THE EFFECT OF MINDFULNESS COACHING ON PRESERVICE TEACHERS' SELF-EFFICACY AND MINDFULNESS UTILIZING A MIXED-REALITY SIMULATION ENVIRONMENT

Parvin K. Taraz

Bachelor of Arts in Anthropology, New York University, 2007

Master of Science in Education, Hunter College, 2011

A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education in Instructional Leadership

in the

Department of Education and Educational Psychology

at

Western Connecticut State University

2020

THE EFFECT OF MINDFULNESS COACHING ON PRESERVICE TEACHERS' SELF-EFFICACY AND MINDFULNESS UTILIZING A MIXED-REALITY SIMULATION ENVIRONMENT

Parvin K. Taraz, EdD

Western Connecticut State University

Abstract

The purpose of this study was to explore the effect of mindfulness coaching on preservice teachers' self-efficacy and mindfulness, utilizing a mixed-reality simulation environment. Data was collected via a concurrent embedded mixed methods design. This study involved a treatment group of preservice teacher participants that received mindfulness coaching and a comparison group of preservice teacher participants that did not receive mindfulness coaching, within a mixed-reality simulation environment. Each preservice teacher participant completed the Mindful Attention Awareness Scale to measure mindfulness and the Teachers' Sense of Efficacy Scale to measure self-efficacy as pretests and posttests. Participants were also interviewed. Findings were then analyzed and while there were no statistically significant quantitative results, qualitative analysis resulted in the following finding statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers.

APPROVAL PAGE

School of Professional Studies
Department of Education and Educational Psychology
Doctor of Education in Instructional Leadership

Doctor of Education Dissertation

THE EFFECT OF MINDFULNESS COACHING ON

PRESERVICE TEACHERS' SELF-EFFICACY AND MINDFULNESS

UTILIZING A MIXED-REALITY SIMULATION ENVIRONMENT

Presented by

Parvin K. Taraz, Ed.D.

Catherine M. O'Callaghan, Ph.D.	*Catherine M. O'Callaghan*	5/7/2020
Dissertation Committee Chair	Signature	Date
Jody S. Piro, Ed.D.	*Jody S. Piro*	5/7/2020
Dissertation Committee Member	Signature	Date
Laila Richman, Ph.D.	*Laila Richman*	5/7/2020
Dissertation Committee Member	Signature	Date

2020

ACKNOWLEDGEMENTS

Writing this dissertation was challenging and required much support and kindness from many people in my life. Of particular note, I'd like to thank my primary advisory, Dr. Catherine O'Callaghan, whose feedback and encouragement fueled my productivity. I'd also like to acknowledge my classmates from Cohort 7 as the momentum of the group carried me along the way. An extra special note of appreciation goes to Erin, Sam, Aimee, and our group chat, which offered me unrelenting positivity and warmth. Much gratitude to my colleagues at Wooster School and especially Elizabeth Higgins (my shero) for inspiring me to pursue this degree. Lastly, thank you to my closest friends and family for shaping me as a person, making it possible for me to persevere and accomplish hard things.

DEDICATION

I dedicate this dissertation to my husband, Ryan Nassisi, my loudest cheerleader. While I worked on this study, he did the laundry. And that made all the difference.

TABLE OF CONTENTS

Page

Figures

CHAPTER ONE: INTRODUCTION TO THE STUDY

Close to one third of educators leave the profession within their first three years of teaching, citing reasons such as feelings of isolation and stress, insufficient feedback and support from administrators, and inadequate professional development (Headden, 2014). The societal costs associated with teacher burnout and turnover are too great to ignore (Flook, Goldberg, Pinger, Bonus, & Davidson, 2015). It costs the nation seven billion dollars a year according to a 2007 report from the National Commission on Teaching and America's Future, with low-performing, high-poverty schools being hit the hardest (Barnes, Crowe, & Schaefer, 2007). Teachers with high self-efficacy for teaching are more satisfied with their job (Caprara, Barbaranelli, Steca, & Malone, 2006; Klassen, Bong, Usher, Chong, Huan, Wong, et al., 2009; Skaalvik & Skaalvik, 2010) and less prone to burnout (Betoret, 2006; Skaalvik & Skaalvik, 2010). Furthermore, shifting resources into social and emotional well-being supports for teachers through professional learning has been shown to influence decisions about remaining in the profession, reduce burnout (Flook et al., 2015), and to improve student outcomes (Rosenthal, 2016). Mindfulness is one strategy and wellness practice that teacher educators and school administrators can offer in-service and preservice teachers to help them cope with challenges associated with the profession (Dorman, 2014; Gerstenschlager & Tassell, 2017; Hue & Lau, 2015; Schonert-Reichl, 2017; Wong, 2017).

Saltzman & Goldin, (2008) define mindfulness as paying attention with kindness and curiosity to what is happening inside and around oneself, such as being present and compassionate with oneself and others. Research shows that mindfulness practices such as meditation, yoga, and breathing techniques have the capacity to positively impact teachers who

are encountering workplace stress (Davidson & McEwen, 2012; Grossman, Neimann, Schmidt, & Walach, 2004; Srinivasan, 2014).

Teacher preparation programs are constantly considering innovative approaches to teacher education. TLE TeachLivE™, created by the University of Central Florida's Center for Research in Education Simulation Technology (CREST; About CREST/TeachLivE, 2020), is a mixed-reality simulation environment that came into use in 2007 and is utilized at 37 universities (About CREST/TeachLivE, 2020; Dieker, Rodriguez, Lignugaris/Kraft, Hynes, & Hughes, 2014). In 2015, Mursion™ (2018), a virtual simulation software company, formed a public-private commercialized partnership with TLE TeachLivE™. When best practices are in place, this technological tool creates opportunities for preservice teachers to practice high stakes classroom situations without the risk of losing valuable resources such as time or rapport with students (Dieker et al., 2014).

This study explored how mixed-reality simulations, coupled with the presence of mind fostered by mindfulness coaching, allowed for preservice teachers to grow and to develop their self-efficacy for teaching through mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal (Bandura, 1994).

Rationale

Mixed-reality simulations create learning opportunities that otherwise might not be available in a real-life context (Cobb, 2007; Limniou, Roberts, & Papadopoulos, 2008). When executed with best practices in mind, these experiences increase teacher content knowledge and pedagogical practices (Dieker, et al., 2014). In addition, coaching following participation in a mixed reality simulation has been shown to increase the target behavior (DeSantis, Delcourt, Shore, & Greenwood, 2018). Since mixed-reality simulations in a teacher education context just

recently emerged in 2007, a relative paucity of research around this topic exists (Clarke, 2013). Furthermore, there is a limited amount of research regarding the topic of mindfulness coaching with preservice teachers utilizing mixed-reality simulations and its relationship to teacher self-efficacy.

Findings from studies indicate that teacher self-efficacy is related to a range of teacher outcomes, influencing instructional practices, motivation styles, and pedagogical beliefs, ultimately affecting student outcomes such as achievement and motivation (Duffin, French, & Patrick, 2012; Pajares, 1996; Woolfolk Hoy & Davis, 2006). Further, teachers with high self-efficacy for teaching report greater job satisfaction (Caprara et al., 2006; Klassen et al., 2009; Skaalvik & Skaalvik, 2010), and are more likely to remain in the profession (Betoret, 2006; Skaalvik & Skaalvik, 2010). It is important to examine self-efficacy for teaching among preservice teachers because these beliefs are more malleable in earlier stages of learning (Bandura, 1997) and it is difficult to change these beliefs once established (Pajares, 1996). Broderick and Jennings (2012) posit that mindfulness has the potential to enhance perceived self-efficacy through cultivating positive emotional states and performance accomplishments made possible through increased self-regulation abilities.

Mindfulness has been shown to help teachers cope with stressors associated with the profession, (Bernay, 2014; Srinivasan, 2014) and, by extension, benefit students (Singh, Lancioni, Winton, Karazsia, & Singh, 2013). Furthermore, higher rates of mindfulness are associated with increased self-efficacy (Bernay, 2014; Gerstenschlager & Tassell, 2017; Luberto, Cotton, McLeish, Mingione, & O'Bryan, 2014; Soysa & Wilcomb, 2013; Srinivasan, 2014).

Statement of the Problem

Teaching is a demanding profession that takes both a physical and emotional toll on teachers (Headden, 2014). Teacher preparation programs seek to provide teacher candidates with meaningful experiences that will prepare them for the profession. Mixed-reality simulation environments such as Mursion™ (2018), create opportunities for preservice teachers to approximate the experience of teaching in the classroom (Dieker et al., 2014). These simulation experiences have the potential to shape and influence preservice teacher's sense of self-efficacy for teaching (Gundel, Piro, Straub, & Smith, 2019). A teacher's self-efficacy for teaching has an impact on his or her ability to succeed and remain in the teaching profession (Betoret, 2006; Skaalvik & Skaalvik, 2010). Additionally, mindfulness has been shown to help teachers cope with stressors associated with the profession (Bernay, 2014; Srinivasan, 2014). Since, higher rates of mindfulness are correlated with increased self-efficacy for teaching (Bernay, 2014; Gerstenschlager & Tassell, 2017; Luberto, Cotton, McLeish, Mingione, & O'Bryan, 2014; Soysa & Wilcomb, 2013; Srinivasan, 2014), researchers posit that mindfulness has the potential to enhance perceived self-efficacy (Broderick & Jennings, 2012). Therefore, more research is needed so that developers of teacher preparation programs can better understand factors that influence teaching self-efficacy in order to develop curricula and experiences to instill preservice teachers with a strong sense of self-efficacy.

Significance of the Research

This study builds upon findings from research on mixed-reality simulation environments, looking at the impact of mindfulness coaching on preservice teachers' self-efficacy for teaching and mindfulness. Mindfulness has been linked to a reduction in stress, anxiety, and depression (Bernay, 2014; Gold, Smith, Hopper, Herne, Tasey, & Hulland, 2010; Grossman et al., 2004), all

of which are mental health concerns commonly reported among teachers (Kyriacou, 2001). Studies suggest that mindfulness has a positive impact on teaching practices and student learning in the classroom (Bernay, 2014; Hue & Lau, 2015; Singh et al., 2013; Srinivasan, 2014). Furthermore, research indicates that teachers with higher self-efficacy for teaching are more successful (Duffin et al., 2012; Pajares, 1996; Woolfolk Hoy & Davis, 2006). This study relates these findings to preservice teachers and examines relationships between mindfulness coaching and the teaching self-efficacy of preservice teachers.

Potential Benefits

This study offers a potential benefit to preservice teachers because coordinators of teacher preparation programs may be able to use findings from this study to inform decisions around the structure and format of teacher preparation programs. Additionally, this research contributes to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of mindfulness coaching on preservice teachers' self-efficacy for teaching and mindfulness.

Definition of Key Terms

1. The term **avatar** refers to perceptible digital representations whose behaviors reflect a specific human being, typically in real time (Nagendran, Pillat, Kavanaugh, Welch, & Hughes, 2014).
2. The term **coaching** refers to a knowledgeable person (the coach) working one-to-one with a preservice teacher, providing feedback on performance, guidance, and other resources as needed; and the coach focuses on practical strategies for cultivating student learning (Delcourt & McKinnon, 2011).

3. The term **high-leverage practice** refers to techniques an educator can use while teaching to positively effect student learning in the desired content area (Ball & Forzani, 2010).
4. The term **mindfulness** refers to nonjudgmentally paying attention with kindness and curiosity to what is happening inside and around oneself, such as being fully present and compassionate with oneself and others (Saltzman & Goldin, 2008).
5. The term **mixed-reality** refers to a blending of the virtual and real environments which imitated a likeness to a real-life scenario (Milgram & Kishino, 1994; Milgram, Takemura, Utsumi, & Kishino, 1994).
6. The term **mixed-reality simulation** refers to experiences within the simulated classroom environment; and encompasses five to eight minutes of teaching, followed by two to three minutes of feedback from the professional learning community for a combined total of approximately ten minutes of experience per simulation session (Gundel, 2018).
7. The term **pause the classroom** refers to the ability to pause a simulation with the goal of un-pausing and continuing the session following guidance from the professional learning community (Becht & Delisio, 2015).
8. The term **peer observation** refers to seeing people similar to oneself succeed by sustained effort, raising one's beliefs that they too possess the capacity to master comparable activities" (Bandura, 1994); and for the purpose of this study, this key term is synonymous with *vicarious experiences.*
9. The term **preservice teacher participant** refers to students at the university, registered in a teacher education course, which includes exposure to mixed-reality simulations (Gundel, 2018).

10. The term **professional learning community** refers to the peer group, professors, simulation facilitators, student avatars, and host teachers at fieldwork placement sites for all preservice participants enrolled in this study (Gundel, 2018); it is further defined as an environment that fosters mutual cooperation, emotional support, and personal growth through working together to achieve a goal (DuFour & Eaker, 1998).
11. The term **self-efficacy** refers to individuals' beliefs about their capacity to produce designated levels of performance that exercise influence over events that affect their lives (Bandura, 1994).
12. The term **social encouragement** refers to verbally persuading individuals to believe they possess the capabilities to master given activities, resulting in sustained effort (Bandura, 1994).
13. The term **student participant** refers to preservice teacher participants, who are enrolled in the teacher education program at the university, which utilizes mixed-reality simulations (Gundel, 2018).
14. The term **reflection** refers to the process of engaging the self in attentive and iterative interactions with one's thoughts and actions, and their underlying conceptual frame, with a view to changing those thoughts and a view on the change itself (Nguyen, Fernandez, Karsenti, & Charlin, 2014).
15. The term **vicarious experience** refers to seeing people similar to oneself succeed by sustained effort, raising one's beliefs that they too possess the capacity to master comparable activities" (Bandura, 1994); and for the purpose of this study, this key term is synonymous with *peer observation*.

CHAPTER TWO: REVIEW OF THE LITERATURE

The purpose of this research study was to investigate the impact of a mindfulness-based coaching treatment on preservice teachers' sense of self-efficacy for teaching and mindfulness utilizing a mixed-reality simulation learning environment. This chapter presents a review of related literature and offers an overview of the theoretical underpinnings of mixed-reality simulation learning, teaching self-efficacy, and mindfulness in addition to an in-depth review of recent research relating to those three constructs. The review of the literature is organized into seven sections: (a) overview of the chapter, (b) review process, (c) theoretical framework, (d) preservice teacher mindfulness literature, (e) preservice teacher self-efficacy literature, (f) mixed-reality simulation learning environment literature, and (e) summary of the chapter.

Overview of the Chapter

This research study sought to understand the impact of a mindfulness-based coaching treatment on preservice teachers' sense of self-efficacy and mindfulness within the context of a mixed-reality simulation learning environment. The theories and relevant research discussed within this chapter inform the purpose, design, context, and methodology of the present study. This chapter details the literature review process and the methods through which pertinent research articles were initially collected and then subsequently included or excluded from the discussion herein.

A review of the theoretical underpinnings of mixed-reality simulation learning environments, teaching self-efficacy, and mindfulness speaks to the historical significance of these constructs and conveys the nature of the relationships between these constructs and preservice teacher education programs. The review of literature for teaching self-efficacy and

mindfulness focused on preservice teacher contexts and the review of literature for mixed-reality simulations learning environments focused on education contexts.

The researcher also cross-referenced the constructs of mindfulness, teaching self-efficacy, and mixed-reality simulation learning environments, looking for instances when teaching self-efficacy and mindfulness were studied together or instances when either of those constructs were studied in a mixed-reality simulation learning environment context. The researcher found multiple studies that looked at teaching self-efficacy in a mixed-reality simulation learning environment context and only one study that focused on mindfulness and mixed-reality simulation learning environments. Throughout the research process, the researcher was unable to find any studies that considered all three of these constructs together.

Review Process

The review of literature for each construct began with a keyword search within the EBSCO combined databases. When researching mindfulness, the researcher began with "mindfulness" and returned 163,534 results. The researcher then limited articles to 2015-2019 and that reduced the search results to 89,435. Adding in the search criteria of "preservice teacher or pre-service teacher" reduced the search results to 572. The final term added to the query was "teacher education," which resulted in 490 research articles. From there, the researcher reviewed the article abstracts and titles to identify the literature that was relevant to this study, focusing on literature that related to the impact of mindfulness on preservice teachers. The researcher employed a similar approach when researching teaching self-efficacy.

