completed a video-recording of their lesson in the same course.

Prior to the collection of data related to the study, Institutional Review Board (IRB) approval was obtained on July 14, 2022. Data collection began and was concluded in the Fall 2022 semester (See Appendix A).

Setting

The setting for this study was in a university created course at Texas Woman's University in Denton, Texas. Texas Woman's University is a 4-year, public university that has around 10,000 total students enrolled (US News, 2023). The College of Professional Education is one of

six colleges and departments and has four areas of study (Texas Woman's University, 2023c). The areas of study are educator education, human development/family studies/counseling, literacy and learning, and library and information sciences. The undergraduate course that this specific research study took place was EDSP 4253, Instructional Strategies for Students with Disabilities. This course was 7 weeks long and started the week of October 24, 2022, and ended the week of December 9, 2022. The educator of record for this course was Schuyler Beecher, M.Ed., ABD. No teaching assistants were present for this course.

EDSP 4253, Instructional Strategies for Students with Disabilities, is a required course for students in the Bachelor of Science in Education (EC-6 Core Subjects with Special Education) program (Texas Woman's University, 2023a). The course is intended to teach pre-service educators about various instructional strategies and accommodations that are needed to teach across all subjects to students with disabilities. These strategies include, but are not limited to, cognitive/compensatory strategies, evidence-based practices, and HLPs. This course also has observation hour requirements, required for certification, to see the instructional strategies taught in the course in an applied setting.

This course was supported through various educational and distance learning platforms. The course was provided by the Texas Woman's University through the Canvas Learning Management System (LMS; Texas Woman's University, 2023b). Canvas LMS is a web-based platform that allows instructors to put materials online, assign assignments, provide lesson material, post announcements, and communicate through messages.

This course was primarily online; however, there were some semi-synchronous opportunities for students on Zoom. The Zoom online meeting system was used for both the access to the Mursion mixed-reality system and mini-conferences over their lessons. Participants

met with the instructor via Zoom several times during the semester, depending on group, to discuss the GoReact video-analysis and review student performance using the explicit instruction rubric. The recordings for the video-analysis were collected through Zoom. The only audio recording collected was the audio that accompanies the videos. This was not used in isolation or for qualitative analysis. Participants were notified that the Zoom software was recording their sessions.

Participants

The participants in this study were undergraduate students enrolled in EDSP 4253, Instructional Strategies for Students with Disabilities, during the Fall 2022 semester at Texas Woman's University. Up to 35 students can be enrolled in this course and there was no inclusion or exclusion based on age; however, the typical age for college students ranges between 20 and 65 years of age. Eligibility requirements were that they were enrolled in this course for its entirety, submitted all assignments, and consented through the process approved by IRB.

$N = 23$ participants were enrolled in this course and who were eligible and consented to participate in the study. Participants were randomly divided into two groups, differentiated by learning environment, at the start of the 7-week semester. The first group ($n = 12$) was expected to complete their assignment on the Mursion platform. The second group ($n = 11$) was expected to complete their assignment by self-recording a video of them teaching a lesson.

Both groups were expected to demonstrate teaching a lesson over cell organelle vocabulary using an explicit instruction rubric. This was chosen as a middle school learning standard to reach students who were interested in teaching both primary and secondary school. This standard was also pre-selected for the course assignment from previous instructors. Both groups were also expected to teach the lesson in 10 minutes. This time frame gave the

participants a realistic time frame for a mini-lesson. The Mursion group was required to demonstrate the lesson using the Mursion technology on Zoom and the video group was required to record their lesson and submit the video file to be assessed. The Mursion group was recorded by the instructor while they were teaching live with the avatars. Participants were expected to execute assignments independently and not as a group. Assessment of the assignment was completed during the review of both group's recorded videos.

Participant Recruitment

Participants in this study were recruited through a Canvas LMS announcement within the course. The recruitment script was posted in Canvas and participants also received email communication. Embedded in the scripted email was a Google Form link in which students were invited to click and fill out. Students were asked to read the form and either consent or not consent based on their preference. In this form they were able to understand the context of the study, review the risks, and provide or decline consent (See Appendix B).

Data Collection Tools

Data collection tools were chosen for this study based on the fact they were research validated tools. The scale used to measure self-efficacy and the rubric used to measure explicit instruction that were chosen based on fit for the assignments required for the course and the research objectives. The use of self-reflection was to support a simple way for students to relay their feelings and thoughts about the assignment with a limited amount of time left in the course. This allowed for the instructor to not have to meet with each student individually and record a transcript of an interview.

Teacher Self-Efficacy Scale

Pre-service special educators completed the Teacher Self-Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk-Hoy, 2001) using a pre-post-test model which determined perceived efficacy levels for participants who completed the survey. The TSES was created at Ohio State University and includes a long and a short form intended to allow researchers to gain a better understanding of what difficulties an educator encounters from their perspective. The long form of the TSES was used for this research study and included 24 questions covering educator self-efficacy in the areas of student engagement, instructional strategies, and classroom management. The questions in the survey were in a Likert scale form, on a scale from one to nine;nine indicating most confident. Tschannen-Moran and Woolfolk-Hoy (2001) discussed the power of educator self-efficacy and the connection between educator efficacy and meaningful outcomes related to an educator's career. Benefits to understanding an educator's self-efficacy supports educator persistence and commitment, enthusiasm about one's job, instruction, and student outcomes and achievements. Using the TSES allows for the researcher to better understand an educator's perception of their own efficacy in the classroom (Tschannen-Moran & Woolfolk-Hoy, 2001; See Appendix C).

Recognizing Effective Special Education Teachers Rubric

The Recognizing Effective Special Education Teachers Explicit Instruction Observation Rubric (RESET Rubric) is a validated observation tool, designed to evaluate the implementation of elements specific to explicit instruction providing a conduit for feedback and collaborative discussions between the in-service special educators, trainers, and coaches (Moylan et al., 2017). Pre-service special educator participants were evaluated using the RESET rubric during each teaching session. This rubric provides data related to the pre-service special educator

participants' ability to explicitly instruct with fidelity (Moylan et al., 2017). The RESET rubric was required from all of the students, and is currently a part of the regular curriculum as a reflective tool used in working with the instructor on record (See Appendix D).

The RESET rubric covers 25 different skills within explicit instruction, totaling to 75 points. For this specific research study, 10 of the 25 skills were chosen to make a condensed version of the rubric. This made the rubric easier to achieve and a great starting point for the participants to complete during this 7-week course. A condensed version of the rubric was self-created to fit the 10-minute lesson assignment expected of the participants. The 10 skills chosen were distributed across the seven major components of the RESET rubric, concentrating heavily on monitoring and feedback. The seven components of the RESET rubric are identifying and communicating goals, alignment, teaching procedures, guided practice, pacing, engagement, and monitoring and feedback. Skills in Table 5 were assessed using annotated video analysis.

Table 5

RESET Rubric Targeted Skills

Component	Targeted Skill
Identifying and Communicating Goals	The goals of the lesson are clearly communicated to the students.
Alignment	Instruction is completely aligned to the stated or implied goal.
Teaching Procedures	The educator provides clear demonstrations of proficient performance.

Table 5 Continued

RESET Rubric Targeted Skills

Component	Targeted Skill
Guided Practice	Guided practice is focused on the application of skills or strategies related to the stated or implied goal.
Pacing	The educator maintains an appropriate pace throughout the lesson.
Engagement	There are structured and predictable instructional routines throughout the lesson.
Monitoring and Feedback	The educator consistently checks for understanding throughout the lesson. The educator provides timely feedback throughout the lesson. Feedback is specific and informative throughout the lesson. The educator makes adjustments to instruction as needed based on the student responses.

Lessons were evaluated by the instructor during a structured video analysis to annotate the video with markers aligned with the condensed rubric. Participants were given scores 1-10 based on how many of the skills were present in their lesson. Reliability scores were collected through inter-observer agreement (IOA). IOA was achieved through a second observer matching over 80% accuracy for 20% of the data collected. The second observer was the instructor's mentor and committee chair, Dr. Randa Keeley.

Structured Video Analysis

The structured video analysis was completed in the GoReact platform. GoReact, as a video analysis tool to annotate videos, can provide a seamless platform for watching, assessing, and monitoring skills, supporting the distance learning that occurs in educator education (Ardley & Hallare, 2020). It allows instructors to annotate videos and provide synchronized feedback through marking, or annotating, the video in real-time based on a predetermined set of markers. The markers were derived from the RESET rubric. The markers were chosen from each domain of the rubric to shorten the rubric. From the instructor's experience, the instructor chose what the assignment was going to target from that rubric. Specific markers from the RESET rubric, in Table 6, were used within GoReact. The markers aligned with the condensed RESET rubric. Using these specific markers from the RESET rubric, the instructor conducted a structured video analysis through the video annotation software GoReact. Reports were generated for the participants to review and reflect before their second teaching session.