To begin researching teaching self-efficacy, again utilizing the EBSCO combined databases, the researcher began with the search term, "self-efficacy," which yielded 437,965 items. Limiting the articles to 2015-2019 reduced the search results to 149,509. Adding in the

search criteria of "preservice teacher or pre-service teacher" reduced the search results to 15,732. The researcher then limited the search to academic journals only, reducing the search results to 4,539. The researcher then refined the search by specifying that these search terms be within the title of research articles, thereby identifying 364 results. From there, the researcher reviewed the article abstracts and titles to identify the literature that was most pertinent to the study, focusing on literature that examined factors that influence teaching self-efficacy among preservice teachers. After researching mindfulness and teacher self-efficacy, the researcher sought out articles relating to mixed-reality simulation learning environments.

When researching mixed-reality simulation learning environments, the researcher began with the search term, "Teachlive," which resulted in 280 results. The researcher then refined the results to only include articles from 2015-2019, reducing the total count to 165. From there, the researcher reviewed the article abstracts and titles to identify the literature that was most pertinent to the study, focusing on literature that involved a teacher education context, paying particular attention to articles that also related to self-efficacy or mindfulness. After finding articles for all three constructs, the researcher took to cataloging and digesting these articles.

In order to keep track of the literature review research process, the researcher maintained a research matrix, wherein the researcher cataloged and annotated relevant research articles. Additionally, the researcher downloaded and saved PDF copies of all research articles that were cataloged within the research matrix. The researcher used this matrix to compare studies in order to make determinations about which articles to include within the review of related literature. Of the studies found through EBSCO combined databases, the chosen articles were ones with a relevant connection to the present study. The final literature review was informed by the scope of the designed study, including articles that pertained to mindfulness, teaching self-efficacy, and

mixed-reality simulation learning environments. After completion of Chapter 5, the significance of the study, the researcher reevaluated the included articles to ensure that the review properly supported the significance of the study.

Theoretical Framework

Social Cognitive Theory

Social cognitive theory (SCT) posits that past behavioral, cognitive, and environmental experiences shape learners' perceptions of their abilities (Bandura, 1986; Ertmer & Newby, 1993). Knowledge is acquired through internal processes such as self-efficacy (Ertmer & Newby, 1993). Further, these experiences and perceptions impact the establishment, change, or abandonment of goals, and this ultimately influences behavior (Bandura, 2000).

Self-efficacy. Self-efficacy is a predominant construct within SCT. The term self-efficacy refers to individuals' beliefs about their capacity to achieve designated levels of performance that exercise influence over events that impact their lives (Bandura, 1994). According to Bandura (1986, 1994, 1997), four types of experiences grow perceived self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal.

Direct experience in mastering a task, skill, or goal is the most effective method for increasing self-efficacy (Bandura, 1994). However, when people only experience easy success, they come to expect quick results and grow discouraged by failure (Bandura, 1994). Conversely, overcoming obstacles through perseverant effort results in a resilient sense of self-efficacy. Struggling with challenging obstacles bolsters self-efficacy via mastery experiences (Bandura, 1994).

Vicarious experiences, also referred to as secondhand experiences, increase self-efficacy through relating the observed outcomes of others to oneself (Bandura, 1994). According to

Bandura (1994), observing similar people succeed through sustained effort increases the observer's beliefs about their capacity to master equivalent activities. The inverse is also true; witnessing failure can lower one's self-efficacy toward a related task.

Verbal persuasion takes the form of social encouragement from individuals with whom one interacts. Lastly, an individual's response to stressful situations impacts self-efficacy. An individual's beliefs about their ability to handle a stressful situation impacts how they will engage with the activity as well as their level of motivation (Bandura, 1994).

Perceived self-efficacy. High-perceived self-efficacy, rooted in experience, results in venturesome behaviors that are within one's capabilities, rather than unrealistic expectations about oneself (Luszczynska & Schwarzer, 2005). Levels of perceived self-efficacy impact appraisal of stressful stimuli, subsequently influencing emotional states (Luszczynska & Schwarzer, 2005). Broderick and Jennings (2012) posit that, operating within the SCT framework, mindfulness has the potential to enhance perceived self-efficacy through cultivating positive emotional states and performance accomplishments made possible through increased self-regulation abilities. This relates to the next construct related to the present study, mindfulness.

Mindfulness

Jon Kabat-Zinn (1994), founder of mindfulness-based stress reduction (MBSR), describes mindfulness as paying attention in the present moment, on purpose, and without judgment. Mindfulness training such as MBSR has been connected to a reduction in stress, depression, and anxiety (Grossman et al., 2004).

Psychological and Neuroscientific Basis for Mindfulness. Experiential factors such as childhood trauma or interventions designed to promote prosocial behaviors shape neural

pathways that underlie social and emotional behavior (Davidson & McEwen, 2012). Due to neuroplasticity, moderate to severe stress is shown to increase growth in the amygdala and decrease growth in the hippocampus and prefrontal cortex (Davidson & McEwen, 2012). Practicing mindfulness is linked to increased activity in regions of the brain that are responsible for attention regulation and prosocial emotions such as empathy (Davidson et al., 2003). Structural and functional changes that take place in the brain suggest that training can enhance well-being and prosocial behaviors (Davidson & McEwen, 2012).

Mindfulness for Teachers and Learners. Studies with K-12 students indicate that mindfulness results in improvements in working memory, attention, academic performance, social skills, emotional regulation, and self-esteem (Srinivasan, 2014). Further, mindfulness with students is linked to self-reported improvements in mood and decreased anxiety, stress, and fatigue (Gold et al., 2010; Srinivasan, 2014). Studies also indicate that mindfulness training for teachers can increase their sense of self-efficacy for teaching as well as their general sense of well-being (Srinivasan, 2014). This in turn affects teachers' ability to manage classroom behaviors and cultivate meaningful relationships with students (Srinivasan, 2014). Training teachers in mindfulness affects student behaviors (McLeod, 2001; Singh et al., 2013). As discussed, researchers have studied mindfulness within education contexts extensively.

Mindfulness and Teaching Self-efficacy. Mindfulness has been shown to have direct connections to self-efficacy in numerous populations, ranging from adult business leaders to early childhood students (Luberto et al., 2014; Soysa & Wilcomb, 2013). Mindfulness and self-efficacy have also been explored in educational contexts. Research shows that mindfulness can have a positive impact on teacher self-efficacy when proper supports are in place and teachers embrace the practices personally (Aylesworth, 2018). Further, learning about mindfulness and

self-compassion has been linked to an increase in self-efficacy, especially for classroom management and ability to modify lessons to meet individual student needs (Akpan & Saunders, 2017). Qualitative research has shown that special educators believe that engagement in personal and classroom mindfulness practice was responsible for students making academic, social, and emotional gains (Kynaston, 2017). Additionally, these educators were able to cope with feelings of burnout and focus on the needs of the classroom environment and students (Kynaston, 2017). As discussed, researchers have studied teaching self-efficacy and mindfulness within education contexts extensively. The upcoming review of literature within this chapter focuses on these constructs specifically with preservice teachers as it relates more closely to the present study.

Mixed-reality Simulations

Mixed-reality simulations are amalgamations of virtual and real environments that imitate a likeness to a real-life scenario (Milgram & Kishino, 1994; Mikgram, Takemura, Utsumi, & Kishino, 1994), underpinned by educational theories such as situated learning and cognitive apprenticeship (Brown, Collins, & Duguid, 1989). Learning through mixed-reality simulations supports the context-dependent, situated, and enculturating nature of learning (Brown et al., 1989; Piro & O'Callaghan, 2019). These environments are utilized for training in disciplines such as law enforcement and healthcare (Richards, Szilas, Kavakli, & Dras, 2008), as well as aviation (Salas, Bowers, & Rhodenizer, 1998). More recently, mixed-reality simulations are being used in an educational context (Dieker et al., 2014).

Mixed-reality simulations allow teachers to practice working through high stakes situations in a low risk environment (Dieker et al., 2014). Three components drive the efficacy of mixed-reality learning in teacher education. They are: (a) personalized learning, (b)

suspension of disbelief, and (c) cyclical procedures to ensure impact (Dieker et al., 2014). Effective simulation experiences hinge upon the phenomenon of "presence" (Dede, 2009), wherein the experience feels real to the preservice teacher, as an outcome of engagement between the human and the technology (Dede, 2009).

Preservice Teacher Mindfulness Literature

After conducting an exhaustive review of preservice teacher mindfulness literature, the researcher organized the most relevant articles into two subsections: (a) preservice teacher mindfulness and emotional states and attitudes, and (b) preservice teacher mindfulness and stress.

Preservice Teacher Mindfulness and Emotional States and Attitudes

The researcher identified three research articles that related to preservice teacher mindfulness and emotional states and attitudes. Garner, Bender, and Fedor (2018), conducted a study to explore the impact of a mindfulness-based program and social emotional learning (SEL) training on preservice teachers' mindfulness, social-emotional competence and beliefs, and responsiveness to hypothetical vignettes of students displaying antisocial behaviors. Kerr, Lucas, DiDomenico, Mishra, Stanton, Shivde, Pero, Runyen, and Terry (2017) researched the impact of an intervention program on preservice teachers regarding self-compassion, perceived stress, and emotional regulation. Lastly, Gerstenschlager and Tassell (2017) conducted a study to examine the impact of seminars that incorporated strategies for improving mindfulness, reducing anxiety, improving self-efficacy, and shifting towards a growth mindset.

Garner et al. (2018), explored the impact of a mindfulness-based program and social emotional learning (SEL) training on preservice teachers' mindfulness, social-emotional competence and beliefs, and responsiveness to hypothetical vignettes of students displaying

antisocial behaviors. Participants in this study were preservice teachers (n = 87) enrolled in an undergraduate teacher preparation program. All but four were female. This study followed a pretest/posttest design. Participants were randomly assigned to a treatment or comparison group. Both groups received a mindfulness intervention, which involved learning about research on mindfulness and mindfulness meditation training. The treatment group also received an SEL intervention, which involved lectures, role-playing, hypothetical case studies, group discussions, and collaborative work. The Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006) measured mindfulness. The Self-Report Emotional Intelligence scale (SREIS; Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006) measured emotional competence. The Emotional Labor of Teaching Scale (ELTS; Brown, Horner, Kerr, & Scanlon, 2014) and the Emotional Labor Strategies Scale (ELSS; Diefendorff, Croyle, & Gosserand, 2005) measured emotional display rules. Participants also read and responded to three short vignettes that depicted students engaging in aggressive, antisocial behaviors. Researchers conducted repeated measures analyses to examine differences between the treatment and comparison groups. Additionally, regression analyses examined associations between participants' responses to the vignettes and their scores on pretests and posttests. Consistent with the researchers' hypotheses, mindfulness scores increased for both groups. However, these scores increased more significantly for participants in the treatment group, who also received the SEL intervention. Across both groups, increases in mindfulness and the ability to manage emotions were associated with teacher beliefs about how negative classroom behaviors impact academic and social development outcomes. This indicates that preservice teachers, who are mindful and emotionally competent, may be particularly well-suited to respond to distressed students.

Kerr et al. (2017) examined the impact of a mindfulness-based training intervention program on preservice teachers with regards to self-compassion, perceived stress, and emotional regulation. Participants in this study were preservice teachers (n = 23) at a university in Pennsylvania. The sample was primarily composed of women. Participants had completed four years of a teacher preparation program, had spent at least 194 hours in classrooms prior to the study, and were completing a semester-long student teaching placement during the study. This study followed a pretest/posttest quasi-experimental design. Participants in a treatment group underwent a six-week mindfulness-based training program that included discussions, activities, and opportunities to practice mindfulness skills in groups. This training was designed to teach mindfulness while promoting emotional regulation, offering strategies for managing stress, and cultivating positive emotions. Qualitative data was also collected via questionnaire at the end of the study. Researchers used a battery of instruments to measure different variables. The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) measured stress levels, the Difficulties in Emotional Regulation Scale (DERS; Gratz & Roemer, 2004) measured emotional dysregulation, the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) measured positive and negative affect, the Kentucky Inventory of Mindfulness Scale (KIMS; Baer, Smith, & Allen, 2004) measured mindfulness, and the Self-compassion Scale (SCS-LF; Neff, 2003) measured self-compassion. Researchers analyzed the quantitative data with t-tests. Findings from the analysis revealed significant differences between the treatment and control group on the DERS Clarity subscale (Gratz & Roemer, 2004), the DERS Strategies subscale (Gratz & Roemer, 2004), the KIMS Acceptance subscale (Baer et al., 2004), the SCS Mindfulness subscale (Neff, 2003), the SCS Humanity subscale (Neff, 2003), and the SCS Isolation subscale (Neff, 2003). Overall, findings indicated that the treatment was effective

regarding emotional regulation. Participants in the treatment group were more able to control impulsive behaviors, showed more flexibility with emotional responses, and showed less emotional dysregulation.

Gerstenschlager and Tassell (2017) conducted a study to examine the impact of seminars that incorporated strategies for improving mindfulness, reducing anxiety, improving self-efficacy, and shifting towards a growth mindset. Participants in this study were preservice teachers (n = 29) studying elementary education. This study followed a mixed methods concurrent embedded design wherein the researchers collected and triangulated qualitative and quantitative data. The researchers used a battery of instruments to measure mindfulness, anxiety, mindset, and self-efficacy. Participants in the treatment group attended the seminars, while participants in the control group did not attend the seminars. The instruments were administered to both groups as pretests and posttests to understand the impact of the seminars. Qualitative data were collected via interviews, observation notes, and responses to journal prompts. Researchers coded the qualitative data following an open-coding scheme and then collapsed the codes into themes. Researchers used descriptive statistics and t-tests to analyze the quantitative data. Results from the analyses revealed statistically significant changes in math anxiety, mathematics teaching efficacy, and mindset for participants in the treatment group. However, the control group also showed statistically significant changes in math anxiety and mathematics teaching efficacy. No differences were found for mathematics teaching outcome expectancy or mindfulness. Qualitative findings indicated that participants developed mindfulness in both their personal and academic lives. Participants also shared about a general awareness of their internal dialogue.

All three of the studies within this subsection relate to the present study insofar as they examined the impact of a mindfulness intervention on preservice teachers, focusing specifically on emotional states and attitudes. Garner et al. (2018) found that mindfulness scores increased more significantly for participants, who also received the SEL intervention along with the mindfulness intervention. Increases in mindfulness and the ability to manage emotions were associated with teacher beliefs about how negative classroom behaviors impact academic and social development outcomes. This finding indicates that preservice teachers, who are mindful and emotionally competent, may be particularly well suited to respond to distressed students. Kerr et al. (2017) found that participants that received a mindfulness-based training intervention program were more able to control impulsive behaviors, showed more flexibility with emotional responses, and showed less emotion dysregulation. In contrast to those findings, Gerstenschlager and Tassell (2017) found statistically significant changes in math anxiety and mathematics teaching efficacy for participants in both the treatment and control groups. Treatment group participants showed statistically significant changes in mindset. No differences were found for mathematics teaching outcome expectancy or mindfulness. Qualitative findings showed that participants developed mindfulness in both their personal and academic lives and shared a general awareness of their internal dialogue. All three of these studies involved mindfulness interventions. While, Garner et al. (2018) and Kerr et al. (2017) arrived at quantitative findings, which suggested that the mindfulness intervention had a positive impact on the preservice teachers, findings for the Gerstenschlager an Tassell (2017) study were less conclusive. Additional research involving mindfulness interventions with preservice teachers would shed more light onto this body of research.

Preservice Teacher Mindfulness and Stress

The researcher identified four research articles that related to preservice teacher mindfulness and stress. Brown (2017) conducted a study to examine the impact of mindfulness instruction on preservice elementary teachers' mindfulness and perceived stress. Hartigan (2017) conducted a study to understand the impact of teaching mindfulness to preservice teachers and then asking those preservice teachers to infuse mindfulness and mindfulness-based stress reduction (MBSR) techniques into their classrooms. Dirghangi (2019) implemented a pilot unit that integrated mindfulness-based self-inquiry tailored to the needs to preservice English teachers. Lastly, Hue and Lau (2015) conducted a study to understand the impact of a six-week mindfulness program on the mindfulness, well-being, stress, and depressive symptoms of preservice teachers and to evaluate the feasibility of such a program in China. All four of these studies found results that had implications for preservice teachers and stress.

Brown (2017) examined the impact of mindfulness instruction on preservice elementary teachers. Participants in this study were first semester, sophomore, female undergraduate students (n = 20) studying inclusive elementary and special education at a university in the northeastern United States. The researcher followed a case study approach, collecting quantitative and qualitative data. A pretest/posttest design was used to determine changes in stress and mindfulness. The researcher used the Mindful Attention Awareness Scale (MAAS: Brown & Ryan, 2003a) to measure mindfulness and the Perceived Stress Scale (PSS; Cohen & Williamson, 1988) to measure stress. Qualitative data was collected via written responses to open-ended questions, audiotaped debriefings, and dialogue from focus-group discussions. The researcher used a Wilcoxon Repeated Sample Signed Ranks test to analyze the quantitative data and an inductive analytic approach to identify themes with the qualitative data. Findings from

the analyses showed a statistically significant decrease in mindfulness and a statistically significant increase in stress from pretest to posttest, suggesting that the mindfulness instruction was insufficient to increase mindfulness and reduce stress. However, findings from the qualitative data revealed that participants found the mindfulness practices to be beneficial. Many of the participants did not use the mindfulness techniques outside of the classroom, noting that reminders to practice would have been helpful.

Hartigan (2017) conducted a study to understand the impact of teaching mindfulness to preservice teachers and then asking those preservice teachers to infuse mindfulness and MBSR techniques into their classrooms. Participants in this study were first year preservice teachers (*n* = 29) pursuing a master's degree in early childhood education. The sample was composed of diverse races, gender, and socioeconomic backgrounds. Preservice teachers were introduced to MBSR over the course of two semesters, learning strategies from a Learning to Breathe (Broderick, 2013), a mindfulness curriculum, to use in their personal lives and from The MindUp Curriculum: Grades Pre-K to 2 (Hawn Foundation, 2011) to use with students in their classroom. Participants completed a pre and post-program questionnaire to document their own growth as well as the growth of their students. Qualitative data was also collected via student work, interviews, and journals. Preservice teachers shared that the mindfulness training helped them ease stress and created a sense of calmness in "being allowed" to practice mindfulness during class time. Further, preservice teachers wrote about the mindfulness strategies helping them approach challenging students in a less judgmental manner. All participants reported changes in their own level of stress as a result of the mindfulness in their professional and personal lives, sharing that they intended to use some form of mindfulness in their future classrooms and also personally.

Dirghangi (2019) implemented a pilot unit that integrated mindfulness-based self-inquiry tailored to the needs to preservice English teachers. The pilot unit framework included activities such as breath work, body scans, mindful movement, self-caring practice, loving-kindness practice, generating and savoring the positive, mantra work, and setting intentions (Jennings, 2015). These activities were shared in the form of mini lessons that broke up a long evening course once a week throughout the semester. Preservice teachers responded positively to the pilot unit, sharing instances of using the practices during their student teaching experiences and in their personal lives. Participants also shared about gaining empathy for students at their student teaching placement. They also reflected upon their challenging demands, noting the importance of balance, well-being, and self-care, remarking that self-care was neglected during times of stress. Some preservice teachers were able to apply a gratitude practice with a positive impact when faced with a challenging situation.

Hue and Lau (2015) conducted a study to understand the impact of a six-week mindfulness program on the mindfulness, well-being, stress, and depressive symptoms of preservice teachers and to evaluate the feasibility of such a program in China. Participants in this study were first year preservice teachers (n = 70) at the Hong Kong Institute of Education. Preservice teachers completed a six-week mindfulness program, totally twenty-two hours, alongside their regular coursework. The program centered on four main activities: body movement and sensation, daily mindfulness practice activities, body scans, and loving-kindness practices. The study followed a mixed methods design involving a pretest/posttest method with a treatment and comparison group. Qualitative data was collected through focus group interviews and written feedback. The researchers used the MAAS (Brown & Ryan, 2003a) and the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006) to measure mindfulness, the

WHO-5 (Bech, 1998) to measure well-being, the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995) to measure depression, anxiety, and stress, and the Perceived Stress Scale (PSS; Cohen et al., 1983) to measure stress. Researchers used chi-square tests, t-tests, MANOVA, correlational analysis, and regression analysis to analyze the quantitative data. Findings from the analyses showed a statistically significant increase in well-being for participants in the treatment group. Mindfulness scores also increased significantly. Mindfulness was found to be positively correlated with well-being and negatively correlated with depression, anxiety, and stress. Regarding depressive symptoms and stress, no significant differences between the groups were found, indicating that the treatment did not impact those variables. According to the regression analysis, the MAAS (Brown & Ryan, 2003a) and the FMI (Walach et al., 2006) were significant predictors for all variables in the study. The qualitative data revealed that participants had positive experiences with the program and that they felt it helped them reduce stress, arouse compassion, and cultivate more awareness.

Hartigan's (2017) and Dirghangi's (2019) studies were both more qualitative in nature and arrived at findings which suggested that mindfulness helped preservice teachers manage stress. Hartigan (2017) found that the mindfulness training helped preservice teachers ease stress and created a sense of calmness in "being allowed" to practice mindfulness during class time. All participants reported changes in their own level of stress as a result of the mindfulness in their professional and personal lives, sharing that they intended to use some form of mindfulness in their future classrooms and personally. Dirghangi's study (2019) found that preservice teachers responded positively to a pilot unit that integrated mindfulness-based self-inquiry, sharing instances of using the practices during their student teaching experiences and also in their personal lives. They also reflected upon their challenging demands, noting the importance of

balance, well-being, and self-care, remarking that self-care was neglected during times of stress. Both studies indicated mindfulness had a positive impact on preservice teachers and offering a mindfulness-based intervention, such as the one in the present study, posed little threat of harm to preservice teachers.

Brown's (2017) and Hue and Lau's (2015) mixed methods studies were largely quantitative in nature. Brown (2017) found a statistically significant decrease in mindfulness and a statistically significant increase in stress from pretest to posttest, suggesting that the mindfulness instruction was insufficient to increase mindfulness and reduce stress. This study utilized the MAAS (Brown & Ryan, 2003a) to measure mindfulness, which was one of the two instruments utilized in the current study. However, findings from the qualitative data revealed that participants found the mindfulness practices to be beneficial. In contract to Brown (2017), Hue and Lau (2015), also utilizing the MAAS (Brown & Ryan, 2003a) among other instruments, found a statistically significant increase in well-being and mindfulness for participants that received the mindfulness treatment. However, there were no significant differences found for depressive symptoms or stress, indicating that the treatment did not impact those variables. Similar to Brown's (2017) study, qualitative data revealed that participants had positive experiences with the program and that they felt it helped them reduce stress, arouse compassion, and cultivate more awareness. Inconsistent findings around the impact of a mindfulness-based intervention on measures of mindfulness, especially when utilizing the MAAS (Brown & Ryan, 2003a), suggests that research along those lines, as in the present study, could be elucidating.

Preservice Teacher Self-Efficacy Literature

After conducting an exhaustive review of preservice teacher self-efficacy literature, the researcher organized the most relevant articles into two subsections: (a) preservice teacher self-

efficacy and emotional states and attitudes and (b) preservice teacher self-efficacy and practicum experiences.

Preservice Teacher Self-efficacy and Emotional States and Attitudes

The researcher identified six research articles that related to preservice teacher self-efficacy and emotional states and attitudes. Cansoy and Turkoglu (2017) conducted a study to examine relationships between preservice teachers' critical thinking disposition problem-solving skills, and self-efficacy beliefs. Ulucinar Sagir, Aslan, Bertiz, and Oner Armagan (2016) conducted a study to examine relationships between preservice teacher self-efficacy in science teaching and disposition towards reflective thinking. Bedel (2016) conducted a study to explore relationships between academic motivation, academic self-efficacy, and attitudes towards teaching among preservice early childhood education teachers. Senler (2016) conducted a study to look at relationships between preservice science teachers' self-efficacy, locus of control, attitude toward science teaching, and teaching anxiety. DeMauro and Jennings (2016) conducted a study to understand the relationship between teacher efficacy beliefs and emotional states such as depression, anxiety, and stress and to examine how student teaching experiences predict efficacy. Lastly, Cruz, Wilson, and Wang (2019) conducted a study to examine relationships between preservice teachers' mathematical disposition and self-efficacy for teaching mathematics in connection to matriculation status, content area, intended grade level and other descriptors related to their program status.

Cansoy and Turkoglu (2017) conducted a study to examine relationships between preservice teachers' critical thinking disposition problem-solving skills, and self-efficacy beliefs. Participants in this study were first-year and third-year preservice teachers (n = 519) at a university in Turkey. The sample was 73% female and 27% male. This study followed a

correlational research model. The dependent variables were sub-dimensions of teacher self-efficacy: efficacy for student engagement, efficacy for instructional strategies, and efficacy for classroom management. The independent variables were critical thinking disposition and problem solving skills. The researchers used the California Critical Thinking Disposition Inventory (CCTDI; Facione, Facione, & Giancarlo, 1996) to measure critical thinking disposition, the Problem Solving Inventory (PSI; Heppner & Petersen, 1982) to measure problem solving skills, and the Teacher Self-Efficacy Scale (TSES; Tschannen-Moran & Woolfolk-Hoy, 2001) to measure teacher self-efficacy. Data were analyzed with descriptive statistics, correlation analysis, and multiple linear regression to determine the predictive power of critical thinking disposition, and problem solving skills on teacher self-efficacy. Findings indicated that teacher self-efficacy correlated positively with critical thinking disposition and problem solving skills. According to the regression analysis, critical thinking disposition and problem solving skills accounted for 20% of the variance in teacher self-efficacy beliefs.

Ulucinar Sagir et al. (2016) conducted a study to examine relationships between preservice teacher self-efficacy in science teaching and disposition towards reflective thinking. Participants in this study were 3rd and 4th year preservice teachers (n = 619) from four Turkish universities. This study followed a relational survey model wherein two or more variables were examined without any intervention (Creswell, 2003). Researchers used the Science Teaching Efficacy Belief Instrument (STEBI; Enochs & Riggs, 1990) to measure science teaching self-efficacy and the Disposition Towards Reflective Thinking Scale (DTRTS; Semerci, 2007) to measure disposition towards reflective thinking. To analyze the data, researchers used independent sample t-tests, single-factor ANOVA, correlation analysis to determine relationships between variables, and regression analysis to determine the degree to which independent

variables predicted dependent variables. Findings from this study indicated a medium-level positively significant relationship between perceived self-efficacy in science teaching and disposition towards reflective thinking. When compared with respect to grade level as well as gender, no significant differences in self-efficacy were found. However, female students showed a greater tendency to think in a reflective manner.

Bedel (2016) conducted a study to explore relationships between academic motivation, academic self-efficacy, and attitudes towards teaching among preservice early childhood education teachers. Participants in this study were preservice early childhood education teachers (n = 251) at a Turkish university. The sample was 85% female and 15% male and included 77 freshmen, 35 sophomores, 72 juniors, and 67 seniors. This study followed a correlational design. Researchers used the Academic Motivation Scale (AMS; Vallerand, Pelletier, Blais, Briere, Senecel, & Vallieres, 1992) to measure academic motivation, the Academic Self-efficacy Scale (ASES; Hampton, 1998) to measure academic self-efficacy, and the Attitude Toward Teaching Scale (ATTS; Erkus, Sanli, Bagli, & Guven, 2000) to measure attitudes towards teaching. Data were analyzed with descriptive statistics, correlation analysis, and regression analysis. Findings showed a significant relationship between academic motivation and academic self-efficacy. No significant relationship was found between attitudes toward teaching and academic motivation. According to the regression analysis, academic self-efficacy explained 28% of the variance in academic motivation. Further, researchers found that neither gender nor grade level predicted academic motivation.

Senler (2016) conducted a study to look at relationships between preservice science teachers' self-efficacy, locus of control, attitude toward science teaching, and teaching anxiety. Participants in this study were preservice elementary science teachers (n = 356) from five public

universities in Turkey. The sample was composed of 153 males and 203 females. This study followed a correlational design. Researchers used the STEBI (Enochs & Riggs, 1990) to measure teacher self-efficacy, the Locus of Control Scale for Teachers (LCST; Sadowski, Taylor, Woodward, Peacher, & Martin, 1982) to measure locus of control, the Science Teaching Attitude Scale (STAS; Thompson & Shrigley, 1986) to measure attitude towards science teaching, and the Teaching Anxiety Scale (TAS; Peker, 2006) to measure teaching anxiety. Researchers used descriptive statistics, correlational analysis, and path analysis (Kline, 2011) to analyze the data. Findings from this study showed the highest positive correlation was between science teaching self-efficacy and attitude towards science teaching. A negative correlation was found between science teaching self-efficacy and science teaching anxiety. The path analysis indicated that locus of control had a significant direct effect on attitude towards science teaching, explaining 33% of the variance. Additionally, locus of control and attitude towards science together accounted for 54% of the variance in teaching anxiety. Lastly, attitude towards teaching, science teaching anxiety, and locus of control together explained 65% of the variance in science teaching self-efficacy.

DeMauro and Jennings (2016) conducted a study to understand the relationship between teacher efficacy beliefs and emotional states such as depression, anxiety, and stress and to examine how student teaching experiences predict efficacy. Participants in this study were preservice teachers (n = 297) from a public university in the mid-Atlantic region of the United States. Within this sample, 36% were preparing to teach elementary students, 46% secondary students, 16% special education students, and 2% physical education students. At the time of data collection, 40% of the sample had student teaching experience. This study followed a correlational design. The researchers used the TSES (Tschannen-Moran & Hoy, 2011) to

measure teacher self-efficacy and the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) to measure emotional states. To analyze the data, researchers conducted correlation analysis and multiple linear regression analysis. Findings from this study showed a small, but significant negative correlation between teacher self-efficacy and depression as well as a small, but significant negative correlation between teacher self-efficacy and anxiety. There were no significant relationships between teacher self-efficacy and stress or teacher self-efficacy and teaching experience. However, there was a significant relationship between anxiety and student teaching experience with no experiences correlating with higher reports of anxiety. The regression analysis showed that depressive symptoms significantly negatively predicted teacher self-efficacy, stress was marginally significant, and anxiety was not significant. Lastly, when controlling for emotional states, participants with student teaching experience tended to have lower teacher self-efficacy scores, but this prediction only approached significance.

Cruz et al. (2019) conducted a study to examine relationships between preservice teachers' mathematical disposition and self-efficacy for teaching mathematics and in connection to matriculation status, content area, intended grade level and other descriptors related to their program status. Participants in this study were preservice teachers (n = 238) at a midsized university in the Southwestern United States. Researchers used a survey to collect information about mathematical disposition, self-efficacy for teaching mathematics, age, gender, university classification, intended grade level and content area, and participants' perspective on their prior mathematic teachers' impact on them. To create the survey, researchers adapted instruments that had been previously used in research (Chester & Beaudinm, 1996; Doepken, Lawsky, & Padwa, 2004; Enochs, Smith & Huinker, 2000; Kloosterman & Stage, 1992; Raymond, 1997). To analyze the data, researchers used an ANOVA, pairwise comparison post hoc tests, and multiple

linear regression. Results from the analyses showed significant differences between mathematical disposition and self-efficacy for teaching mathematics based up on intended grade level, with high school teachers having the highest mean scores and elementary having the lowest. There were also observable differences in mathematical disposition as it related to age and university classification, with older students scoring higher than younger students. Further, preservice teachers that were positively influenced by their former math teachers had higher self-efficacy for teaching ratings than preservice teachers that had a neutral or negative influence by their former math teachers. According to the regression analysis, mathematical disposition predicts self-efficacy for teaching mathematics, explaining 33.8% of the variance. Consequently, these two variables are positively correlated.