Table 6

Markers for Grading in GoReact

Marker	Description
MA	Makes Adjustment
DE	Descriptive Feedback
TI	Timely Feedback
CH	Checks for Understanding

Table 6 Continued

Markers for Grading in GoReact

Marker	Description
IN	Instructional Routines
AP	Appropriate Pace
GU	Guided Practice
DE	Demonstrates Mastery
AL	Aligned Instruction
CL	Clearly Communicated Goals

Participant Self-Reflection

After each teaching session participants completed an instructor created self-reflection based on open-ended response questions. Two student reflections were completed throughout the research study. Participants filled out the self-reflection after their teaching lesson experience and submitted it through Canvas LMS. The questions in Table 7 illustrate the questions asked in the self-reflections required for submission for the course.

Table 7

Self-Reflection Questions

Self-Reflection	Questions
1	What would you like to change for your next lesson?
1	What resources could you find/use to support your instruction and what item(s) would like to change?
2	What would you like to change for any future lesson?
2	What did you feel like you did best at improving?
2	How did you feel about the experience?
1 & 2	What went well during your lesson?
1 & 2	Anything else you'd like to share?

Procedure

The EDSP 4253 course began the week of October 24, 2022. Throughout the entire semester communication went through the Canvas LMS System message center and instructor-generated announcements and memos. The course was separated into seven modules, one for each week of instruction. Each module had required coursework and assignments that correlate with what was expected from the students in the course. The participants in this study followed all seven modules, described in Table 8, as students, to complete class requirements.

Table 8

Modules by Week for Explicit Instruction Assignment

Modules	Activities
Module/Week 1	a. Consent form completion b. TSES completion c. Review of instructional materials regarding explicit instruction d. Optional zoom meeting to explain course e. Meet and greet session on Mursion technology for Mursion group
Modules/Weeks 2 & 3	a. Plan an explicit instruction lesson per assignment guidelines b. Mursion group to sign up for session times c. Execute/submit lesson in video recorded or Mursion learning environment d. First self-reflection question submission
Module/Week 4	a. Sign up for meeting time with instructor b. Review recording of previous lesson c. Meet with instructor for 5 minute mini conference to go over feedback d. Ask questions regarding feedback

Table 8 Continued

Modules by Week for Explicit Instruction Assignment

Modules	Activities
Modules/Weeks 5 & 6	a. Make edits to their explicit instruction lesson per assignment guidelines and feedback b. Mursion group to sign up for second session times c. Execute/submit lesson in video recorded or Mursion learning environment d. Second self-reflection question submission
Module/Week 7	a. Received final scores b. Asked questions regarding assignment scoring

Module/Week 1

At the start of the semester, Module/Week 1, participants were provided with consent forms and were not penalized for non-participation. Students that chose to not consent to the research study still complete the same required assignments in alignment with the course syllabus, their data just was not used for this research study. Participants individually completed the optional TSES prior to engaging with instructional materials for the course, other than the syllabus. All questions were not required, and the survey was optional/extra credit. To be an eligible participant in data analysis after the completion of the course, the TSES scale must have been completed in entirety. The TSES was put into Canvas LMS as an ungraded quiz or survey to ease the burden on participants. The participants filled out the ungraded survey. Also in

Module/Week 1, The participants were provided with instructional materials outlining the characteristics of explicit instruction to include examples through multiple sources. The explicit instruction checklist provides essential skills related to core elements of explicit instruction (CEC, 2023b) and was provided to participants as a planning guide for the lesson in aspects of how to use explicit instruction and implement into their lessons.

An optional Zoom meeting was held for each group on October 24th to have a face-to-face opportunity to clearly explain the course overview. Every student enrolled in the course attended the Zoom meetings for the course overview. The Mursion group was offered an optional meet-and-greet session with the Mursion avatars on October 27th. Meeting the avatars prior to a teaching session may decrease the stress and anxiety related to the unknown of the platform (Walters et al., 2021). This session was intended to help the Mursion group to better understand and gain experience with the avatars in the Mursion platform.

Module/Week 2 & 3

During Weeks 2-3, participants were asked to plan a lesson using explicit instruction and execute that lesson in a simulated or video-recorded learning environment, depending on the group they are randomly assigned. The Mursion group was to sign up for times on November 1st, 2nd, or 4th to sign on to Zoom and teach through the Mursion platform. During these Mursion group sessions, the lessons were recorded. The video group was expected to submit their video recorded lesson by November 6th, the end of the week.

The Mursion group signed up for time slots to teach their lessons in real-time. The Mursion sessions included logging into Zoom, beginning a session, and teaching their lesson they created to a group of five avatar students. The participants in the Mursion group were expected to teach their lesson while interacting with the avatar students. The Mursion session

avatars would interact with the participant like a typical student. They would answer questions, ask questions, and maintain general conversation with the participant. The avatars in the Mursion session were moderated by a person trained by Mursion Technology. The Mursion moderator was met prior to the sessions to prepare expectations of the participants and make sure that each session was similar in expectation. A Mursion moderator is the person who is behind the avatars. They control what the avatars do and say in relation to the participant interacting with the platform. The moderators are aware of the goal the instructor is trying to achieve with the platform and the scenarios are set up accordingly. The Mursion moderator is a simulation specialist and is able to achieve the desired behaviors to support a pre-service teacher's learning experience.

The students in the video group were expected to teach the same lesson they created, but instead teach to a camera and video-record their teaching/lesson. This included the participants self-recording their lesson taught and submitting the assignment through Canvas LMS.

After completion of the first taught lesson in their designated learning environment, participants were then to individually prepare a written reflection of their thoughts and experiences. Reflections were submitted through the Canvas LMS platform.

Module/Week 4

During Module/Week 4, participants met with the instructor, via Zoom, to discuss the recorded lesson using GoReact video-analysis report and the RESET rubric. Meetings were mini-conferences that lasted 5 minutes each. Participants met with the instructor on November 17th and had time to review the report prior. Participants were given their rubric score during the mini-conference. Participants were able to ask questions and clarify any confusion. Participants using the Mursion platform were able to review their videos released by the instructor prior to

meeting with the instructor. The video group already had access to their recordings due to the nature of self-recording.

Module/Week 5 & 6

During Weeks 5-6, participants will then revise the lesson based on feedback and reflection and then re-teach the lesson in the simulated or video-recorded learning environment (i.e., Mursion), identical to before. The Mursion group was to sign up for times on November 28th, 29th, or 30th to sign on to Zoom and teach through the Mursion platform. During these Mursion group sessions, the lessons were recorded. The video group was expected to submit their video recorded lesson by December 4th, the end of the week.

After completion of the second taught lesson in their designated learning environment, participants were then to individually prepare a written reflection of their thoughts and experiences related to the experience. Reflections were submitted through the Canvas LMS platform.

Module/Week 7

During Week 7, participants were given final scores and details in comparison to previous lessons taught. Reports and rubrics were shared, and participants individually completed the optional TSES a second time.

Data Analysis

Data analysis methods for this study are focused on the participants in the study and how they construct experiences and meanings in relation to the area of inquiry (Charmaz, 2014; Tie et al., 2019).

Quantitative Analysis

For quantitative analysis, researchers used the most up to date version of SPSS to compare pre- and post- assessment results from the TSES and RESET rubric to compare initial responses or performance to final responses or performance. Data was exported from GoReact and Canvas to be input into SPSS (See Appendix E). The researcher conducted a mixed model ANOVA to examine the two groups. A separate mixed-model ANOVA was conducted for each quantitative research question. This analysis was chosen to have a better understanding of the relationship between the two groups and their experience completing the required assignments. Mean within descriptive statistics were analyzed, along with the significance level between the test groups. A mixed-model ANOVA is used when trying to better understand factors between subjects and within subjects (Murrar & Brauer, 2018).

A priori power analysis was conducted using G*Power 3.1.9 to determine the minimum sample size required to find statistical significance using a 2 (group) x 2 (time) repeated measures analysis of variance (i.e., a mixed-model ANOVA). With a desired level of power set at .80, an alpha (α) level at .05, and a moderate effect size of .25 (*f*), it was determined that a minimum of 34 total participants would be required to ensure adequate power (Cohen, 1988).

Qualitative Analysis

For qualitative analysis, participants' experience with their simulated or video-recorded learning environment were assessed through grounded theory with a thematic analysis component, through their self-reflections. All data was cross-referenced by a word frequency analysis in QSR International NVIVO Qualitative Analysis Program (NVIVO).