All the research articles within this subsection involved correlational studies that examined existing relationships between teaching self-efficacy and various emotional states and attitudes, typically including a battery of instruments, utilizing quantitative analyses such as ANOVAs and multiple linear regression. Cansoy and Turkoglu (2017), DeMauro and Jennings (2016), and Bedel (2016) focused generally on teaching self-efficacy and emotional states and attitudes, while Ulucinar Sagir et al. (2016), Senler (2016), and Cruz et al. (2019) looked more specifically at math and science teaching self-efficacy at it related to emotional states and attitudes.

Cansoy and Turkoglu (2017) found that teacher self-efficacy correlated positively with critical thinking disposition and problem-solving skills. DeMauro and Jennings (2016) found a small, but significant negative correlation between teacher self-efficacy and depression as well as a small, but significant negative correlation between teacher self-efficacy and anxiety. There were no significant relationships between teacher self-efficacy and stress or teacher self-efficacy

and teaching experience. Bedel (2016) found a significant relationship between academic motivation and academic self-efficacy. No significant relationship was found between attitudes toward teaching and academic motivation. Ulucinar Sagir et al. (2016) found a medium-level positively significant relationship between perceived self-efficacy in science teaching and disposition towards reflective thinking. Senler (2016) also focused on science teaching self-efficacy and found a high positive correlation between science teaching self-efficacy and attitude towards science teaching. A negative correlation was found between science teaching self-efficacy and science teaching anxiety. The path analysis indicated that locus of control had a significant direct effect on attitude towards science teaching. Lastly, Cruz et al. (2019) found a significant difference between mathematical disposition and self-efficacy for teaching mathematics based up on intended grade level, with high school teachers having the highest mean scores and elementary having the lowest. All studies point to the importance of teaching self-efficacy as a construct within education.

Preservice Teacher Self-efficacy and Practicum Experiences

The researcher identified four research articles that related to preservice teacher self-efficacy and practicum experiences. Colson, Sparks, Berridge, Frimming, and Willis (2017) conducted a study to compare teacher self-efficacy beliefs among preservice teachers in a year-long student teaching placement and preservice teachers in a semester-long placement. Dever and Clement (2016) conducted a study to examine the impact of an authentic science teaching experience on preservice teachers' self-efficacy and their beliefs about their outcomes with middle school students. Memduhoglu, Kotluk, and Yayla (2017) conducted a study to investigate the impact of providing feedback to preservice teachers through focus groups on teaching self-efficacy and on perceptions about teaching experiences. Lastly, Han, Shin, and Ko

(2017) conducted a study to investigate how a technology-centered student teaching experience impacted the self-efficacy and intention to use technology of preservice teachers with different teaching beliefs.

Colson et al. (2017) compared teacher self-efficacy beliefs among preservice teachers in a year-long student teaching placement and preservice teachers in a semester-long placement. Participants in this study were preservice teachers (n = 144) at a mid-sized public university in the Midwest of the United States. Researchers conducted an exploratory study, collecting data via survey and with the TSES (Tschannen-Moran & Hoy, 2011). Researchers used an independent sample t-test to evaluate the impact of the two different types of student teaching experiences. Participants with the year-long placement reported significantly higher levels of teaching self-efficacy in student engagement and classroom management relative to participants with the semester-long placement. However, no significant differences were found in teaching self-efficacy in instructional practices, with both groups reporting high levels of self-efficacy in instructional practices. Researchers recommended following up with a mixed methods or qualitative design to determine which elements of the student teaching experience were the most effective.

Dever and Clement (2016) conducted a study to examine the impact of an authentic science teaching experience on preservice teachers' self-efficacy and their beliefs about their outcomes with middle school students. Participants in this study were preservice teachers (n = 7) studying middle childhood education at a large public university in the Midwest of the United States. All participants were in the second semester of their junior year. The sample was composed of six females and one male. This study followed a mixed methods design. Data was collected via an on-line survey and the researchers used the STEBI (Enochs & Riggs, 1990) to

measure self-efficacy for teaching science and to measure beliefs about outcomes. Preservice teachers in this study examined artifacts from an archeological dig and then created an interdisciplinary unit as part of a science methods course. The STEBI (Enochs & Riggs, 1990) was administered at the beginning of the project and then again at the end of the project. The survey was anonymously administered online at the end of the project. Researchers used a t-test to compare group means before and after the experience. Results of the analyses showed a significant negative change in self-efficacy from beginning to end of the experience. There was not a significant change in beliefs about preservice teachers' outcomes of teaching science. Overall, results showed that placing students in authentic learning experiences does not automatically result in increased self-efficacy.

Memduhoglu et al. (2017) conducted a study to investigate the impact of providing feedback to preservice teachers through focus groups on teaching self-efficacy and on perceptions about teaching experiences. Participants in this study were preservice teachers (n = 12) at a university in Turkey. This study followed a mixed methods design. The quantitative component of this study followed a pretest/posttest model and qualitative data was collected in an on-going manner via diaries, semi-structured observations, and a semi-structured focus group form. Researchers used the TSES (Tschannen-Moran & Hoy, 2001) at the pretest and posttest to measure teaching self-efficacy. Six participants were randomly assigned to the treatment and six participants were randomly assigned to a comparison. Participants in the treatment group engaged in focus groups over the course of twelve weeks wherein they observed each other teaching, recorded observations, and then discussed those experiences. Researchers used thematic coding to analyze the qualitative data and used descriptive statistics and a Mann-Whitney U test to determine the impact of the treatment. Findings from the analyses showed that

participation in the focus groups had a significantly positive effect on the self-efficacy of the pre-service teachers. Further, preservice teachers felt that participating in the focus groups contributed positively to their teaching abilities. Overall, findings suggested that feedback plays an important role in the development of self-efficacy beliefs of preservice teachers and in the promotion of teaching-related skills.

Han et al. (2017) conducted a study to investigate how a technology-centered student teaching experience impacted the self-efficacy and intention to use technology of preservice teachers with different teaching beliefs. Participants in this study were preservice teachers (n = 55) in their senior year at a university in South Korea. The sample was 78% female. To collect data the researchers created a survey using pre-existing instruments (Cheon, Lee, Crooks, & Songs, 2012; Ertmer, 2005; Hoy, Hoy, & Kruz, 2008; Hsu, 2013; Liu, 2011; Woolley, Benjamin, & Woolley, 2004) to measure pedagogical beliefs, self-efficacy, and intention to use technology. Pre- and post-survey data were collected via Survey Monkey before and after the student teaching experience. Based up on initial responses, teachers were categorized as traditional (teacher-centered) or constructivist (student-centered). To analyze the data, researchers used a repeated measures ANOVA. Findings from the analyses showed an increase in self-efficacy among the traditional and constructivist groups after the student teaching experience. However, depending upon their teacher beliefs, the student teaching experience differently impacted preservice teachers' intention to use technology, with the traditional group showing a significant increase in their intention after the student teaching.

All the research studies within this subsection looked at the impact of a practicum experience on teaching self-efficacy. Colson et al. (2017) found that participants with a year-long placement reported significantly higher levels of teaching self-efficacy in student

engagement and classroom management relative to participants with a semester-long placement. However, no significant differences were found in teaching self-efficacy in instructional practices, with both groups reporting high levels of self-efficacy in instructional practices. Dever and Clement (2016) studied the impact of an authentic science teaching experience and found very different results, a significant negative change in self-efficacy from beginning to end of the experience. Results from this study showed that placing students in authentic learning experiences does not automatically result in increased self-efficacy. However, in contrast to Dever and Clement (2016), Han et al. (2017) also found an increase in self-efficacy among teachers with both traditional and constructivist teaching styles after a student teaching experience. Memduhoglu et al. (2017) conducted a study that was unique in that it coupled feedback-based focus group with a practicum experience and found that participation in feedback-based focus groups had a significantly positive effect on the self-efficacy of the preservice teachers. These findings indicate that feedback plays an important role in the development of self-efficacy beliefs of preservice teachers. The present study relates to the research articles in this subsection because it involved preservice teacher participation utilizing a mixed-reality simulation learning environment, a fieldwork experience, coupled with teacher and peer feedback, as well as researcher coaching.

Mixed-reality Simulation Learning Environment Literature

After conducting an exhaustive review of mixed-reality simulation learning environments literature, the researcher organized the most relevant articles into four subsections: (a) mixed-reality simulation learning environments impact on preservice teachers, (b) mixed-reality simulation learning environments impact on coaching and feedback, (c) mixed-reality simulation

learning environments and self-efficacy, and (d) mixed-reality simulation learning environments and mindfulness.

Mixed-reality Simulation Learning Environments Impact on Preservice Teachers

The researcher identified three research articles that related to mixed-reality simulation learning environments impact on preservice teachers generally. Piro and O'Callaghan (2019) conducted a study to understand how preservice teachers experience threshold concepts in a mixed-reality simulation learning environment. Aguilar and Telese (2019) conducted a study to understand the impact of mixed-reality simulation learning environments on eliciting students' mathematical thinking and understanding using productive mathematical talking moves (Chapin, O'Connor, & Anderson, 2009). Lastly, Pankowski and Walker (2016) conducted a study to compare the impact of a mixed-reality simulation learning environment on graduate students enrolled in traditional and alternative certification programs at the same university.

Piro and O'Callaghan (2019) examined how preservice teachers experience threshold concepts in a mixed-reality simulation learning environment. Participants in this study were preservice teachers (n = 29) at a public university. Participants engaged in nine mixed-reality simulation learning environment experiences over the course of three semesters. Researchers collected video data of simulation experiences and subsequent or within coaching of high leverage teachings practices. The video data was analyzed via a thematic analysis approach (Gall, Gall, & Borg, 2007) with literature informing the codes. Findings suggested that mixed-reality simulation learning environment experiences within a teacher preparation program can facilitate the movement of preservice teachers from pre-professional spaces to liminal learning spaces and, in some instances, toward professional identities.

Aguilar and Telese (2019) conducted a study to understand the impact of mixed-reality simulation learning environments on eliciting students' mathematical thinking and understanding through the use of productive mathematical talking moves (Chapin, et al., 2009). Participants in this study were teacher candidates (n = 55) enrolled in an elementary mathematics methods course at a large Hispanic-serving institution. One section of students served as a treatment group, receiving training in the use of productive math talk moves within a mixed-reality simulation learning environment. The other section of students acted as the comparison group and received the same training in a traditional classroom environment. Data was collected via notes, audio-transcriptions, and written reflections. Data was coded using categories from productive math talk moves (Chapin et al., 2009). Preliminary analysis of the data revealed that pre-service teachers exposed to the mixed-reality simulation learning environment felt more confident relative to their peers, however, not all the talking moves of the treatment group were productive. Treatment group participants were only exposed to the mixed-reality simulation learning environment on one occasion. This issue was discussed as a limitation of the study because past research has recommended three to five sessions (Dieker et al., 2014).

Pankowski and Walker (2016) conducted a study to compare the impact of a mixed-reality simulation learning environment on graduate students enrolled in traditional and alternative certification programs at the same university. Participants in this study were graduate students (n = 26) in the Northeastern United States. Twelve participants were enrolled in the traditional program and 14 were enrolled in the alternative certification program, part of the New York City Teaching Fellows. Each participant engaged in three mixed-reality simulation experiences. After each simulation, each participant would view and then rate the effectiveness of their performance and respond to a set of self-evaluation questions. As a pre and posttest,

researchers had participants write about their conceptions of classroom management. These qualitative data were coded with each definition being placed into four categories: *control*, *care*, *self-regulation*, and *other*. Researchers also coded the strategies observed during simulations using the same four categories. Participants also rated the realness and helpfulness of the simulations after each experience. To analyze these data, researchers used Kolmogorov-Smirnov tests, Wilcoxon sign-rank tests, and repeated measures ANOVA. Results from the analyses shows that participants in the traditional group made fewer references to control in their pretest. Both groups increased references to care and decreased references to control in the posttest. However, these differences were more pronounced for the alternative certification group. Based on analysis of participants' numeric self-ratings of effectiveness, it was found that alternative certification teachers had higher ratings after each simulation. Lastly, participants in the traditional certification program found the simulations to be more helpful and realistic relative to the alternative certification peers.

All the research articles within this subsection generally examined preservice teachers in a mixed-reality simulation learning environment context. Piro and O'Callaghan (2019) found that mixed-reality simulation learning environment experiences within a teacher preparation program can facilitate the movement of preservice teachers from pre-professional spaces to liminal learning spaces and, in some instances, toward professional identities. Aguilar and Telese (2019) found that pre-service teachers exposed to the mixed-reality simulation learning environment felt more confident relative to their peers, who operated in a traditional classroom environment. Pankowski and Walker (2016), who compared mixed-reality simulation learning environment experiences of preservice teachers in traditional certification programs and alternate certification programs, found alternative certification teachers had higher self-ratings after each

simulation. Additionally, participants in the traditional certification program found the simulations to be more helpful and realistic relative to the alternative certification peers.

Mixed-reality Simulation Learning Environments Impact on Coaching and Feedback

The researcher identified three research articles that related to mixed-reality simulation learning environments impact on coaching and feedback. Peterson-Ahmad (2018) conducted a study to examine how mixed-reality simulations combined with instructional coaching impacted the manner in which preservice teachers learned how to provide opportunities to respond (OTR). Pas, Johnson, Larson, Brandenburg, Church, and Bradshaw (2016) conducted a study to examine the effects, acceptability, and feasibility of mixed-reality simulations and coaching interventions for teachers serving student with moderate to severe autism spectrum disorder. Lastly, Vince-Garland, Holden, and Garland (2016) conducted a study to investigate the efficacy of individualized clinical coaching of least-to-most prompting, also referred to as system-of-least prompts (SLP), within a mixed-reality simulation learning environment.

Peterson-Ahmad (2018) conducted a study to examine how mixed-reality simulations combined with instructional coaching impacted the way preservice teachers learned how to provide OTR. Participants in this study were undergraduate preservice special education teachers (n = 8). This study followed a case study design. Case Study Group 1 (n = 4) participated in four mixed-reality simulation experiences over the course of five weeks and they also received instructional coaching. Case Study Group 2 (n = 4) participated in the simulations yet did not receive any coaching. The coaching focused on how often OTR were provided and on setting goals to modify instruction to increase delivery of OTR. Participants in both groups responded to self-reflection prompts after each simulation experience. Researchers analyzed and coded these self-reflections. Findings from the data analysis showed that two participants in

Case Study Group 1 increased their average rate of providing OTR. However, two participants in the Case Study Group 2 also increased in this way. Among both groups, 100% of participants increased their use of OTR over the course of four mixed-reality simulation experiences. Overall, researchers concluded that preservice teachers who are taught, coached, and given time to practice strategies are likely to experience an increase in student learning and improvement in student behaviors within the mixed reality environment.

Pas et al. (2016) conducted a study to examine the effects, acceptability, and feasibility of mixed-reality simulations and coaching interventions for teachers serving student with moderate to severe autism spectrum disorder. Participants in this study were teachers (n = 19) at two non-public special education settings that served students with autism spectrum disorder. All the participants had master's degrees. Researchers utilized the Classroom Check-Up (CCU: Reinke, Stormont, Herman, Puri, & Goel, 2011) coaching protocol. Participants received professional development in the form of coaching in classroom management paired with guided practice in a mixed-reality simulation learning environment. Data about the simulations was collected with the Assessing School Settings: Interactions of Students and Teachers (ASSIST; Rusby, Taylor, & Milchak, 2001) classroom observation tool. Researchers collected data at three points in time: prior to the coaching, following the coaching, and then three months later as a follow up. Researchers also developed a scale to measure the acceptability of the use of the mixed-reality simulation learning environment. To analyze the data, researchers used repeated measures MANOVA, repeated measures ANOVA, pair-wise comparisons to calculate effect size, and descriptive statistics. Results of the analyses showed a significant improvement in teaching behaviors. Furthermore, follow-up data did not differ significantly, suggesting that the effect was sustained. The largest effect sizes were observed for teacher control, teacher monitoring,

meaningful participation, and proactive behavior management. Overall, researchers found this intervention to be promising for special education teachers.

Vince-Garland et al. (2016) conducted research to investigate the efficacy of individualized clinical coaching of least-to-most prompting, also referred to as system-of-least prompts (SLP), within a mixed-reality simulation learning environment. Participants in this study were novice teachers (n = 6) enrolled in a graduate special education course focusing on evidence-based practices, located in the northeastern region of the United States. This study followed a multiple probe across participants single case design (Gast & Ledford, 2010). Researchers used the System of Least Prompts Performance Evaluation Rubric (SLPPER; National Professional Development Center, 2010) to measure performance in the mixed-reality environment. Results from the analysis indicated that individualized clinical coaching in the mixed-reality simulation learning environment was effective at increasing teacher fidelity when implementing SLP. Furthermore, participants remarked upon the importance of learning the prompting skills in a mixed-reality setting because it would help them when working with students in other settings.

All the studies within this subsection found mixed-reality simulation learning environments to be effective means of professional development for educators, especially when paired with feedback and coaching. Peterson-Ahmad (2018) concluded that preservice teachers who are taught, coached, and given time to practice strategies are likely to experience an increase in student learning and improvement in student behaviors. Pas et al. (2016) found significant improvement in teaching behaviors for educators that served students with autism spectrum disorder. Furthermore, follow-up data did not differ significantly, suggesting that the effect was sustained. Overall, researchers found professional development in the form of coaching in

classroom management paired with guided practice in a mixed-reality simulation learning environment to be promising for special education teachers. Vince-Garland et al. (2016) found that individualized clinical coaching in the mixed-reality simulation learning environment was effective at increasing teacher fidelity when implementing SLP. Furthermore, participants remarked upon the importance of learning the prompting skills in a mixed-reality setting because it would help them when working with students in other settings. Similar to the studies described within this subsection, coaching and feedback within the context of a mixed-reality simulation learning environment, were components of the present study.

Mixed-reality Simulation Learning Environments and Self-efficacy

The researcher identified four research articles that related to mixed-reality simulation learning environments and self-efficacy. Ledger, Ersozlu, and Fischetti (2019) conducted a study to capture preservice teachers' reflections on mixed-reality simulation learning environments, focusing on preferred teaching strategies and teaching confidences. Hudson, Voytecki, and Zhang (2018) conducted a study to evaluate the impact of a mixed-reality learning environment on preservice teachers' perceptions of readiness to manage a classroom. Bautista and Boone (2015) conducted a study to investigate the impact of a mixed-reality simulation learning environment on the science teaching self-efficacy of preservice teachers. Lastly, Gundel, Piro, Straub, and Smith (2019) conducted a study to examine the effects of a mixed-reality simulation learning environment on preservice teachers' sense of self-efficacy.

Ledger et al. (2019) conducted a study to capture preservice teachers' reflections on mixed-reality simulation learning environments, focusing on preferred teaching strategies and teaching confidences. For the purposes of this study, researchers also created and validated an instrument, the Teaching Quality Scale (TQS; Ledger et al., 2019) to evaluate teaching

simulation experiences. Participants in this study were Australian, first-year preservice teachers (n = 322), representing 82% of teacher candidates in the program at a public university. This study followed a mixed-method design, incorporating qualitative data content analysis, descriptive statistics, factor analysis, item analysis, and a two-step cluster analysis to interrogate the data. Each participant planned, delivered, and then reflected upon a 10-minute teaching experience inside of the mixed-reality simulation learning environment. Participants responded to a series of structured question regarding their teaching strategy. Participants used a Likert scale to evaluate their confidence levels. Also, researchers developed and used the TQS (Ledger et al., 2019) to determine the quality of the teaching. Themes that emerged from the qualitative data analysis were direct instruction, questioning, collaborative learning, active learning, and classroom management. Results from the quantitative analysis showed that most preservice teachers preferred questioning and direct instruction. The TQS was deemed valid and reliable. Results from a one-way ANOVA indicated that there is a significant effect of teaching quality on preferred teaching strategy, $F(6, 315) = 6.076$, $p = .000$. Furthermore, teaching quality had a significant effect on teaching confidence, $F(3, 318) = 34.786$, $p = .000$. Researchers clustered the data and these results suggested that teachers who preferred student-centered teaching strategies had higher levels of teaching confidence.

Hudson et al. (2018) conducted a study to evaluate the impact of a mixed-reality learning environment on preservice teachers' perceptions of readiness to manage a classroom. Participants in this study were undergraduate special education juniors (n = 25) at a university in the southeast United States. This study followed a mixed-method design wherein qualitative and quantitative data were concurrently collected and triangulated. Over the course of a semester, participants completed three mixed-reality simulation experiences. Researchers adapted a

perceptions questionnaire (Bautista & Boone, 2015) to collect demographic information and perceptions of readiness to manage a classroom. Participants completed this questionnaire at the end of their third mixed-reality simulation experience. Qualitative data was collected via videotaped one-minutes reflections that participants recorded after the second and third simulation. Researchers transcribed and coded these data. Several themes emerged through the data analysis. Participants reported that the mixed-reality experience felt real to them. They were able to practice new skills and gained confidence. Reflection helped participants gain a deeper understanding of their own teaching practices thus becoming aware of important skills that they lacked. Participants felt that they struggled to manage disruptive behavior positively.

Bautista and Boone (2015) conducted a study to investigate the impact of a mixed-reality simulation learning environment on the science teaching self-efficacy of preservice teachers. Participants in this study were preservice childhood education teachers (n = 62) at a Midwest public university in the United States. Participants completed three mixed-reality simulations and reflected on these experiences during a science methods class as part of their program coursework. In addition to participating in simulations, preservice teachers observed peers in their class section. To measure science teaching self-efficacy and science teaching outcome expectations, researchers used the STEBI (Enochs & Riggs, 1990) as a pretest and posttest. Researchers also collected qualitative data through five guided journal entries, which included open-ended questions for the preservice teachers to answer. The journal also prompted the preservice teachers to rate their confidence in their teaching abilities after each experience. Researchers used t-tests to analyze the quantitative data. The journal entries were thematically analyzed. Findings from the quantitative data analysis showed that science teaching self-efficacy and science teaching outcome expectations increased significantly over the course of the

semester. According to the journal entry analysis, participants' confidence in their ability to teach science decreased after the first simulation. However, after the third simulation, most of the participants felt more confident. Additionally, a lack of familiarity with the mixed-reality simulation learning environment software negatively impacted preservice teachers' emotional state and this in turn lowered their self-efficacy. Participants found the peer observation and instructor modelling to be helpful and valuable.

Gundel et al. (2019) conducted a study to examine the effects of a mixed-reality simulation learning environment on preservice teachers' sense of self-efficacy. Participants in this study were preservice teacher candidates (n = 53), who were sophomores or juniors in an undergraduate teacher preparation program in the northeastern United States. Researchers followed a repeated measures method, which involved a quasi-experimental, one group with three levels, pretest/posttest design. Participants in exposure group one experienced a total of 30 minutes in the mixed-reality simulation environment. Participants in exposure group two experienced a total of 60 minutes in the mixed-reality simulation learning environment. Participants in the exposure group three experienced a total of 90 minutes in the mixed-reality simulation environment. To collect data, researchers used the TSES (Tschannen-Moran & Hoy, 2001) to measure self-efficacy for teaching in addition to a demographic survey. Researchers used t-tests and an ANOVA to analyze the data. Findings from the analyses showed a significant main effect for total exposure time. Of note, researchers found a nonsignificant drop in self-efficacy among participants after 60 minutes of exposure time, a finding that has also been observed in other studies (Bautista & Boone, 2015). This phenomenon is thought to be the result of a "reality shock" that preservice teachers experience when transitioning from no experience to some practical experience.

All the research articles within this subsection looked at the effect of mixed-reality simulation learning environments on educators. Ledger et al. (2019) and Hudson et al. (2018) focused on the effects on teaching confidence while Bautista and Boone (2015) and Gundel et al. (2019) focused more specifically on the impact of mixed-reality simulation learning environments on teaching self-efficacy. Ledger et al. (2019) found that most preservice teachers operating within a mixed-reality simulation learning environment preferred questioning and direct instruction. There is a significant effect of teaching quality on preferred teaching strategy. Furthermore, teaching quality had a significant effect on teaching confidence. Results indicated that teachers who preferred student-centered teaching strategies had higher levels of teaching confidence. Hudson et al. (2018) found that the mixed-reality experience felt real to the participants. Participants were able to practice new skills and gained confidence. Reflection helped participants gain a deeper understanding of their own teaching practices thus becoming aware of important skills that they lacked. Lastly, participants felt that they struggled to manage disruptive behavior positively. Bautista and Boone (2015) found that science teaching self-efficacy and science teaching outcome expectations increased significantly over the course of the semester. Participants' confidence in their ability to teach science decreased after the first simulation. However, after the third simulation, most of the participants felt more confident. Participants found peer observation and instructor modelling to be helpful and valuable. Gundel et al. (2019) found a significant main effect on preservice teachers' sense of self-efficacy for total exposure time. Of note, researchers found a nonsignificant drop in self-efficacy among participants after 60 minutes of exposure time, a similar finding was observed by Bautista & Boone (2015). The present study builds upon this body of research, looking at the impact of a

mixed-reality simulation learning environment on the self-efficacy of preservice teachers while also integrating in the construct of mindfulness.

Mixed-reality Simulation Learning Environments and Mindfulness

The final subsection with this literature review centered around mixed-reality simulation learning environments and mindfulness. The researcher identified one related research article. Olcese, Fulchini, and McKinizie (2016) conducted a study to investigate how participating in a professional learning community (PLC) while receiving professional learning that incorporated mindfulness-based support and mixed-reality simulation learning environments impacted the overall experience of teachers. They also sought to understand the impact of these types of professional learning experiences on PreK-20 students. Participants in this study were teachers (n = 8) from socioeconomically low elementary schools in Orange County Public Schools. Recruitment for the study was purposive, based up being a first-year teacher and a willingness to participate in a PLC focused on the topic of supporting diverse learners. Over the course of six months, participants in the study attended three in-person professional learning sessions and engaged in an online PLC that involved teacher-led discussions grounded in the goal of learning and sharing about ways to support students. These online sessions also integrated various mindfulness-based therapy strategies. At the conclusion of the study, teachers demonstrated mindfulness-based communication strategies while engaging in a mixed-reality simulation learning environment utilizing a mixed-reality simulation learning environment. Data was collected via participant surveys, audio recordings of open-ended focus group interviews, and observational field notes. Following an interpretive qualitative approach, researchers analyzed the data with a thematic and constant comparative method (Creswell, 2017). After participating in this experience, teachers reported a shift in their perspective on mindfulness and its ability to

impact teaching and learning, as well as an openness to utilizing mindfulness-based practices in their personal lives. Further, teachers appreciated the safe space that the PLC provided them.

The researcher only identified one research study, that of Olcese et al. (2016), which involved mixed-reality simulation learning environments and mindfulness. Findings from this study were promising as teachers reported a shift in their perspective on mindfulness and its ability to impact teaching and learning, as well as an openness to utilizing mindfulness-based practices in their personal lives. The present study extended this research insofar as it also focused on mindfulness within a mixed-reality simulation learning environment context.

Summary of the Chapter

The purpose of this research study was to investigate the impact of a mindfulness-based coaching treatment on preservice teachers' sense of self-efficacy and mindfulness utilizing a mixed-reality simulation learning environment. This chapter presented a review of related literature and offered an overview of the theoretical underpinnings of mixed-reality simulation learning, teacher self-efficacy, and mindfulness in addition to an in-depth review of recent research relating to those three constructs. The literature review presented in this chapter was divided into three parts: (a) preservice teacher mindfulness literature, (b) preservice teacher self-efficacy literature, and (c) mixed-reality simulation learning environment literature.

The present study filled a noticeable gap in the literature, focusing on mindfulness, while also integrating self-efficacy, within a mixed-reality simulation learning environment. The importance of self-efficacy as a construct within education has been studied at great length. Similarly, an abundance of research spoke to the value of mindfulness, especially within an educational context. Furthermore, studies have considered mixed-reality simulation learning environments and self-efficacy (Bautista and Boone, 2015; Gundel et al., 2019; Ledger et al.,

2019; Hudson et al., 2018). One study (Olcese, et al., 2016) looked at mixed-reality simulation learning environments and mindfulness. Throughout the literature review process, however, the researcher was unable to find any research studies that integrated self-efficacy and mindfulness together with mixed-reality simulation learning environments.

Chapter Three includes: (a) description of the setting, participants, and sampling procedures, (b) research questions and hypothesis, (c) research design, (d) instrumentation, (e) data collected, (f) analyses, and (g) statement of ethics.

CHAPTER THREE: METHODOLOGY

This chapter describes the methodology used to conduct the study. The information presented in this chapter has been organized into seven sections: (a) description of the setting, participants, and sampling procedures, (b) research questions and hypothesis, (c) research design, (d) instrumentation, (e) data collected, (f) analyses, and (g) statement of ethics.

Description of the Setting, Participants, and Sampling Procedures

This study took place at a southern New England state university where, during the fall semester of 2018, there were 5,642 students; 614 graduate and 5,028 undergraduates (Western Facts & Figures, 2018). Eighty-five percent of the students were in-state residents (Western Facts & Figures, 2018). Women comprised 50.8% of the incoming freshman students and 35.6% of these students identified as racial or ethnic minorities (Western Facts & Figures, 2018). There were 220 full-time faculty members at this university, 90% of whom held advanced degrees (Western Facts & Figures, 2018). The faculty to student ratio was 13:1 (Western Facts & Figures, 2018).

The sample for the quantitative component of the study was a sample of convenience (Gall, Gall, & Borg, 2007). Participants in this study were selected based upon their enrollment in ED 206 Introduction to Education, an introductory course in the undergraduate preservice teacher preparation program, which students typically completed during their sophomore year.

This teacher preparation program was accredited by the National Council for Accreditation of Teacher Education (NCATE, 2015) and utilized the university's Mursion™ (2018) mixed-reality simulation (Piro & O'Callaghan, 2016; see Appendix A). Throughout the semester, students enrolled in ED 206 Introduction to Education completed three simulation experiences as part of the required coursework (Piro & O'Callaghan, 2017). The simulation

classroom involved a group of five middle school students (Piro & O'Callaghan, 2016). The high-leverage practices that the scenarios emphasized were building classroom rapport and forming rules (Piro & O'Callaghan, 2016). Students in ED 206 were instructed to prepare a lesson prior to each simulation experience (Piro & O'Callaghan, 2016). The preservice teachers had a specific task to accomplish during each simulation. Table 3.1 outlines the tasks and underlying pedagogy for each simulation.

Table 3.1

Tasks and Pedagogy for Mursion Simulations in ED 206 Introduction to Education

Simulation	Task	Pedagogy
#1	Discover information regarding your students to build rapport through a discussion	Teacher directed Whole class discussion Individual student questioning
#2	Guide a discussion on classroom procedures and routines	Teacher directed Whole class discussion Individual student questioning
#3	Guide a discussion on classroom rules	Teacher directed Whole class discussion Individual student questioning

Note. (Piro & O'Callaghan, 2016)

The preservice teacher participants for this study were comprised of four course sections of ED 206 Introduction to Education. Two course sections in the spring semester of 2019 comprised the treatment group and two course sections in the fall semester of 2019 comprised the comparison group. The groups remained intact (Gall et al., 2007). The treatment group contained a total of 17 participants. The comparison group contained a total of 23 participants.

When designing this study, the initial plan was to only include two course sections from spring semester of 2019. One section would be assigned as the treatment group and the other section would be assigned at the comparison group. However, due to low course enrollment, the

researcher decided to provide the treatment to both sections of ED 206 Introduction to Education in the spring semester of 2019. Comparison group data was then collected from two additional course sections in the fall semester of 2019.

The sample for the qualitative component of the study was bound by enrollment in ED 206 Introduction to Education. The researcher interviewed all participants in the treatment and comparison groups for the study.

At the start of each semester, the researcher met with students enrolled in ED 206 Introduction to Education to ask if they would like to participate in the study. During the spring semester of 2019, all preservice teachers in both sections agreed to participate. This comprised the treatment group, $n = 17$. During the fall semester of 2019, all preservice teachers in both sections agreed to participate. Preservice teachers with incomplete datasets were removed from the study. This comprised the comparison group, $n = 23$. Participants for the qualitative component of this study included all treatment and comparison group participants, $n = 40$.