Validity Measures

Social validity measures were taken through the self-reflection data collected from participants throughout the research study. Tschannen-Moran and Woolfolk-Hoy (2001) confirmed reliability and validity of the TSES survey. Moylan et al. (2017) confirmed reliability and validity of the RESET rubric and the validity of this rubric was also maintained through analysis of the agreement between another trained rater and the researcher. Inter-observer ratings agreed over 80% for 20% of the videos collected throughout the study. Validity of the hand-coded qualitative data analysis was cross referenced through the qualitative analysis word frequency setting on NVIVO and provides reliability.

CHAPTER IV

RESULTS

Overview of the Results

The purpose of this study was to better understand the impact of a learning environment for pre-service educator self-efficacy and their implementation of explicit instruction. This study specifically focused on the use of the Mursion mixed-reality simulation as an alternative learning environment to a basic video-recorded lesson. The goal of the research analysis was to better understand how the learning environment impacted participant self-efficacy and their ability to instruct explicitly. The use of self-reflection was to better understand the general opinion and feelings surrounding the Mursion technology.

Two groups were randomly assigned and compared throughout the quantitative data analysis portion. The Mursion group (n = 12) and the Video group (n = 11) were expected to complete the same assignments, but with a differing learning environment. In a traditional online teaching course, virtual lesson assignments were commonly assigned as video recordings without students present. The intervention assessed through this research project was the implementation of the Mursion mixed-reality system as an alternative option for an online course. Both groups were asked to complete a pre- and post-TSES survey through Canvas LMS. All participants were asked to teach a 10-minute lesson twice and cover middle school science vocabulary. Each participant was graded by the RESET rubric after the first and second lesson demonstration. The mini conference was in-between the two demonstrations to clarify any misconceptions or confusion regarding the reports or results. Self-reflections were submitted by the participants after each teaching demonstration to reflect over their experience. Only the qualitative

self-reflections from the Mursion group were analyzed for this research study because the research question was specifically aimed at understanding participants' perspective of Mursion.

Qualitative and quantitative data was collected simultaneously with the intention to better understand the impact of the Mursion mixed-reality learning environment and its impact on pre-service educator self-efficacy and explicit instruction. This chapter details a mixed-methods approach across the three research questions outlining the results of the Mursion mixed-reality platform in an experimental comparison to the video-recorded lesson environment.

Research Question 1

The first research question was to better understand how the learning environment, Mursion mixed reality platform versus video-recorded, impacted pre-service educator self-efficacy. All participants ($N = 23$) data was organized and input into IBM Statistical Package for Social Sciences 28 (SPSS). Scores could total up to 216 indicating a very high level of self-efficacy and the minimum score could be 0 indicating a very low level of self-efficacy. Scores between 108 and 216 were *somewhat influenced* and *influenced a great deal*. Scores between 0 and 108 yield scores between *not influenced* and *somewhat influenced.* Scores in the Table 9 show totaled scores for each participant in the Mursion group where each individual rating on all 24 questions were added together.

Table 9

Mursion Group Pre- and Post-TSES Scores

Participant	Pre-TSES	Post-TSES
MG1	158	163
MG2	143	199
MG3	176	196
MG4	87	117
MG5	164	165
MG6	132	215
MG7	168	166
MG8	163	192
MG9	175	190
MG10	205	197
MG11	149	183
MG12	167	187

Of the 12 Mursion Group participants 10 of the participants' self-efficacy ratings improved. Both participants, MG7 and MG10, whose rating did not improve, decreased by less than 10 points on a 216 point scale. Eleven out of 12 participants of the Mursion group began the assignment between *somewhat influenced* and *influenced a great deal* and all participants in the Mursion group ended the assignment between *somewhat influenced* and *influenced a great deal*. Scores in Table 10 show totaled scores for each participant in the video group where each individual rating on all 24 questions were added together.

Table 10

Video Group Pre-and Post-TSES Scores

Participant	Pre-TSES	Post-TSES
VG1	169	183
VG2	172	199
VG3	172	205
VG4	194	189
VG5	186	189
VG6	173	185
VG7	168	183
VG8	175	190

Table 10 Continued

Video Group Pre-and Post-TSES Scores

Participant	Pre-TSES	Post-TSES
VG9	167	186
VG10	185	201
VG11	169	185

Of the Video Group participants (n = 11), 10 of the participants' self-efficacy ratings improved. Participant VG4, who's rating did not improve, decreased by 5 points on a 216 point scale. All of the video group (n = 11) began the assignment between *somewhat influenced* and *influenced a great deal* on the self-efficacy scale and all participants in the video group ended the assignment between *somewhat influenced* and *influenced a great deal.*

Three data collection variables were assessed: group, pre-test scores, and post-test scores. Pre- and post- test scores were analyzed between both groups (Mursion group, n = 12; Video group, n = 11). The researcher conducted a mixed model ANOVA to examine the two groups. Mean within descriptive statistics was analyzed, along with the significance level between the test groups. Tables 11-13 provide the analysis of the mixed model ANOVA examining self-efficacy scores.

Table 11

SPSS Analysis for TSES: Between Subject Factors

	Value Label	*N*
InstructionGroup	MursionGroup	12
	VideoGroup	11

Table 12

SPSS Analysis for TSES: Descriptive Statistics

	Instruction Group	*M*	*SD*	*N*
SelfEffPre	Mursion Group	157.2500	28.73112	12
	Video Group	175.4545	8.86976	11
	Total	165.9565	23.12904	23
SelfEffPost	Mursion Group	180.8333	25.41236	12
	Video Group	190.4545	7.68588	11
	Total	185.4348	19.33632	23

Table 13

SPSS Analysis for TSES: Test Between Subjects

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Intercept	1422171.826	1	1422171.826	2235.799	<.001
InstructionGroup	2221.826	1	2221.826	3.493	.076
Error	13357.913	21	636.091		

A 2 x 2 mixed ANOVA revealed an insignificant group x self-efficacy survey interaction, $F(1, 21) = 3.493$, $p = .076$. Participants who were in the Mursion group did not have significantly different improvements in self-efficacy. Both groups made progress pre versus post self-efficacy survey. The Mursion group (Pre$M$ = 157.25, PreSD = 28.73 vs. Post$M$ = 180.83, PostSD = 25.41, respectively) saw improvement in their pre to post mean by 23.58. The Video group (Pre$M$ = 175.45, PreSD = 8.869 vs. Post$M$ = 190.45, PostSD = 7.69, respectively) saw improvement in their pre to post mean by 15.00. Both groups combined (Pre$M$ = 165.96, PreSD = 23.13 vs. Post$M$ = 185.43, PostSD = 19.34, respectively) saw improvement in their pre to post mean by 19.47. The Mursion group did have a larger improvement score (Mursion Group Difference in M = 23.58, Video Group Difference in M = 15.00), but statistics were not significant.

Research Question 2

The second research question was to better understand how the learning environment, Mursion mixed reality platform versus video-recorded, impacted pre-service educator's ability to explicitly instruct a lesson. All participant (N = 23) data was organized and input into IBM SPSS.

Scores were out of 10, one point for each skill on the rubric. Table 14 outlines the Mursion Group's RESET rubric scores.

Table 14

Mursion Group RESET Rubric Scores

Participant	Lesson 1	Lesson 2
MG1	5	8
MG2	7	10
MG3	10	10
MG4	6	8
MG5	9	9
MG6	8	7
MG7	8	7
MG8	8	10
MG9	8	10
MG10	10	10
MG11	8	10
MG12	10	10

Of the Mursion Group participants (n = 12), 10 of the participants' RESET rubric scores improved. Both participants, MG6 and MG7, whose score did not improve, decreased by 1 point. At the end of the second lesson, seven of the 12 participants in the Mursion group were able to hit every skill, scoring a 10 on the RESET rubric. All participants scored over 70%. Table 15 outlines the Video Group's RESET rubric scores.

Table 15

Video Group RESET Rubric Scores

Participant	Lesson 1	Lesson 2
VG1	6	10
VG2	10	10
VG3	8	10
VG4	7	10
VG5	7	9
VG6	8	10
VG7	8	9
VG8	10	7
VG9	6	7

Table 15

Video Group RESET Rubric Scores

Participant	Lesson 1	Lesson 2
VG10	8	10
VG11	8	10

Of the 11 Video Group participants, 10 of the participants' RESET rubric scores improved. Participant VG8, whose score did not improve, decreased by 3 points. Seven of the 11 participants in the Video group were able to hit every skill, scoring a 10 on the RESET rubric, at the end of the second lesson. All participants scored over 70%. Tables 16-18 provide the analysis of the mixed model ANOVA examining self-efficacy scores.