For demographic data on the preservice teacher participants, refer to Tables 3.2, 3.3, 3.4, and 3.5.

Table 3.2

Preservice Teacher Participant Demographic Data in Quantitative Study

Participant	Age	Gender	Ethnicity	Major	GPA
			Treatment		
1	20	Male	Hispanic-American	Secondary Ed 7-12 Math	3.10
2	20	Female	Caucasian-American	Elementary Education	3.09
4	20	Female	Caucasian-American	Secondary Ed 7-12 Math	3.23
5	18	Female	Caucasian-American	Elementary Education	3.12
6	18	Female	Caucasian-American	Secondary Ed 7-12 Math	4.00
7	20	Female	Caucasian-American	Music Education (K-12)	3.52
8	20	Female	Hispanic-American	Secondary Ed 7-12 Biology	3.07
9	20	Female	Caucasian-American	Secondary Ed 7-12 English	3.20
10	21	Male	Caucasian-American	Music Education (K-12)	3.20
11	20	Male	Caucasian-American	Music Education (K-12)	3.00
12	18	Female	Caucasian-American	Elementary Education	3.00
13	19	Male	Caucasian-American	Secondary Ed 7-12 History	3.90
14	20	Female	Caucasian-American	Secondary Ed 7-12 Science	3.37
15	19	Female	Caucasian-American	Secondary Ed 7-12 English	3.02
16	23	Female	Hispanic-American	Elementary Education	3.48
17	20	Female	Caucasian-American	Secondary Ed 7-12 English	3.74
19	21	Female	Caucasian-American	Music Education (K-12)	3.60
			Comparison		
21	19	Female	Caucasian-American	Elementary Education	3.73
22	19	Female	Caucasian-American	Elementary Education	3.68
23	18	Male	Caucasian-American	Elementary Education	3.00
24	19	Female	Caucasian-American	Secondary Ed 7-12 Math	4.00
25	18	Female	Caucasian-American	Elementary Education	3.60
26	20	Male	Caucasian-American	Music Education (K -12)	3.50
30	18	Female	Hispanic-American	Secondary Ed 7-12 History	3.60
32	20	Female	Caucasian-American	Elementary Education	2.97
33	19	Female	Caucasian-American	Elementary Education	3.10
34	19	Male	Caucasian-American	Secondary Ed 7-12 History	3.74
35	18	Female	Caucasian-American	Elementary Education	3.10
36	18	Female	Caucasian-American	Elementary Education	2.77
42	19	Female	Caucasian-American	Music Education (K -12)	3.96
46	19	Female	Caucasian-American	Music Education (K -12)	3.50
47	19	Female	African-American	Music Education (K -12)	3.60
49	18	Female	African-American	Secondary Ed 7-12, English	3.20
50	18	Male	Caucasian-American	Music Education (K -12)	3.70
52	19	Male	Caucasian-American	Secondary Ed 7-12 History	3.00
53	20	Female	Caucasian-American	Secondary Ed 7-12 Math	3.40

(continued)

Table 3.2

Preservice Teacher Participant Demographic Data in Quantitative Study

Comparison					
Participant	Age	Gender	Ethnicity	Major	GPA
55	19	Female	Caucasian-American	Elementary Education	3.20
56	19	Female	Latina	Secondary Ed 7-12 Math	3.40
60	21	Male	Caucasian-American	Health Promotion Studies	3.04
61	18	Male	Asian-American	Music Education (K -12)	3.65

Table 3.3

Summary of Preservice Teacher Demographic Data in Quantitative Study

Variable	Qualifier	Treatment Group		Comparison Group	
		n	%	*n*	%
Gender	Male	4	24	7	30
	Female	13	76	16	70
Ethnicity	African-American	0	0	2	9
	Asian-American	0	0	1	4
	Caucasian-American	14	82	18	78
	Hispanic-American	3	18	2	9
Graduation Year	2020	1	6	0	0
	2021	11	65	3	13
	2022	5	29	20	87
Program	Elementary	4	24	11	48
	K-12	1	6	3	13
	Secondary	12	71	9	39

Table 3.4

Demographic Information for Preservice Teacher Participants in Qualitative Study

Variable	Qualifier	Number of Student Participants	
		n	%
Gender Identity	Female	29	73
	Male	11	27
Ethnicity	African-American	2	5
	Asian-American / Pacific Islander	1	3
	Caucasian-American	32	80
	Hispanic-American	5	13
Anticipated Graduation Year	2020	1	3
	2021	14	35
	2022	25	63
Program	Elementary	16	33
	K-12	13	26
	Secondary	20	41
Concentration	Health	1	3
	Interdisciplinary Major	13	33
	Music	10	25
	Secondary Education	16	40

Table 3.5

Age and Grade Point Average Statistics of Preservice Teacher Participants in Qualitative Study

Variable (n = 40)	Age	Grade Point Average
Mean (Average)	19	3.38
Median	19	3.40
Mode	19	3.60
Minimum	18	2.77
Maximum	23	4.00

Research Questions and Hypothesis

Three research questions guided the study:

1. Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' perceptions of mindfulness during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.
2. Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' sense of self-efficacy during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.
3. What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment?

Research Design

This study followed a mixed-methods concurrent embedded (Creswell & Plano Clark, 2011) design. Qualitative and quantitative data were concurrently collected. Data were analyzed separately and then compared and combined (Creswell & Plano Clark, 2011).

Phase one of the study included a quasi-experimental design (Gall et al., 2007). The independent variable was the treatment type and the dependent variables were self-efficacy for teaching and mindfulness as measured by the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001) and the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003a), respectively. These instruments were administered as pretests and posttests to the treatment group (n = 17) and the comparison group (n = 23).

The qualitative research design was an exploratory case study bound by preservice teacher candidates enrolled in ED 206 Introduction to Education (Creswell, 2017). During phase one of the study, the researcher also collected qualitative data relating to the preservice teachers in the treatment and comparisons groups via various instruments outlined in the instrumentation section of this chapter.

Phase two of the study was comprised of participant interviews (Seidman, 2013). The researcher utilized researcher-adapted semi-structured interview protocols (see Appendices D & E). The goal of these participant interviews was to understand the perceptions of preservice teachers that participated in mixed-reality simulations and received the mindfulness coaching treatment as well as the perceptions of preservice teachers that did not receive the treatment.

Data Collection Procedures and Timeline

After receiving Internal Review Board (IRB) approval for the study, the researcher obtained permission from the university dean, the education department chair, and the course

instructors to conduct the study (see Appendixes F, G, & H). During week 1 of the spring semester of 2019, the researcher obtained consent from preservice teachers in the treatment group (see Appendix G). During week 1 of the fall semester of 2019, the researcher obtained consent from the preservice teachers in the comparison group (see Appendix H). The TSES (Tschannen-Moran & Hoy, 2001) and the MAAS (Brown & Ryan, 2003a) were administered to all the preservice teacher participants. The researcher attended and videotaped all three of the mixed-reality simulations for participants in the treatment and comparison groups, which took place during weeks 6, 10, and 14 of the spring semester of 2019 and weeks 6, 10, and 14 of the fall semester of 2019. The researcher recorded notes using a researcher-adapted observation protocol (see Appendix I). Video recordings as well as the observation notes informed the one-to-one mindfulness coaching sessions for participants in the treatment group. At the end of each mixed-reality simulation, participants in the treatment and comparison groups responded to a reflection prompt (see Appendices L & M). The researcher read and analyzed these reflections as a form of triangulation (Creswell, 2017: Lincoln & Guba, 1985).

The researcher audio recorded and transcribed the one-to-one mindfulness coaching sessions and used a researcher-created note-catcher document (see Appendix L) to record information and notes during the mindfulness coaching sessions. Throughout the semester, each participant in the treatment group received four one-to-one mindfulness-coaching sessions, with the first session taking place during week 3, 4, or 5 or the semester, prior to the first mixed-reality simulation. Subsequent coaching sessions took place during weeks 6, 10, and 14 of the semester, within 72 hours of each mixed-reality simulation. To ensure consistency and fidelity, the researcher followed a researcher-adapted semi-structured mindfulness-based coaching protocol (see Appendix M) and utilized a researcher-created mindfulness-based coaching

curriculum (see Appendix N), which reflected essential, research-backed characteristics of mindfulness-based programs (Crane, Brewer, Feldman, Kabat-Zinn, Santorelli, Williams, & Kuyken, 2017; see Appendix O). The researcher communicated with participants in the treatment group via text message (see Appendix P) during weeks 6, 10, and 14 of the semester, in the morning prior to each mixed-reality simulation to remind participants about goals from the coaching sessions.

At the conclusion of the spring semester of 2019, during week 15, the researcher re-administered the TSES (Tschannen-Moran & Hoy, 2001) and MAAS (Brown & Ryan, 2003a) to all treatment group participants as posttests to determine the impact of the mindfulness-based coaching treatment on the preservice teachers' self-efficacy for teaching and mindfulness. Treatment group participant interviews then took place during week 15 of the spring semester of 2019. At the conclusion of the fall semester of 2019, during week 15, the researcher re-administered the TSES (Tschannen-Moran & Hoy, 2001) and MAAS (Brown & Ryan, 2003a) to all comparison group participants. Comparison group participant interviews then took place during week 15 of the fall semester of 2019. Table 3.6 below displays a data collection and treatment timeline.

Table 3.6

Data Collection and Treatment Timeline

Spring Semester 2019 - Treatment Group	
Timeframe	Data Collection / Treatment Event
Week 1	Obtain Consent Administer Researcher-created Demographic Survey Administer TSES Administer MAAS
Week 2	Course Sessions
Week 3	Administer Mindfulness Coaching Session #1
Week 4-5	Course Sessions
Week 6	Send Text Message #1 Collect Observation Data from Simulation #1 Collect Written Reflections Administer Mindfulness Coaching Session #2
Week 7-9	Course Sessions
Week 10	Send Text Message #2 Collect Observation Data from Simulation #2 Collect Written Reflections Administer Mindfulness Coaching Session #3
Week 11-13	Course Sessions
Week 14	Send Text Message #3 Collect Observation Data from Simulation #3 Collect Written Reflections Administer Mindfulness Coaching Session #4
Week 15	Administer TSES Administer MAAS Conduct Participant Interviews

(continued)

Table 3.6

Data Collection and Treatment Timeline

Fall Semester 2019 - Comparison Group	
Timeframe	Data Collection / Treatment Event
Week 1	Obtain Consent from Comparison Group Participants Administer Researcher-created Demographic Survey Administer TSES Administer MAAS
Week 2-5	Course Sessions
Week 6	Collect Observation Data from Simulation #1 Collect Written Reflections
Week 7-9	Course Sessions
Week 10	Collect Observation Data from Simulation #2 Collect Written Reflections
Week 11-13	Course Sessions
Week 14	Collect Observation Data from Simulation #3 Collect Written Reflections
Week 15	Administer TSES Administer MAAS Conduct Participant Interviews

Treatment

Participants in the treatment group received a mindfulness-based coaching treatment over the course of 15 weeks in the spring semester of 2019 (see Appendix N). Throughout this semester, preservice teacher participants in the treatment group engaged in three mixed-reality simulation learning environment experiences utilizing the Mursion™ (2018) technology. The researcher met in-person with participants in the treatment group on four different occasions to

provide one-to-one mindfulness-based coaching sessions in conjunction with the simulation experiences. The researcher collected video recordings of these simulation experiences. The researcher also recorded notes using a researcher-adapted observation protocol (see Appendix I) during the simulation experiences. These data informed the one-to-one mindfulness-based coaching sessions.

The first mindfulness coaching session took place during weeks 3, 4, or 5 of the semester, depending upon the participant's schedule, prior to the first mixed reality simulation. Mindfulness-based coaching sessions then followed each simulation experience, during weeks 6, 10, and 14 of the semester, taking place within 72 hours of the simulation experience when possible. The researcher communicated with each participant via text message to schedule and coordinate these meetings.

In addition to the mindfulness-based coaching, the researcher communicated with participants in the treatment group via text message the morning prior to each mixed-reality simulation experience to remind treatment group participants about goals from the most recent coaching session. Table 3.7 below displays the mindfulness coaching reminder text messages that were sent to participants in the treatment group.

Table 3.7

Text Message Reminders Sent to Treatment Group Participants Prior to Each Simulation

Text Message for Simulation #1	**"**Hi <participant name>. This is <researcher name>. It was great meeting you last week. As you mentally prepare for your Mursion™ simulation tonight, remember to breathe and try your best to stay present in the moment tonight. You will do great – BCOOL!"
Text Message for Simulation #2	**"**Hi <participant name>. I hope you are having a good day. Looking forward to seeing you tonight. As you ready yourself for the Mursion™ simulation, think about the mindfulness practice of Noting that we spoke out during our last meeting. Also, don't forget to breathe!"
Text Message for Simulation #3	"<participant name>! Congrats on almost being done with your Mursion™ simulations. During your final simulation tonight, I hope you will be able to apply all of the mindfulness knowledge and practices that we worked through during our coaching sessions together. Remember to breath, BCOOL, and check in with yourself as needed. You will be great!"

Mindfulness Coaching Curriculum. To ensure consistency and fidelity across all coaching sessions, the researcher followed a researcher-adapted mindfulness-based coaching protocol (see Appendix M). The researcher also utilized a researcher-created mindfulness-based coaching curriculum (see Appendix N), which was based upon research-backed characteristics of mindfulness-based programs (Crane et al., 2017). The researcher-created mindfulness-based coaching curriculum contained a curriculum description, content knowledge for the mindfulness coach, and detailed plans and clearly stated objectives for all four one-to-one mindfulness coaching sessions. The researcher-created mindfulness-based coaching curriculum also included four one-page documents that the researcher gave to treatment group participant at each coaching session (see Appendix Q). These one-page documents displayed and summarized key information related to each coaching session.

Treatment Fidelity. The researcher employed strategies to monitor the treatment fidelity within this study, ensuring that the mindfulness-based coaching treatment was implemented as planned, with each component being delivered to all participants within the treatment group in a comparable manner over time, with accuracy and consistency (Smith, Daunic, & Taylor, 2007). As a best practice, the researcher utilized a database to document and track all communications and meetings with participants in the treatment group to ensure that all components of the treatment took place at the designated times (Bellg, Borrelli, Resnick, Hecht, Minicucci, Ogedegbe, Orwig, Ernst, & Czajkowski, 2004). If coaching sessions or communications ever deviated from the intended plan, this was notated in the database. All mindfulness-based coaching sessions were audio recorded and transcribed and these data were also stored within the database. The researcher also maintained a reflexive journal that contained researcher memos with notes and reminders about the treatment implementation (Bellg et al., 2004). Because the researcher both designed and directly implemented the mindfulness-based coaching treatment, there was no need to provide treatment implementation training to others. Having the same person deliver the treatment facilitated consistency.

Comparison Group. Throughout the fall semester of 2019, preservice teacher participants in the comparison group engaged in three mixed-reality simulation learning environment experiences, utilizing the Mursion ™ (2018) technology. However, the researcher did not provide one-to-one mindfulness-based coaching and the researcher did not send text message reminders to participants in the comparison group.

Instrumentation

The Researcher-adapted Demographic Survey. A researcher-adapted demographic survey (see Appendix R) was administered at the beginning of each semester to collect

information about the preservice teacher participant population. This instrument solicited information about gender identity, ethnicity, age, major, GPA, and anticipated teaching level.

Researcher-adapted Observation Protocol. Mixed-reality simulations took place during weeks 6, 10, and 14 of the spring semester of 2019 and weeks, 6, 10, and 14 of the fall semester of 2019. During these simulations, the researcher utilized a researcher-adapted observation protocol (see Appendix I) to collect observation data about each participant. This instrument prompted the researcher to record general observations as well as notes about feedback received from the instructor and peers, notes about mindfulness, and notes about whether or not the participant stepped out of the simulation.

Researcher-created Reflection Prompts. Participants in the treatment and comparison groups responded to a researcher-created reflection prompt (see Appendices L &M) at the conclusion of each mixed-reality simulation, as a form of data triangulation (Creswell, 2017). Reflections prompted the participants to consider how they felt about the overall experience and to describe their emotional response to the experience. For participants in the treatment group, the prompt also asked about mindfulness strategies that were utilized during the simulation.

Pretest/Posttest. To understand the preservice teachers' perceptions of self-efficacy and mindfulness, the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001) and the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003a), respectively, were administered as pretests during week 1 and as posttests during week 15 of each semester.

Teachers' Sense of Efficacy Scale (TSES). The TSES (Tschannen-Moran & Hoy, 2001) measured people's beliefs about their self-efficacy for teaching. The instrument was developed for use with preservice teachers and in-service teachers. The long form version of the TSES (Tschannen-Moran & Hoy, 2001), which was recommended for use with preservice teachers

(Tschannem-Moran & Hoy, 2001; Duffin et al., 2012) contains 24 items, each of which are measured as 1 through 9 on a Likert scale, with 1 being the lowest self-rating and 9 being the highest. The TSES (Tschannen-Moran & Hoy, 2001) contains three self-efficacy subscales: efficacy for classroom management (8 items), efficacy for student engagement (8 items), and efficacy for using instructional strategies (8 items; Tschannen-Moran & Hoy, 2001). Scoring the scale involved computing unweighted means of the different items for each subscale. Tschannen-Moran and Hoy (2001) recommended using the total scale mean score rather than the subscale mean scores for preservice teachers who are at the beginning of their teacher preparation program (Duffin et al., 2012; Tschannen-Moran & Hoy, 2001).

During review of the long form version of the TSES (Tschannen-Moran & Hoy, 2001) for reliability, the self-efficacy subscale's internal consistency (Cronbach's alpha) measured at .90, .87, and .91, respectively, and .94 overall (Tschannen-Moran & Hoy, 2001). Follow up research with two samples of preservice teachers, containing 272 and 180 undergraduate students, achieved similar results (Duffin et al., 2012).

Research indicated that the constructs of this instrument were being measured as intended (Tschannen-Moran & Hoy, 2001). To establish construct validity, Tschannen-Moran and Hoy (2001) compared TSES (Tschannen-Moran & Hoy, 2001) scores with pre-existing self-efficacy instruments. The TSES (Tschannen-Moran & Hoy, 2001) was found to be positively correlated concerning convergent and discriminate validity (Gibson & Dembo, 1984). The TSES (Tschannen-Moran & Hoy, 2001) was easy to use and was available to researchers at no cost. The scale was completed with paper and pencil in approximately five minutes. Findings indicated that the TSES (Tschannen-Moran & Hoy, 2001) was a valid and reliable instrument for research purposes.

Mindful Attention Awareness Scale (MAAS). The Mindful Attention Awareness Scale (Brown & Ryan, 2003a), was a scale that was developed for adults to assess core characteristics of mindfulness. The creators of this scale defined mindfulness as, "the presence or absence of attention to, and awareness of, what is occurring in the present moment (Brown & Ryan, 2003b, p. 824). The MAAS (Brown & Ryan, 2003a) contains 15 items, each of which is measured as 1 through 6 on a Likert scale, with 1 being the lowest self-rating of mindfulness and 6 being the highest self-rating (Brown & Ryan, 2003a). The directions for scoring the scale involved calculating a mean for the 15 items (Brown & Ryan, 2003a).

The MAAS (Brown & Ryan, 2003a) was initially tested for validity and reliability with a sample of 327 university students and a sample of 239 adults. Findings indicated internal consistency (Cronbach's alpha) of .82 and .87, respectively (Brown & Ryan, 2003b). Follow up research has achieved similar results (MacKillop & Anderson, 2007). Confirmatory factor analysis of the MAAS (Brown & Ryan, 2003b) supported the unidimensional factor structure of the scale (MacKillop & Anderson, 2007).

The MAAS (Brown & Ryan, 2003a) had reported convergent and discriminate validity with other measures of psychological well-being (Brown & Ryan, 2003b; MacKillop & Anderson, 2007) such as the NEO Five-Factor Inventory ($r = .19$, $p < .05$; Costa & McCrae, 1992) as well as the Mindfulness/Mindlessness Scale ($r = .33$, $p < .0001$; MMS; Bodner & Langer, 2001). The MAAS (Brown & Ryan, 2003a) exhibited incremental validity through its capacity to predict depressive and anxious symptoms (Zvolensky et al., 2006). Findings indicated that the MAAS (Brown & Ryan, 2003a) was a valid and reliable instrument for research purposes.

Researcher-adapted Semi-structured Interview Protocols. To address the qualitative research question, the researcher adapted two semi-structured interview protocols (see Appendices D & E) from a related study (Gundel, 2018). The interview protocol for participants in the treatment group (see Appendix B) contained questions relating to the experience of receiving a mindfulness-based coaching treatment and participating in mixed-reality simulations as it relates to self-efficacy. The interview protocol for participants in the comparison group (see Appendix C) did not contain questions relating to the mindfulness-based coaching treatment. Semi-structured interviews were conducted in-person at the university or via telephone and lasted between 5 and 20 minutes, depending upon the engagement level of the participant.

Data Collected

The researcher created a database to ensure a reliable and precise record of all quantitative and qualitative data collected. All preservice teacher participants were assigned a unique number and pseudonym to aid in maintaining confidentiality. The researcher manually transferred quantitative data from the demographic survey, MAAS (Brown & Ryan, 2003a), and the TSES (Tschannen-Moran & Hoy, 2001) into the database and also saved digital copies of these raw data. The researcher recorded and transcribed all of the coaching sessions and semi-structured interviews. Digital copies of the audio recording and transcriptions were saved within the database. Written reflections and observational notes were digitally scanned and saved within the database as well. All qualitative data were subsequently uploaded to HyperRESEARCH™ (2019) to facilitate coding.

Quantitative Data

Demographic survey data. All participants within the treatment and comparison groups were invited to respond to a researcher-adapted demographic survey at the beginning of the

semester. This instrument solicited information about gender identity, ethnicity, age, major, GPA, and anticipated teaching level. Participants completed a paper-and-pencil version of this instrument and then the researcher manually transferred these data into the database. All 17 participants in the treatment group and all 23 participants in the comparison group responded to the researcher-adapted demographic survey.

Mindful attention awareness scale data. All participants within the treatment and comparison groups were invited to complete the MAAS (Brown & Ryan, 2003a) as a pretest during week 1 of the semester and a posttest during week 15 of the semester. Participants completed a paper-and-pencil version of his instrument and then the researcher manually transferred these data into the database. All 17 participants in the treatment group and all 23 participants in the comparison group completed the MAAS (Brown & Ryan, 2003a).

Teachers' sense of efficacy scale data. All participants within the treatment and comparison groups were invited to complete the TSES (Tschannen-Moran & Hoy, 2001) as a pretest during week 1 of the semester and a posttest during week 15 of the semester. Participants completed a paper-and-pencil version of his instrument and then the researcher manually transferred these data into the database. All 17 participants in the treatment group and all 23 participants in the comparison group completed the TSES (Tschannen-Moran & Hoy, 2001).

Qualitative Data

Reflection data. At the end of each mixed-reality simulation experience, preservice teacher participants responded to a short reflection prompt (see Appendices L & M). The prompt solicited preservice teacher participant thoughts on the overall simulation experience and asked about emotional responses to the experience. The researcher used a modified reflection prompt (see Appendix J) for the treatment group. This version also included questions that pertained to

the one-to-one mindfulness-based coaching. In total, the researcher collected 127 reflections from preservice teacher participants.

Quotes and citing notes. Quotations from the written reflections were utilized *in situ* by the researcher to support the description of the themes, subthemes, and code categories. When quoting or paraphrasing a preservice teacher participant, the researcher used pseudonyms.

Semi-structured interview data. The researcher adapted a semi-structured interview protocol (see Appendices D & E) from a similar study (Gundel, 2018), asking questions framed by Bandura's (1986, 1994, 1997, 2000) four ways to cultivate a strong sense of self-efficacy. The researcher used a modified semi-structured interview protocol (see Appendix B) for the treatment group. This version also contained questions related to the one-to-one mindfulness-based coaching. Interviews were conducted with all 17 participants in the treatment group. These ranged in length from 7 to 23 minutes in total. Interviews were conducted with all 23 of the participants in the comparison group. These ranged in length from 3 to 13 minutes in total. In all, the researcher collected 5.75 hours of data via semi-structured interview.

Audio transcriptions. All the semi-structured interviews were audio recorded and transcribed. The researcher utilized Otter™ (2019) to record the audio and this application also generated transcriptions. After recording each semi-structured interview, the researcher reviewed and edited each transcription for accuracy while listening to the audio recordings.

Quotes and citing notes. Transcriptions from the semi-structured interviews were utilized *in situ* by the researcher to support the description of the themes, subthemes, and code categories. When quoting or paraphrasing a preservice teacher participant, the researcher used pseudonyms.

Coaching session data. Utilizing a researcher-developed mindfulness-based coaching curriculum (see Appendix N) and a researcher-adapted coaching protocol (see Appendix M), the

researcher provided four one-to-one mindfulness-based coaching sessions to 16 participants in the treatment group. One participant only attended three sessions. These coaching sessions entailed debriefing on simulation experiences, offering feedback, and teaching about mindfulness strategies to utilize. Coaching sessions ranged in length from 6 to 36 minutes in total. In all, the researcher collected data via coaching session over a combined total of 19.25 hours.

Audio transcriptions. All the coaching sessions were audio recorded and transcribed. The researcher utilized Otter™ (2019) to record the audio and this application also generated transcriptions. After recording each coaching session, the researcher reviewed and edited each transcription for accuracy while listening to the audio recordings.

Quotes and citing notes. Transcriptions from the coaching were utilized *in situ* by the researcher to support the description of the themes, subthemes, and code categories. When quoting or paraphrasing a preservice teacher participant, the researcher used pseudonyms.

Mixed-reality simulation observation data. The researcher observed three mixed-reality simulation experiences for each preservice teacher participant, following a researcher-adapted observation protocol (see Appendices K). The protocol was utilized to record anecdotal data related to self-efficacy and mindfulness, as well as to document the feedback sessions that followed the simulation. In summary, the researcher observed and collected data from 24 hours of mixed-reality simulation experiences.

Analyses

Quantitative Analysis

Mindful attention awareness scale data analysis. The researcher conducted an ANOVA on the MAAS (Brown & Ryan, 2003a) pretest data to account for the fact that the individuals were not randomly assigned to the groups in order to confirm that groups were

equivalent at pretest (Meyers et al., 2013). The researcher then conducted an ANOVA on the MAAS (Brown & Ryan, 2003a) posttest data to determine if there were any significant differences (Pallant, 2013) for participants in treatment and comparison groups after receiving the mindfulness-based coaching treatment.

The independent variable was categorical data, treatment type. There were two levels, receiving the mindfulness coaching treatment or not receiving the mindfulness coaching treatment. The dependent variable was numerical data, scores on the MAAS (Brown & Ryan, 2003a). These data were analyzed to address research question one. The researcher used the Statistical Package for Social Sciences (SPSS; 2013) to analyze this test statistic. The alpha level was set at $p = .05$ (Pallant, 2013). To ensure that validity of the results, prior to running each ANOVA, the researcher addressed missing values within the data, assessed the data for outliers, and checked the data for assumptions of the ANOVA (Pallant, 2013).

Teachers' sense of efficacy scale data analysis. The researcher conducted an ANOVA on the TSES (Tschannen-Moran & Hoy, 2001) pretest data to account for the fact that the individuals were not randomly assigned to the groups in order to confirm that groups were equivalent at pretest (Meyers et al., 2013). The researcher then conducted an ANOVA on the TSES (Tschannen-Moran & Hoy, 2001) posttest data to determine if there were any significant differences (Pallant, 2013) for participants in treatment and comparison groups after receiving the mindfulness-based coaching treatment.

The independent variable was categorical data, treatment type. There were two levels, receiving the mindfulness coaching treatment or not receiving the mindfulness coaching treatment. The dependent variable was numerical data, scores on the TSES (Tschannen-Moran & Hoy, 2001). These data were analyzed to address research question two. The researcher used the

Statistical Package for Social Sciences (SPSS; 2013) to analyze this test statistic. The alpha level was set at $p = .05$ (Pallant, 2013). To ensure that validity of the results, prior to running each ANOVA, the researcher addressed missing values within the data, assessed the data for outliers, and checked the data for assumptions of the ANOVA (Pallant, 2013).

Qualitative Analysis

To derive meaning from the qualitative data, the researcher assumed the role of objective recorder and analyzer of the lived experiences of others (Lichtman, 2006). Through multiple methods and sources of data collection, the researcher triangulated data (Creswell, 2017: Lincoln & Guba, 1985), increasing the likelihood of credible findings (Lincoln & Guba, 1985). Data was collected via coaching sessions, written reflections, semi-structured interviews, and observations following researcher-adapted protocols (see Appendices D, E, K, & O). These data were analyzed to address research question three.

The researcher utilized HyperRESEARCH™ (2019), a qualitative data analysis software package, to manage the coding and retrieval of written qualitative data. The researcher analyzed the raw data through an iterative coding processes as described by Saldaña (2010), employing deductive and inductive codes. The researcher utilized codes informed by the literature, using Bandura's (1986, 1994, 1997, 2000) four ways to cultivate a strong sense of self-efficacy (master experiences, vicarious experiences, social encouragement, and emotional arousal) to frame the preliminary coding. This approach was expanded upon with inductive codes that arose from the data as patterns became evident (Miles, Huberman & Saldana, 2014).

When creating inductive codes, the researcher utilized descriptive coding (Miles et al., 2014) to summarize meaning using a short word or phrase such as "self-care practice." The research also employed in vivo coding (Miles et al., 2014), borrowing language from participants

to create codes such as “fake it.” The researcher maintained a codebook within HyperRESEARCH™ (2019) to catalog a list of all codes and the meaning of each code.

Through a second and third cycle of coding, the deductive and inductive coders were reduced down to 92 codes. During this process, the researcher collapsed together codes that had redundant or similar meaning. For example, the codes “breathing exercise,” “deep breath,” “mindful breathing,” and “just breath” were collapsed into the code “breathing exercise.” Condensing the codes enabled the researcher to identify patterns and important factors for analysis (Miles et al., 2014). Codes were then grouped into categories. For example, the codes “breathing exercise,” “decompress,” “psychological health,” “stress relief,” “stress relief strategy,” “support network,” “talking helps,” and “essential oils,” were collapsed into the category of “self-care practices.” Code categories were then organized into subthemes. For example, the code categories “self-care practices” and “extending mindfulness to other aspects of life” comprised the subtheme of “mindfulness as self-care.” Subthemes were then organized into themes. These themes were then connected to one another within a single finding statement. The researcher used a chart to organize this information (see Appendix S).

Statement of Ethics

The researcher had an approved dissertation proposal and received prior approval from the Internal Review Board (IRB) before beginning research. Prior to this study, the researcher obtained a Human Subjects certificate. A letter of permission from the university dean, education department chair, and course instructor (see Appendices F, G, & H) was obtained and given to the primary advisor. The researcher met with all participants in this study at the beginning of the academic semester. As part of standard best practices in educational research, the researcher obtained consent from all participants in the study (see Appendices I & J),

ensuring that participants understood that participation was voluntary. Pseudonyms for the institution and the participants were used. Data was stored in a secured location and personal information was coded for privacy and security. Codes were assigned to responses and these data were available to researchers related to the study for the purpose of data verification, coding, and analysis. An external audit of all data was conducted. The results were made available to participants, if requested.

CHAPTER FOUR: ANALYSIS OF DATA AND FINDINGS

The purpose of this study was two-fold: (a) to investigate the impact of a mindfulness-based coaching treatment on preservice teachers' mindfulness and sense of self-efficacy and, (b) to understand the perceptions regarding self-efficacy of preservice teachers participating a mixed-reality simulation environment. To address this purpose, three research questions related to self-efficacy and mindfulness provided a focus for this study. Data were collected across multiple mediums. This chapter, the analysis of data and findings, contains the following four sections: (a) overview of the study, (b) quantitative findings, (c) results of qualitative data analysis, and (d) summary of findings.