Table 16

SPSS Analysis for RESET: Between Subject Factors

	Value Label	*N*
InstructionGroup	MursionGroup	12
	VideoGroup	11

Table 17

SPSS Analysis for RESET: Descriptive Statistics

	Instruction Group	*M*	*SD*	*N*
RESETLessonOne	Mursion Group	8.0833	1.56428	12
	Video Group	7.8182	1.32802	11
	Total	7.9565	1.42950	23
RESETLessonTwo	Mursion Group	9.0833	1.24011	12
	Video Group	9.2727	1.19087	11
	Total	9.1739	1.19286	23

Table 18

SPSS Analysis for RESET: Test Between Subjects

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Intercept	3367.669	1	3367.669	1495.543	<.001
InstructionGroup	.016	1	.016	.007	.933
Error	47.288	21	2.252		

A 2 x 2 mixed ANOVA revealed an insignificant group x explicit instruction rubric score interaction, $F(1, 21) = 0.007$, $p = .993$. Participants who were in the Mursion group did not have significantly different improvements in explicit instruction rubric scores after the first and second lesson. Both groups made progress from their first to second lesson. The Mursion group (L1M = 8.08, L1SD = 1.56 vs. L2M = 9.08, L2SD = 1.24, respectively) saw improvement in their first to second lesson mean by 1.00. The Video group (L1M = 7.82, L1SD = 1.33 vs. L2M = 9.23, L2SD = 1.19, respectively) saw improvement in their first to second lesson mean by 1.41. Both groups combined (L1M = 7.96, L1SD = 1.43 vs. L2M = 9.17, L2SD = 1.19, respectively) saw improvement in their first to second lesson mean by 1.21. The Video group did have a larger improvement score, but statistics were not significant.

Research Question 3

The third research question required a qualitative analysis of self-reflections to better understand how participants experienced the mixed-reality platform, Mursion. Reflections were submitted by the participants after the first and second lesson. Table 3, previously mentioned, outlines reflection questions. Reflections from the Mursion group (n = 12) were the only reflections analyzed for qualitative data analysis. The following questions were analyzed:

Reflection Question A: “What went well during your lesson?”

Reflection Question B: “What would you like to change for any future lessons?”

Reflection Question C: “How did you feel about the experience?”

Reflection Question D: “Anything else you would like to share?”

Reflection Questions A and B were pulled from the first and second reflection, while Reflection Questions C and D were only pulled from the second reflection. Self-reflection narrative to the

questions in the assignment were both hand-coded and analyzed by the NVIVO program to execute a thematic analysis defined by grounded theory.

Grounded theory is defined by Strauss and Corbin (1990) as a theory that develops a phenomenon and that phenomenon is discovered, developed, and varied through systematic data collection. A thematic analysis is a systematic method for better understanding qualitative data by searching across data sets for repeated patterns to analyze themes among the qualitative data (Kiger & Varpio, 2020). Kiger and Varpio (2020) mention that a thematic analysis is a powerful, but flexible, way to analyze qualitative data.

In working through coding defined by grounded theory (Strauss & Corbin, 1990), data collection was split but by four chosen reflection questions. The data collection was organized to better understand how they felt, what they wanted to change, what they felt went well, and if they had anything else to share. These questions were chosen as answers to the third research question. After collecting the data, then developing concepts through analyzing the data began. During this time, the instructor read the answers and started to better understand phenomena defined by a grounded theory analysis. The frequency of which students share certain feelings and experiences helped guide the basis for open coding. Initial coding was completed through dividing words that naturally stemmed from positive and negative affect. Through continued organization of statements from the participants, patterns were followed to create categories/axial codes within the open codes. This axial themes were derived by frequency of participants' statements. Through these categories, themes arose and were analyzed by question (Kiger & Varpio 2020; Strauss & Corbin, 1990).

Reflection Question A

The first reflection question analyzed was Reflection Question A, asking the participants what they felt went well during their experience teaching a lesson on the Mursion mixed reality simulation platform. Through hand-coding by the researcher, general themes arose among the participants' responses. First, the participants found that their lessons went well overall. The participants were recalling that their timing during the lessons, their ability to answer questions from the avatars, and their general engagement with the avatars went well. Participants also stated their overall interactions with students were positive.

Reflection responses for Reflection Question A were input by PDF file to NVIVO and a word frequency analysis was exported (See Appendix F). The word frequency was analyzed to derive themes to support what went well from the participants perspective. Words, and their corresponding stemmed words, that stood out in the word frequency analysis for Response Question A were: *student, lesson, question, answer, time,* and *engage*. The NVIVO word frequency output was generally aligned with the hand-coding completed by the researcher.

Reflection Question B

The second reflection question analyzed was Reflection Question B, asking the participants what they would like to change about future lessons taught through the Mursion mixed reality platform. Through hand-coding by the researcher and the NVIVO analysis, general themes arose among the participants' responses. The participants exclaimed a consistent message that they wished they would have had more time with the Mursion technology. Participants wanted more time to engage with the students. They also wanted to change how they interacted with the student's behavior.

Reflection responses for Reflection Question B were input by PDF file to NVIVO and a word frequency analysis was exported (See Appendix G). The word frequency was analyzed to derive themes to support what participants wanted to change about their lesson taught through the Mursion mixed reality platform. Words, and their corresponding stemmed words, that stood out in the word frequency analysis for Response Question B were: *lesson, student, time, behavior,* and *better.* The NVIVO word frequency output was generally aligned with the hand-coding completed by the researcher.

Reflection Question C

The third reflection question analyzed was Reflection Question C, asking the participants what they feel about the experience of teaching a lesson through the Mursion mixed reality platform. Through hand-coding by the researcher, general themes arose among the participants' responses. Overall, participants liked the Mursion platform and they found it fun and beneficial for their future. Many participants found themselves nervous prior to the experience, but ended their lessons proud.

Reflection responses for Reflection Question C were input by PDF file to NVIVO and a word frequency analysis was exported (See Appendix H). The word frequency was analyzed to derive themes to support how participants feel about their experience teaching a lesson through the Mursion mixed reality platform. Words, and their corresponding stemmed words, that stood out in the word frequency analysis for Response Question C were: *lesson, student, fun, nervous, like, beneficial,* and *future.* The NVIVO word frequency output was generally aligned with the hand-coding completed by the researcher.

Reflection Question D

The last reflection question analyzed was Reflection Question D, asking the participants if they wanted to share anything else about the experience of teaching a lesson through the Mursion mixed-reality platform. Through hand-coding by the researcher, general themes arose among the participants' responses. Participants stated that their general experience was enjoyable and helpful. They stated that they were thankful for the opportunity and that it will benefit them in the future. Many participants stated that this was the first time they had done anything like this.

Reflection responses for Reflection Question D were input by PDF file to NVIVO and a word frequency analysis was exported (See Appendix I). The word frequency was analyzed to derive themes to see if participants had anything else to share about teaching a lesson through the Mursion mixed-reality platform. Words, and their corresponding stemmed words, that stood out in the word frequency analysis for Response Question D were: *students, teaching, lesson, first, help, enjoy, achieve, thank,* and *future.* The NVIVO word frequency output was generally aligned with the hand-coding completed by the researcher.

CHAPTER V

DISCUSSION

Overview of Study

A mixed-methods research study was conducted to answer three research questions:

RQ1. How does the use of a learning environment (simulated versus video-recorded) impact self-efficacy among pre-service educators?

RQ2. How does the use of a learning environment (simulated versus video-recorded) impact explicit instructional practice among pre-service educators?

RQ3. How do pre-service educators experience the use of a simulated learning environment (i.e., Mursion, a mixed-reality simulated learning platform)?

It was hypothesized that a simulated learning experience would positively impact pre-service educators' self-efficacy ratings and understanding and application of explicit instruction over a video-recorded learning experience. Through quantitative and qualitative analysis, learning environments were researched by analyzing pre-service educator self-efficacy, explicit instruction, and personal reflections of their experiences. Data was collected from 23 participants, split into two separate groups differing by learning environment (Mursion group, $n = 12$; Video group, $n = 11$).

Quantitative Analysis

The overall objective of the quantitative analysis was to answer two quantitative research questions. The statistical analysis completed for the quantitative questions was to better understand how the data compared between the two varied learning environments.

Self-Efficacy

The goal of the first research question was to better understand how pre-service educator self-efficacy improved between both lesson groups. When comparing the total scores at the end of the research study, 100% of the participants ended the assignment believing they were "somewhat influential" in regard to their self-efficacy in the classroom. Self-efficacy ratings indicated that the Video group had higher levels of self-efficacy in comparison to the Mursion group. However, the Mursion group made more progress from pre-test to post-test. The difference between the learning environment was not statistically significant according to results exported from SPSS. This data shows that both video recording and Mursion were effective learning environments for improving their self-efficacy; however, the differences between the groups were not significant.

An inspection of the participants individually shows that 91% of the participants in the Video group (i.e., 10 out of 11 participants) had improved self-efficacy. Eighty-three precent of the participants in the Mursion group (i.e., 10 out of 12 participants) had improved self-efficacy. Finally, among those participants that had a decrease in self-efficacy, their scores reduced by less than 10 points. Participants MG7, MG10, and VG4 were the three who decreased in self-efficacy scores.

Overall, most participants did improve from pre- to post-test. Most participants were able to improve their scores throughout the course, in both learning environments. This shows that self-efficacy improved among pre-service educators while using the Mursion technology or general video recording techniques. There was not a statistically significant difference between each group. A larger participant pool could lead to a better understanding of which learning environment is statistically significant over the other.

Explicit Instruction

The goal of the second research question was to better understand how the participants' ability to explicitly instruct and how their lessons were impacted by their experiences with the varied learning environments. When comparing the total scores at the end of the research study: 100%, 24 out of 24, of the participants ended the assignment with a score above 70%; 71%, 17 out of 24, of the participants ended the assignment with a score above 90%; and 58%, 14 out of 24, of the participants ended the assignment with a score of 100%. Reading both sets of scores, the Mursion and Video group improved from the first to the second lesson. In the first lesson, the Mursion group scored higher. In the second lesson, the Video group scored higher. The Video group made more progress from first to second lesson. The difference between the learning environment was not significant. Understanding that the difference between the two groups was not significant, this data shows that both were effective learning environments for improving their explicit instruction based on mean, however the difference between the groups was not significant.

When looking at the participants individually, 91% of the participants, 10 out of 11 participants, in the Video group's explicit instruction improved from first to second lesson. 83% of the participants, 10 out of 12 participants, in the Mursion group's explicit instruction improved from first to second lesson. Participants MG6, MG7, and VG8 were the three who decreased RESET rubric scores. Participant MG7 decreased in both self-efficacy and explicit instruction scores.

Overall, participants did well in regard to the explicit instruction rubric. Most participants were able to improve their scores from one lesson to the next, in both learning environments. There was not a statistically significant difference between each group. A larger participant pool

could lead to a better understanding of which learning environment is statistically significant over the other.

Quantitative Analysis Conclusion

Quantitative data sets used for analysis in this study included self-efficacy ratings and observation rubric scores. The purpose of the data was to identify any changes in participants' overall self-efficacy and performance ratings using a pre- to post-test format. The results of the self-efficacy ratings in this study were that there was not a statistically significant difference between the lesson groups, however most participants improved their self-efficacy throughout this study. The results of the observation rubric scores in this study were that most students improved their ability to explicitly instruct; however, there was not a statistically significant difference between groups. The research findings for this research study found that there was no statistical significance between both groups; however, there was overall improvement across both groups. The mean scores of each group, and the total mean scores improved for both self-efficacy and explicit instruction implementation. While one learning environment was not statistically significant over the other, both Mursion and the video-recorded learning environments provided an evidence-based positive outcome.

Qualitative Analysis

Using grounded theory with a thematic analysis approach, the third research question, a qualitative analysis to better understand how the pre-service educators experienced the Mursion technology, was hand-coded by the researcher and put through a NVIVO. Both sets of data yielded general themes among the participants that were in the Mursion group based on their self-reflections and recollection of experience. The themes identified included: the feeling of enjoyment, the feeling of nervousness, and the experience of lack of time.

Enjoyment

In summary of the self-reflections, participants stated that they enjoyed, had fun, or liked their experience with the Mursion mixed reality platform. Participants mentioned,

> "Overall it was enjoyable and the course as a whole was helpful in showing how to actually apply the things that we read about."
>
> "I really enjoyed this experience! It was a lot of fun and something that I will always remember."
>
> "I enjoyed this experience, because it allows me to know what to look out for in the future as an educator."
>
> "It was a fun but nerve-racking assignment, but at the end of the day, it really taught me how it is going to be in the real world."
>
> "I was surprised at how receptive the kids were. It was fun interacting with them on a personal level."

Most statements about the Mursion mixed reality platform were positive in that the participants found the program to be fun and enjoyable. They liked getting to see what it was like to interact with avatars, provide feedback to the avatars, and teach a classroom of their own with the mixed reality interactions. When cross-referencing the data to the NVIVO word frequency analysis, fun and enjoy were both common words used in the reflection questions.

This is beneficial to educator education because if the activities that are required for their courses are fun, then educators are more likely to buy into the learning experiences. When enjoying the activities that are required for education classes, they might feel more inclined to commit to education, due to enjoying what they are learning.

Nervousness

Similarly to enjoyment, participants frequently stated they were nervous or initially nervous before or while they were engaging with the Mursion mixed reality platform. Participants stated,

> "I was very nervous going into the teaching session, but now that I know what it is like, I have more confidence going into the next session.".
>
> "I was really nervous at first but it ended up being pretty fun."
>
> "I was nervous and felt like I lost my place a few times"
>
> "Even though I was nervous and awkward, it was nice doing this."
>
> "Hearing about how we were going to be giving these lessons at the beginning of the class made me nervous. Then, meeting the students was interesting. Going into the lessons I was still nervous because anything could happen with it."

Many of the statements about being nervous were followed with positive statements about how their perspectives had changed. The nervousness the students felt was supported by explanations that this program was new or unlike things they had encountered before. When cross-referencing the hand-coded data with the word frequency output from the NVIVO data analysis, nervous, or stemmed words from nervous, was used frequently among the self-reflections.

This is beneficial to understand for educator education because understanding that pre-service educators might feel initially nervous using new technology platforms, instructors must take responsibility in helping the pre-service educators feel comfortable using a variety of technology due to the progressive nature of technology in education. It is important that as an

instructor in educator education, EPPs are exposing pre-service educators to many different ways to teach, practice, and interact with students.

Time

In understanding that the participants enjoyed the platform and initially felt nervous when using the technology, participants also mentioned throughout the self-reflections that they wish they had more time with the Mursion mixed reality platform. Participants exclaimed,

> "I wish this class were a little longer and we would have more time with the students or even another lesson."
>
> "I just wish I had more time! It's funny that all through college we make these elaborate lesson plans that are supposed to be completed in one class period, when really the discussion takes up so much time! Discussion is important, so I think giving myself more time in the future would help students understand the concepts more"
>
> "The time limit of the lesson got to me during this execution because I was trying to fit in all the components"
>
> "I would like to change the amount of time I have. I understand that I do not have all the time in the world when I get into my classroom. The gift of time with learning is a unicorn."

In understanding that the students wanted and needed more time, due to their responses in the self-reflections, EPPs can better prepare our pre-service educators to be better prepared for the classroom. Understanding the amount of time an educator in the classroom must actually teach a small group of students will help justify the length of time we are allowing the pre-service educator to teach a lesson in a controlled setting. This creates opportunities for EPPs to provide meaningful experiences for the pre-service educators, whether that be allowing more

time to teach, or consistently expecting pre-service educators across the board to teach in a shorter time frame. When looking at the concern of not having enough time to teach or just wanting more time with the mixed reality platform. The participants consistently showed a desire for more time to execute their lessons within the experience. When cross-referencing the hand-coding with the NVIVO analysis, time was a frequent word across all self-reflection questions.

Qualitative Analysis Conclusion

Through qualitative analysis, this research study wanted to better understand how the participants in the Mursion group experienced the mixed reality experience. When looking at the emerging themes, participants found their experience with the Mursion mixed reality platform to be fun and exciting. They found themselves nervous, but most statements of nervousness were resolved with continued experience with the program. Participants also wished they had more time with the mixed reality platform, whether that be to complete their full lesson teaching cycle, or to have more experience. Overall, the participants liked the Mursion platform, and through self-reflection, researchers were able to confirm that Mursion was a positive experience for the pre-service educators who experienced it.

Limitations

Limitations found in this research study potentially could have created a barrier when collecting or analyzing the data. The first limitation was the number of participants in the study. The power analysis stated that the ideal number of participants was 34; however, the classroom enrollment was 27, and the participants who consented and met the eligibility criteria totaled 23. This limitation impacted the amount of data collected and the potential generalizability of the data.

Another limitation was the duration of the study. The course in which the research study occurred was a 7-week course, creating a tight schedule to complete all Mursion and video teaching demonstrations. The research study could have provided opportunities with more teaching sessions in the Mursion platform, or longer Mursion sessions per participant. Dieker et al. (2014) states that four 10-minute sessions with a mixed reality platform on one teaching technique can change at least one teaching behavior. This limitation also impacted the amount of data collected and potentially the significance of the data.

A limitation of this study was that this course was a requirement for the participants degree and that they may have felt required to consent. The recruitment script was approved by the IRB in intention to remove coercion statements. Although all precautions were taken, it may have created natural inclination to consent.

The last limitation of the study was the exclusive use of a virtual platform and reliance on technology. All of this course was held and research was collected remotely, and not in person. Relying on technology exclusively comes with its limitations. One participant in the Mursion group had difficulty with wireless connectivity, and some Mursion group participants had issues with the avatars echoing through their computer speakers. This limitation impacted the ease of the study and could have created emotional stress for the participants in the Mursion group.

Implications for Future Research

More research is needed in special educator preparation to help provide successful strategies to support effective teaching and student learning (Brownell et al., 2019). This study proved that both video-recording and Mursion technology improved self-efficacy and explicit instruction technique. Future research for consideration based on this specific study would be a replicated study with a larger participant group, and longer time frame. With a larger participant

pool, and a longer timeline for the study, more data could be collected in hope to reach more power in the research results providing clear distinction in benefit based on the learning environment. This would impact educator preparation by allowing EPPs to understand how mixed reality platforms impact certain aspects of HLP mastery.

The emergence of mixed reality platforms in EPPs could continue to be studied to better understand their impact on HLP. The Mursion mixed reality platform could be researched to better evaluate effectiveness in supporting other methods of instruction defined by HLPs. The practices can include, but are not limited to, adaptation of activities, cognitive and meta-cognitive strategies to support independence, or strategies to support student engagement (CEC, 2023b). The Mursion platform was able to support pre-service educator candidates in allowing them to practice strategies supporting pedagogical skills (Landon-Hays et al., 2020). Understanding that Mursion has the potential to support a wide variety of educator skills, creates much opportunity for future research for impact on educator preparation.

Conclusion

Through qualitative and quantitative research, innovative learning environments for pre-service educators were assessed to better understand university instruction of future educators. This dissertation study set an opportunity to collect information on the impact of higher education instruction methods in teaching pre-service educators in EPPs. This research study was able to find that when comparing a traditional video recorded lesson and a mixed reality teaching demonstration experience, both strategies were proven effective in improving quality explicit instruction and educator self-efficacy. Students enjoyed the mixed reality platform and found it to be an experience like no other. They wished they had more time with the Mursion technology and found the experience to be fun, even nerve-wracking at times. While

there was no statistical significance between the learning environments, Mursion and video-recorded, both learning environments provided a positive evidence-based platform for improving pre-service educator self-efficacy and explicit instruction practice.

The overall impact of this study was positive for the future instruction of pre-service teachers. In understanding the benefits of both Mursion and video-recorded platforms for teaching demonstrations, EPPs can effectively teach pre-service educators to meet the demands of the classroom.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER

Texas Woman's University
Institutional Review Board (IRB)
irb@twu.edu
https://www.twu.edu/institutional-review-board-irb/

July 11, 2022

Schuyler Beecher
Teacher Education

Re: Exempt - IRB-FY2022-376 Measuring Teacher Candidate Self-Efficacy Using Varied Learning Environments to Implement Explicit Instruction

Dear Schuyler Beecher,

The above referenced study has been reviewed by the TWU IRB - Denton operating under FWA00000178 and was determined to be exempt on July 6, 2022.

Note that any modifications to this study must be submitted for IRB review prior to their implementation, including the submission of any agency approval letters, changes in research personnel, and any changes in study procedures or instruments. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All modification requests, incident reports, and requests to close the file must be submitted through Cayuse.

On July 5, 2023, this approval will expire and the study must be renewed or closed. A reminder will be sent 45 days prior to this date.

If you have any questions or need additional information, please email your IRB analyst at irb@twu.edu or refer to the IRB website.

Sincerely,

TWU IRB - Denton

APPENDIX B

RECRUITMENT SCRIPT

Students,

During this course I would like to invite you to be a part of a dissertation research project. The project is designed to determine the impact of a learning environment on your ability to use Explicit Instruction and your overall self-efficacy. If you agree to participate in this research then I will be able to use the work that you have completed for this class in data analysis, research presentations, and publications. I will not include your name or any other identifying information in these presentations.

You can choose to not participate in the research project; however, this does not excuse you from doing the class assignments associated with the project. I hope that you will join me in trying to determine if this teaching method is effective for pre-service teachers.

Please click on this link to a Google Form to indicate your willingness to participate. Please note that participation is voluntary and there is always a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions. Within the Google Form you will find additional information about the project as well as potential risks and benefits.

An email will be sent to all students as a reminder to complete the Google From at a later date.

Sincerely,
Schuyler Beecher, M.Ed

APPENDIX C

TEACHERS' SENSE OF EFFICACY SCALE

Teachers' Sense of Efficacy Scale[1] (long form)

Teacher Beliefs Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.	How much can you do? Nothing		Very Little		Some Influence		Quite A Bit		A Great Deal
1. How much can you do to get through to the most difficult students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2. How much can you do to help your students think critically?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3. How much can you do to control disruptive behavior in the classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4. How much can you do to motivate students who show low interest in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5. To what extent can you make your expectations clear about student behavior?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6. How much can you do to get students to believe they can do well in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7. How well can you respond to difficult questions from your students ?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
8. How well can you establish routines to keep activities running smoothly?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
9. How much can you do to help your students value learning?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10. How much can you gauge student comprehension of what you have taught?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11. To what extent can you craft good questions for your students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12. How much can you do to foster student creativity?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13. How much can you do to get children to follow classroom rules?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
14. How much can you do to improve the understanding of a student who is failing?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
15. How much can you do to calm a student who is disruptive or noisy?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
16. How well can you establish a classroom management system with each group of students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
17. How much can you do to adjust your lessons to the proper level for individual students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
18. How much can you use a variety of assessment strategies?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
19. How well can you keep a few problem students form ruining an entire lesson?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
20. To what extent can you provide an alternative explanation or example when students are confused?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
21. How well can you respond to defiant students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
22. How much can you assist families in helping their children do well in school?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
23. How well can you implement alternative strategies in your classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
24. How well can you provide appropriate challenges for very capable students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Teachers' Sense of Efficacy Scale[1] (short form)

Teacher Beliefs Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.		How much can you do?								
		Nothing		Very Little		Some Influence		Quite A Bit		A Great Deal
1.	How much can you do to control disruptive behavior in the classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.	How much can you do to motivate students who show low interest in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.	How much can you do to get students to believe they can do well in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4.	How much can you do to help your students value learning?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5.	To what extent can you craft good questions for your students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6.	How much can you do to get children to follow classroom rules?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7.	How much can you do to calm a student who is disruptive or noisy?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
8.	How well can you establish a classroom management system with each group of students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
9.	How much can you use a variety of assessment strategies?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10.	To what extent can you provide an alternative explanation or example when students are confused?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11.	How much can you assist families in helping their children do well in school?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12.	How well can you implement alternative strategies in your classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Directions for Scoring the Teachers' Sense of Efficacy Scale[1]

Developers: Megan Tschannen-Moran, College of William and Mary
[redacted]nita Woolfolk Hoy, the Ohio State University.

Construct Validity

For information the construct validity of the Teachers' Sense of Teacher efficacy Scale, see:

> Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing and elusive construct. *Teaching and Teacher Education, 17,* 783-805.

Factor Analysis

It is important to conduct a factor analysis to determine how your participants respond to the questions. We have consistently found three moderately correlated factors: *Efficacy in Student Engagement, Efficacy in Instructional Practices*, and *Efficacy in Classroom Management*, but at times the make up of the scales varies slightly. With preservice teachers we recommend that the full 24-item scale (or 12-item short form) be used, because the factor structure often is less distinct for these respondents.

Subscale Scores

To determine the *Efficacy in Student Engagement, Efficacy in Instructional Practices*, and *Efficacy in Classroom Management* subscale scores, we compute unweighted means of the items that load on each factor. Generally these groupings are:

Long Form

Efficacy in Student Engagement:	Items 1, 2, 4, 6, 9, 12, 14, 22
Efficacy in Instructional Strategies:	Items 7, 10, 11, 17, 18, 20, 23, 24
Efficacy in Classroom Management:	Items 3, 5, 8, 13, 15, 16, 19, 21

Short Form

Efficacy in Student Engagement:	Items 2, 3, 4, 11
Efficacy in Instructional Strategies:	Items 5, 9, 10, 12
Efficacy in Classroom Management:	Items 1, 6, 7, 8

Reliabilities

In Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing and elusive construct. *Teaching and Teacher Education, 17,* 783-805, the following were found:

	Long Form			Short Form		
	Mean	SD	alpha	Mean	SD	alpha
OSTES	7.1	.94	.94	7.1	.98	.90
Engagement	7.3	1.1	.87	7.2	1.2	.81
Instruction	7.3	1.1	.91	7.3	1.2	.86
Management	6.7	1.1	.90	6.7	1.2	.86

[1] Because this instrument was developed at the Ohio State University, it is sometimes referred to as the *Ohio State Teacher Efficacy Scale*. We prefer the name, *Teachers' Sense of Efficacy Scale*.

APPENDIX D

RESET EXPLICIT INSTRUCTION RUBRIC

RESET Explicit Instruction Rubric 2017-18 Video Code: _____
SCORING
3 Implemented
2 +
2 Partially Implemented 2 -
1 Not Implemented NA Not Applicable

Components	met	3 Implemented	2+	2 Partially Implemented	2-	1 Not Implemented	Score	Explanation
Identifying and Communicating Goals	1	The goals of the lesson **are clearly** communicated to the students.		The goals of the lesson are **not clearly** communicated to the students.		The goals of the lesson are **not** communicated to the students.		
	2	The stated goal(s) is/are **specific.**		The stated goal(s) is/are **broad or vague.**		There is **no stated goal**.		

	3	The teacher **clearly** explains the relevance of the stated goal to the students.		The teacher **tries to explain** the relevance of the stated goal to the students, but the **explanation is unclear or lacks detail.**		The teacher **does not explain** the relevance of the stated goal to the students.		
Alignment	4	Instruction is **completely aligned** to the stated or implied goal.		Instruction is **partially or loosely aligned** to the stated or implied goal.		Instruction is **not aligned** to the stated or implied goal.		
	5	**All** of the examples or materials selected **are aligned** to the stated or implied goal.		**Some** of the examples or materials **are aligned** to the stated or implied goal; **OR** examples and materials are **somewhat aligned** to the stated or implied goal.		Examples or materials selected **are not aligned** to the stated or implied goal.		

Components	**m e t l**	**3 Implemented**	**2 +**	**2 Partially Implemented**	**2 -**	**1 Not Implemented**	**Score**	**Explanation**

	6	Examples or materials selected **are aligned** to the instructional level of **most or all** of the students.		Examples or materials selected **are aligned** to the instructional level of **some** of the students.		Examples or materials selected **are not aligned** to the instructional level of **most students**.		
Teaching Procedures	7	The teacher **effectively** reviews prior skills and/or engages background knowledge **before beginning** instruction.		The teacher reviews prior skills and/or engages background knowledge **before beginning** instruction, **but not effectively.**		The teacher **does not** review prior skills and/or engage background knowledge **before beginning** instruction.		
	8	The teacher **provides clear** demonstrations of proficient performance.		The teacher **does not provide clear** demonstrations of proficient performance.		The teacher **does not provide any** demonstrations of proficient performance.		
	9	The teacher **provides an adequate number** of demonstrations given the nature and complexity of the skill or task.		The teacher **does not provide an adequate number** of demonstrations given the nature and complexity of the skill or task.		The teacher **does not provide** demonstrations.		

	10	The teacher uses language that is **clear, precise, and accurate** throughout the lesson.		The teacher uses language that is **not always clear, precise, and accurate**.		The teacher uses language that is **confusing, unclear, imprecise, or inaccurate** throughout the lesson.		

Components	**met l**	**3 Implemented**	**2+**	**2 Partially Implemented**	**2-**	**1 Not Implemented**	**Score**	**Explanation**
	11	Scaffolding is provided **when it is needed** to facilitate learning.		**Some** scaffolding is provided, but **more is needed** to facilitate learning.		Scaffolding is **needed,** but **no** scaffolding is provided **to facilitate learning.**		

	12	Complex skills or strategies **are broken down** into logical instructional units to address cognitive overload, processing demands, or working memory.		Complex skills or strategies **are not effectively broken down** to address cognitive overload, processing demands, or working memory.		Complex skills and strategies **are not broken down as needed** into logical instructional units to address cognitive overload, processing demands, or working memory.		
		3 The teacher **systematically withdraws** support as the students move toward independent use of the skills.		The teacher withdraws support, but **it is not withdrawn systematically.**		The teacher **does not withdraw** support; **OR** the teacher provides very limited support and then **abruptly withdraws** it.		
Guided Practice	14	Guided practice is **focused** on the application of skills or strategies related to the stated or implied goal.		Guided practice is **somewhat focused** on the application of skills or strategies related to the stated or implied goal.		Guided practice is **not focused** on the application of skills or strategies related to the stated or implied goal.		

	15	The teacher **consistently prompts** students to apply skills or strategies throughout guided practice.		The teacher prompts students to apply skills or strategies, but **not consistently OR not effectively** throughout guided practice.		The teacher **does not prompt** students to apply skills or strategies throughout guided practice.		

Components	**met l**	**3 Implemented**	**2+**	**2 Partially Implemented**	**2-**	**1 Not Implemented**	**Score**	**Explanation**
Pacing	16	The teacher maintains an **appropriate** pace **throughout the lesson**.		The teacher maintains an **appropriate** pace during **some of the lesson**.		The teacher maintains an **inappropriate** pace **throughout the lesson**.		

	17	The teacher **allows adequate** time for students to think or respond **throughout** the lesson.		The teacher **sometimes allows adequate** time for students to think or respond but **inconsistently throughout** the lesson.		The teacher **never allows** adequate time to students to think or respond.		
	18	The teacher **maintains focus** on the stated or implied goal **throughout** the lesson.		The teacher **inconsistently focuses** on the stated or implied goal.		The teacher **does not focus** on the stated or implied goal.		
Engagement	19	The teacher **provides frequent** opportunities for students to engage or respond during the lesson.		The teacher **provides limited** opportunities for students to engage or respond during the lesson.		The teacher **does not provide** opportunities for students to engage or respond during the lesson.		
	20	There are **structured and predictable** instructional routines throughout the lesson.		Instructional routines are **not consistently** applied throughout the lesson.		There is **no** instructional routine.		

Components	met	3 Implemented	2+	2 Partially Implemented	2-	1 Not Implemented	Score	Explanation
	21	The teacher **monitors** students to ensure they remain engaged.		The teacher **monitors inconsistently** throughout the lesson; **OR** the teacher **does not consistently** monitor **all students** to ensure they remain engaged.		The teacher **does not** monitor students to ensure they remain engaged.		
Monitoring and Feedback	22	The teacher **consistently** checks for understanding **throughout the lesson**.		The teacher only checks **some students** for understanding; **OR** the teacher does **not consistently** check for understanding throughout the lesson.		The teacher does **no or very minimal** checking for understanding.		
	23	The teacher provides timely feedback **throughout the lesson**.		The teacher **occasionally** provides timely feedback.		The teacher **does not** provide feedback; **OR** it is **not timely**.		

	24	Feedback is specific and informative **throughout** the lesson.		Feedback is **not consistently** specific and informative throughout the lesson.		There is **no** feedback; **OR** it is **not at all** specific and informative.		
	25	The teacher **makes** adjustments to instruction **as needed** based on the student responses.		The teacher **makes some** adjustments to instruction as needed based on the student responses, **but more adjustments are needed.**		The teacher **does not make** adjustments to instruction **as needed** based on the student responses.		

Moylan, L.A., Johnson, E.S., Crawford, A.R., Zheng, Y. (2017). Explicit Instruction Rubric. Recognizing Effective Special Education Teachers (RESET), Boise State University: Boise, ID.

APPENDIX E

DATA SHEET FOR SPSS

InstructionGroup	SelfEffPre	SelfEffPost	RESETLessonOne	RESETLessonTwo
1.00	158.00	163.00	5.00	8.00
1.00	143.00	199.00	7.00	10.00
1.00	176.00	196.00	10.00	10.00
1.00	87.00	117.00	6.00	8.00
1.00	164.00	165.00	9.00	9.00
1.00	132.00	215.00	8.00	7.00
1.00	168.00	166.00	8.00	7.00
1.00	163.00	192.00	8.00	10.00
1.00	175.00	190.00	8.00	10.00
1.00	205.00	197.00	10.00	10.00
1.00	149.00	183.00	8.00	10.00
1.00	167.00	187.00	10.00	10.00
2.00	169.00	183.00	6.00	10.00
2.00	172.00	199.00	10.00	10.00
2.00	172.00	205.00	8.00	10.00
2.00	194.00	189.00	7.00	10.00
2.00	186.00	189.00	7.00	9.00
2.00	173.00	185.00	8.00	10.00
2.00	168.00	183.00	8.00	9.00
2.00	175.00	190.00	10.00	7.00
2.00	167.00	186.00	6.00	7.00
2.00	185.00	201.00	8.00	10.00
2.00	169.00	185.00	8.00	10.00

APPENDIX F

NVIVO DATA: REFLECTION QUESTION A

What Went Well				
Word	Length	Count	Weighted Percentage	Similar Words
students	8	86	6.23%	student, students
lesson	6	62	4.49%	lesson
time	4	42	3.04%	time, times, timing
think	5	33	2.39%	think, thinking
well	4	33	2.39%	well
went	4	29	2.10%	went
questions	9	23	1.67%	question, questions
like	4	22	1.59%	like, liked
asking	6	19	1.38%	ask, asked, asking
able	4	16	1.16%	able
also	4	16	1.16%	also
first	5	14	1.01%	first
helped	6	12	0.87%	helped, helpful
answering	9	12	0.87%	answer, answered, answering, answers
around	6	12	0.87%	around
get	3	11	0.80%	get, getting
made	4	10	0.72%	made
thought	7	10	0.72%	thought
engaging	8	10	0.72%	engage, engaged, engagement, engaging
organelle	9	10	0.72%	organelle, organelles
wanted	6	10	0.72%	want, wanted
talk	4	9	0.65%	talk, talking
tried	5	9	0.65%	tried, try, trying
learning	8	9	0.65%	learned, learning
introduction	12	9	0.65%	introduction
sure	4	9	0.65%	sure
notes	5	8	0.58%	notes
topic	5	8	0.58%	topic
understanding	13	8	0.58%	understanding
vocabulary	10	8	0.58%	vocabulary
check	5	7	0.51%	check, checked, checking, checks
interactions	12	7	0.51%	interact, interacting, interactions
behaviors	9	7	0.51%	behavior, behaviors
cell	4	7	0.51%	cell, cells
make	4	7	0.51%	make, making
another	7	7	0.51%	another
better	6	7	0.51%	better
feel	4	7	0.51%	feel
just	4	7	0.51%	just
know	4	7	0.51%	know, knowing
one	3	7	0.51%	one
group	5	7	0.51%	group, groups
thing	5	7	0.51%	thing, things
examples	8	6	0.43%	example, examples
expect	6	6	0.43%	expect, expectations
responded	9	6	0.43%	respond, responded, responding
showed	6	6	0.43%	show, showed
terms	5	6	0.43%	term, terms
word	4	6	0.43%	word, worded, words
write	5	6	0.43%	write, writing

APPENDIX G

NVIVO DATA: REFLECTION QUESTION B

Change				
Word	Length	Count	Weighted Percentag	Similar Words
lesson	6	46	5.52%	lesson
students	8	44	5.28%	student, students, students'
like	4	26	3.12%	like
change	6	20	2.40%	change
time	4	20	2.40%	time, times
think	5	15	1.80%	think, thinking
get	3	11	1.32%	get, getting
also	4	10	1.20%	also
want	4	9	1.08%	want, wanted
behaviors	9	9	1.08%	behavior, behaviors
better	6	9	1.08%	better
just	4	9	1.08%	just
make	4	8	0.96%	make, making
questions	9	8	0.96%	question, questions
feel	4	7	0.84%	feel
next	4	7	0.84%	next
cell	4	7	0.84%	cell, cells
need	4	7	0.84%	need, needed
teaching	8	7	0.84%	teach, teaching
used	4	7	0.84%	use, used
able	4	6	0.72%	able
example	7	6	0.72%	example, examples
help	4	6	0.72%	help
much	4	6	0.72%	much
work	4	6	0.72%	work, worked, working, works
future	6	5	0.60%	future
know	4	5	0.60%	know
see	3	5	0.60%	see
answer	6	5	0.60%	answer, answering
ask	3	5	0.60%	ask, asked, asking
different	9	5	0.60%	difference, differences, different
hands	5	5	0.60%	hand, hands
practice	8	5	0.60%	practice, practiced, practicing
respond	7	5	0.60%	respond, responded
visuals	7	5	0.60%	visual, visualizing, visuals
activity	8	4	0.48%	actively, activities, activity
actual	6	4	0.48%	actual, actually
another	7	4	0.48%	another
classroom	9	4	0.48%	classroom
focused	7	4	0.48%	focus, focused, focusing
going	5	4	0.48%	going
instead	7	4	0.48%	instead
interact	8	4	0.48%	interact, interacting, interaction, interactive
keep	4	4	0.48%	keep
little	6	4	0.48%	little
one	3	4	0.48%	one
phone	5	4	0.48%	phone, phones
something	9	4	0.48%	something
talking	7	4	0.48%	talk, talking
term	4	4	0.48%	term, terms

APPENDIX H

NVIVO DATA: REFLECTION QUESTION C

Feel				
Word	Length	Count	Weighted Percentag	Similar Words
experience	10	16	3.97%	experience, experiences
lesson	6	13	3.23%	lesson, lessons
students	8	9	2.23%	student, students
teaching	8	9	2.23%	teach, teaching
teacher	7	7	1.74%	teacher, teachers
feedback	8	6	1.49%	feedback
first	5	6	1.49%	first
like	4	6	1.49%	like, liked
fun	3	5	1.24%	fun
going	5	5	1.24%	go, going
lot	3	5	1.24%	lot
something	9	5	1.24%	something
giving	6	5	1.24%	give, gives, giving
school	6	5	1.24%	school, schools
class	5	4	0.99%	class, classes
able	4	4	0.99%	able
classroom	9	4	0.99%	classroom
future	6	4	0.99%	future
just	4	4	0.99%	just
know	4	4	0.99%	know
nervous	7	4	0.99%	nervous
real	4	4	0.99%	real
really	6	4	0.99%	really
still	5	4	0.99%	still
think	5	4	0.99%	think
also	4	3	0.74%	also
beneficial	10	3	0.74%	beneficial
even	4	3	0.74%	even
feel	4	3	0.74%	feel
felt	4	3	0.74%	felt
gave	4	3	0.74%	gave
important	9	3	0.74%	important
overall	7	3	0.74%	overall
people	6	3	0.74%	people
session	7	3	0.74%	session
work	4	3	0.74%	work
world	5	3	0.74%	world
end	3	3	0.74%	end, ended
help	4	3	0.74%	help, helpful
idea	4	3	0.74%	idea, ideas
interact	8	3	0.74%	interact, interaction
show	4	3	0.74%	show, showing, shows
time	4	3	0.74%	time, times
apply	5	2	0.50%	apply
assignment	10	2	0.50%	assignment
beginning	9	2	0.50%	beginning
best	4	2	0.50%	best
better	6	2	0.50%	better
change	6	2	0.50%	change, changed
confident	9	2	0.50%	confident

APPENDIX I

NVIVO DATA: REFLECTION QUESTION D

Extra Share				
Word	Length	Count	Weighted Percentage	Similar Words
students	8	17	3.44%	student, students
teaching	8	14	2.83%	teach, teaching
lesson	6	11	2.23%	lesson, lessons
time	4	10	2.02%	time, times
like	4	7	1.42%	like, liked
class	5	6	1.21%	class, classes
first	5	6	1.21%	first
help	4	6	1.21%	help, helped, helpful
learning	8	6	1.21%	learn, learned, learning
really	6	6	1.21%	really
going	5	6	1.21%	go, going
information	11	6	1.21%	information, informative
actually	8	5	1.01%	actual, actually
assignment	10	5	1.01%	assignment, assignments
also	4	5	1.01%	also
experience	10	5	1.01%	experience
know	4	5	1.01%	know
one	3	5	1.01%	one
opportunity	11	5	1.01%	opportunity
achieve	7	4	0.81%	achieve, achieved, achievements
ask	3	4	0.81%	ask, asked
cell	4	4	0.81%	cell, cells
enjoyed	7	4	0.81%	enjoyable, enjoyed
feedback	8	4	0.81%	feedback
future	6	4	0.81%	future
interact	8	4	0.81%	interact, interacted, interacting
new	3	4	0.81%	new
next	4	4	0.81%	next
repeat	6	4	0.81%	repeat, repeating
thank	5	4	0.81%	thank
whole	5	4	0.81%	whole
content	7	3	0.61%	content
course	6	3	0.61%	course
echo	4	3	0.61%	echo
feel	4	3	0.61%	feel
find	4	3	0.61%	find
get	3	3	0.61%	get
good	4	3	0.61%	good
however	7	3	0.61%	however
interesting	11	3	0.61%	interested, interesting
knowledge	9	3	0.61%	knowledge, knowledgeable
many	4	3	0.61%	many
may	3	3	0.61%	may
nervous	7	3	0.61%	nervous
now	3	3	0.61%	now
prepare	7	3	0.61%	prepare, prepared
program	7	3	0.61%	program
questions	9	3	0.61%	questions
read	4	3	0.61%	read, reading
see	3	3	0.61%	see