Overview of the Study

A mixed-methods concurrent embedded (Creswell & Plano Clark, 2011) design was used to discover effects on and perceptions of self-efficacy amongst preservice teachers when receiving mindfulness-based coaching while participating in a mixed-reality simulation learning environment. The research questions used to guide this study were as follows:

1. Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' perceptions of mindfulness during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.

2. Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' sense of self-efficacy during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.
3. What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment?

The quantitative component of the study employed a quasi-experimental design (Gall et al., 2007). A sample of convenience (Gall et al., 2007) was used from four intact groups of students enrolled in ED 206 Introduction to Education, an introductory course in the undergraduate preservice teacher program, for the treatment and comparison groups. The qualitative research design was an exploratory case study bound by preservice teacher candidates enrolled in ED 206 Introduction to Education (Creswell, 2017).

During the spring semester of 2019, the researcher provided a mindfulness-based coaching treatment to preservice teacher participants in the treatment group (n = 17). Quantitative data for the treatment group was collected via pretest, posttest, and demographic survey. Qualitative data for the treatment group was collected via coaching sessions, mixed-reality simulation experience observations, written reflections, and semi-structured interviews.

The researcher attended and observed three mixed-reality simulation learning environment experiences. Participants responded to a short reflection prompt after each simulation experience. The researcher provided four one-to-one mindfulness-based coaching sessions to 16 participants in the treatment group. One participant only attended three coaching sessions. Semi-structured interviews were conducted with all 17 participants in the treatment group.

During the fall semester for 2019, the researcher collected data from participants in the comparison group (n = 23). No mindfulness-based coaching treatment was provided to participants in the comparison group. Quantitative data for the comparison group was collected via pretest, posttest, and demographic survey. Qualitative data for the comparison group was collected via mixed-reality simulation experience observations, written reflections, and semi-structured interviews. The researcher attended and observed three mixed-reality simulation learning environment experiences. Participants responded to a short reflection prompt after each simulation experience. Semi-structured interviews were conducted with all 23 of the participants in the comparison group.

Following the data collection, all quantitative data were cleansed, and assumptions were addressed. An analysis of variance (ANOVA) was performed twice to address research questions one and two (Gall et al, 2003; Meyers et al., 2013). The researcher conducted two ANOVAs on the pretest data in order to account for the fact that the individuals were not randomly assigned to the groups in order to confirm that groups were equivalent at pretest. Since a total of four ANOVAs were conducted, a Bonferroni Adjustment (Meyers et al., 2013) was applied and the alpha level was set at .0125. To maintain the Overall Type 1 error rate at .05, the alpha level for each individual ANOVA was set at .0125. Data analysis showed no

significant differences in posttest mean scores between the treatment and comparison groups for teachers' perceptions of mindfulness or sense of self-efficacy.

Concurrent to the quantitative data analysis, the qualitative data were analyzed and interpreted to address research question three. The researcher utilized a deductive and inductive coding process (Saldaña, 2010). The original codes were grouped into categories and subthemes, which were then organized into three themes. These themes were then analyzed to create a single findings statement.

Quantitative Findings

The quantitate data for this study were from preservice teacher responses to the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003a) and the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001).

The Mindful Attention Awareness Scale (Brown & Ryan, 2003a), is a scale that was developed for adults to assess core characteristics of mindfulness. The MAAS (Brown & Ryan, 2003a) contains 15 items, each of which is measured as 1 through 6 on a Likert scale, with 1 being the lowest self-rating and 6 being the highest (Brown & Ryan, 2003a). The directions for scoring the scale involve calculating a mean for the 15 items (Brown & Ryan, 2003a).

The TSES (Tschannen-Moran & Hoy, 2001) measures people's beliefs about their self-efficacy for teaching. The long form version of the TSES (Tschannen-Moran & Hoy, 2001), which is recommended for use with preservice teachers, (Tschannen-Moran & Hoy, 2001; Duffin et al., 2012) contains 24 items, each of which are measured at 1 through 9 on a Likert scale, with 1 being the lowest self-rating and 9 being the highest. The TSES (Tschannen-Moran & Hoy, 2001) contains three self-efficacy subscales: efficacy for classroom management, efficacy for student engagement, and efficacy for using instructional strategies (Tschannen-

Moran & Hoy, 2001). Tschannen-Moran and Hoy (2001) recommend using the total scale mean score rather than the subscale mean scores for preservice teachers who are at the beginning of their teacher preparation program (Duffin et al., 2012; Tschannen-Moran & Hoy, 2001).

Data collected from the MAAS (Brown & Ryan, 2003a) and the TSES (Tschannen-Moran & Hoy, 2001), were initially coded and cleansed. Then, the data were analyzed for missing values and outliers (Meyers, Gamst, & Guarino, 2013). Next, all assumptions of the ANOVA were addressed. The ANOVAs were conducted and then the findings were used to address research questions one and two.

Research Question One

The first research question was: Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not? The non-directional hypothesis for research question one proposed that there would be a statistically significant difference in mean scores for teachers' perceptions of mindfulness between preservice teacher participants in the treatment group, who received a mindfulness-based coaching treatment, and preservice teacher participants in the comparison group, who did not receive the treatment. To address this hypothesis, an ANOVA was performed to analyze differences in posttest scores of the MAAS (Brown & Ryan, 2003a) for participants in the treatment and comparison groups.

Pretest Data Preparation.

The process of pretest data preparation for research question one involved data cleansing as well as an analysis of missing values. The researcher checked the data for outliers. The assumptions with respect to the ANOVA were then considered by the researcher. These

assumptions included (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Code and value cleaning. To ensure a reliable and precise record of all data collected, the researcher created a database using Microsoft Excel. Numbers were assigned to each preservice teacher participant at random. The researcher then assigned a pseudonym to each number in order to protect the confidentiality of each preservice teacher participant. Within this database, the researcher recorded pretest data for the MAAS (Brown & Ryan, 2003a). The researcher manually transferred values from paper forms that preservice teacher participants used to record their responses to the MAAS (Brown & Ryan, 2003a) pretest.

Missing value analysis. After coding and entering all data into Microsoft Excel, the researcher initially screened the MAAS (Brown & Ryan, 2003a) pretest data using a visual inspection process (Meyers, et al., 2013). The treatment group MAAS (Brown & Ryan, 2003a) pretest data contained no missing values. The comparison group MAAS (Brown & Ryan, 2003a) pretest data contained one missing value. The researcher then transferred all the MAAS (Brown & Ryan, 2003a) pretest data from the Microsoft Excel spreadsheet into the Statistical Package for the Social Sciences ™ (SPSS; 2013) in order continue analyzing the missing values.

The researcher performed descriptive statistics to ensure the accuracy of all data (Meyers, et al. 2013). As anticipated, the descriptive statistics of the MAAS (Brown & Ryan, 2003a) pretest data showed one missing value in total. To address this, the researcher followed a Missing Value Analysis (MVA) procedure, using the expectation maximization (EM) estimation (see Table 4.1) in SPSS (2013). The researcher then substituted the EM estimation value for the missing value in the MAAS (Brown & Ryan, 2003a) pretest data set (Meyers, et al., 2013).

Table 4.1

Summary of EM Estimations for MAAS Pretest Data

Case	Item	All Values	EM Estimation
26	MAAS Pretest Item 4	3.52	3.52

Assessing for univariate outliers. After addressing missing values within the MAAS (Brown & Ryan, 2003a) pretest data set, the researcher used SPSS (2013) to look for any univariate outliers. Univariate outliers are unusual or extreme values in a single variable (Meyers, et al., 2013). If an outlier is extreme, the case containing the extreme outlier should be considered for possible deletion (Meyers, et al., 2013). To discover potential outliers, the researcher used SPSS (2013) software to produce boxplots for the pretest scores on the MAAS (Brown & Ryan, 2003a).

MAAS Pretest Outliers. Results from the boxplots (see Figure 4.1) generated by SPSS (2013) for the MAAS (Brown & Ryan, 2003a) pretest data showed one potential comparison group outlier within the MAAS (Brown & Ryan, 2003a) pretest data set. This outlier involved case 35.

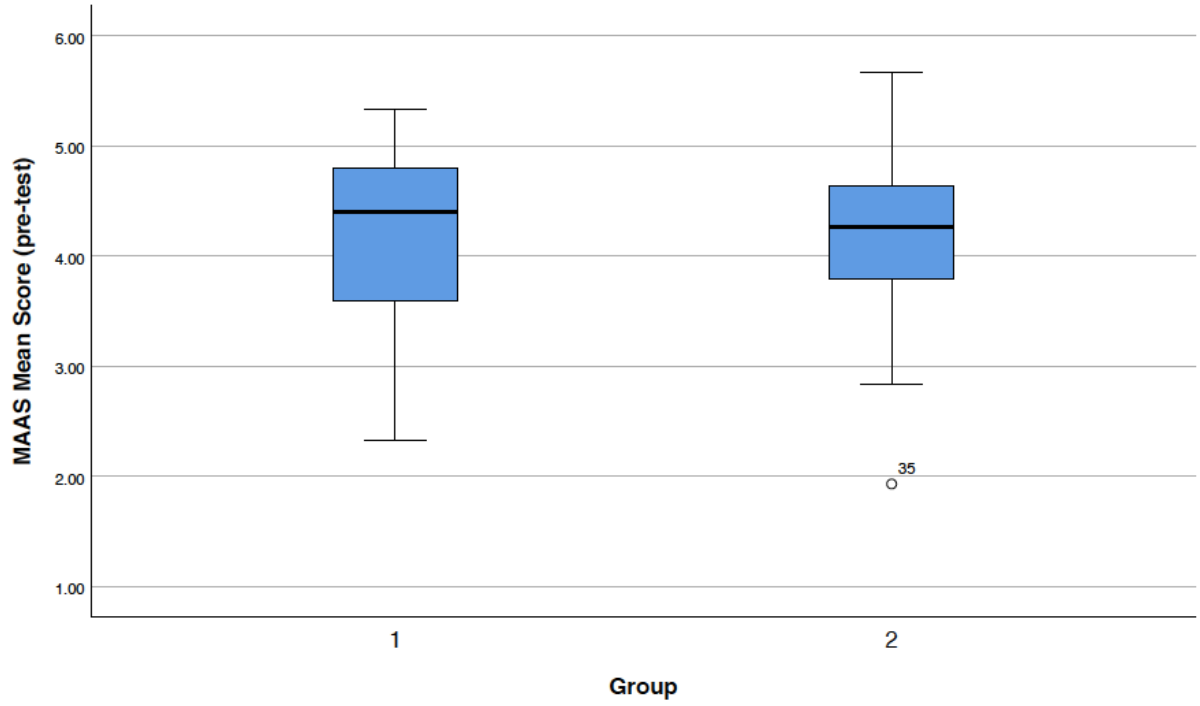

Figure 4.1. Boxplots of MAAS pretest data. This figure illustrates the boxplots for the MAAS pretest data. These boxplots indicate that these data contain one potential outlier in the comparison group, case 35.

Case 35. To further investigate case 35 as a potential outlier, the researcher examined Normal Q-Q plots of the comparison group pretest MAAS (Brown & Ryan, 2003a) data to assess the *z* score for this case. Cases with a *z* score exceeding +2.5 or -2.5 may be considered extreme outliers (Meyers et al., 2013). Analysis of the Normal Q-Q plots showed that this data values fell within the acceptable range (Meyers, et al., 2013). Therefore, the researcher decided to include case 35 within the dataset.

Assumptions of the ANOVA. There are several assumptions that must be met before utilizing the ANOVA (Meyer et al., 2013). The assumptions consist of (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2006).

Assumption of Independence. When using the ANOVA, participants within each group must be independent of each other (Meyers et al., 2013). The researcher considered the

assumption of independence by separating the treatment and comparison groups and having the two groups be independent of each other. By having the treatment group take place during the spring of 2019 and the comparison group take place during the fall of 2019, participants within each group were unable to discuss intervention strategies. Thus, preservice teacher participants in each group were independent of each other. Therefore, the assumption of independence for this study was met.

Assumption of Normality. In order to pass the assumption of normality, the distribution of data for a variable should be a bell-shaped curve (Meyers et al., 2013). The researcher used SPSS (2013) software to find the skewness and kurtosis of the MAAS (Brown & Ryan, 2003a) pretest data to assess the normality.

Skewness refers to the symmetry of the distribution of the data and describes the mean relative to the center of the distribution (Meyers, et al., 2013). Kurtosis describes the peakedness of the distribution (Meyers, et al., 2013). Skewness and kurtosis values were considered acceptable if they fell within the range of -2.0 to +2.0 (D'Agostino & Belanger, 1990). All the MAAS (Brown & Ryan, 2003a) pretest data were found to be within the acceptable range of -2.0 to +2.0. Table 4.2 represents the skewness and kurtosis for MAAS (Brown & Ryan, 2003a) pretest data.

Table 4.2

Skewness and Kurtosis of the MAAS Pretest Data

Group	*n*	Mean	Standard Deviation	Skewness	Kurtosis
Treatment	17	4.1961	.80914	-.857	.128
Comparison	23	4.1030	.84420	-.642	.840

The researcher further examined the normality of the MAAS (Brown & Ryan, 2003a) pretest data by performing a Shapiro-Wilk test of normality as a follow-up analysis. As recommended (Meyers, et al., 2013) these tests were evaluated at a stringent alpha level of .001. The results of the Shapiro-Wilk test of normality indicated no statistical significance ($p < .001$). Therefore, the researcher deemed the normality to be acceptable (see Table 4.3).

Table 4.3

Shapiro-Wilk Test of Normality of MAAS Pretest Data

Group	Sig.
Treatment	.224
Comparison	.703

Homogeneity of variance. Homogeneity of variance refers to equal variances among comparison and treatment groups (Meyer, et al., 2006). The researcher examined the assumption of equal variance using the Levene's test for homogeneity of variance. The Levene's test showed that the variance based on the mean for the MAAS (Brown & Ryan, 2003a) pretest data was not significant, indicating homogeneity of variance, ($p < .05$; see Table 4.4).

Table 4.4

Levene's Test of Homogeneity of Variance for MAAS Pretest Data

Variable	Levene Statistic	*df`1*	*df2*	Sig.
MAAS	.004	1	38	.948

Analysis indicated that all assumptions for the ANOVA were met for the MAAS (Brown & Ryan, 2003a) pretest data. Therefore, the researcher proceeded forward with the analyses for research question one.

Pretest Data Analysis

The researcher performed the ANOVA to on the MAAS (Brown & Ryan, 2003a) pretest data to compare the means for the treatment and comparison groups. Results from the pretest did not yield statistically significant results, $F(1) = .123$, $p = .728$. The results of the ANOVA for the MAAS (Brown & Ryan, 2003a) pretest are shown in Table 4.5. Since there was no significant result, this indicated that the treatment and comparison groups were not significantly different at the beginning of the treatment.

Table 4.5

Results of the ANOVA for the MAAS Pretest

Variable	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.085	1	.085	.077	.728

Posttest Data Preparation

The process of posttest data preparation for research question one involved data cleansing as well as an analysis of missing values. The researcher checked the data for outliers. The assumptions with respect to the ANOVA were then considered by the researcher. These assumptions included (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Code and value cleaning. To ensure a reliable and precise record of all data collected, the researcher created a database using Microsoft Excel. Numbers were assigned to each preservice teacher participant at random. The researcher then assigned a pseudonym to each number in order to protect the confidentiality of each preservice teacher participant. Within this database, the researcher recorded posttest data for the MAAS (Brown & Ryan, 2003a). The

researcher manually transferred values from paper forms that preservice teacher participants used to record their responses to the MAAS (Brown & Ryan, 2003a) posttest.

Missing value analysis. After coding and entering all of the data into Microsoft Excel, the researcher initially screened the data using a visual inspection process (Meyers, et al., 2013). The treatment group MAAS (Brown & Ryan, 2003a) posttest data contained one missing value. The comparison group MAAS (Brown & Ryan, 2003a) posttest data contained one missing value. The researcher then transferred all of the quantitative data from the Microsoft Excel spreadsheet into SPSS (2013) in order continue analyzing the missing values.

The researcher performed descriptive statistics to ensure the accuracy of all data (Meyers, et al. 2013). As anticipated, the descriptive statistics of the MAAS (Brown & Ryan, 2003a) posttest data showed two missing values in total. To address this, the researcher followed an MVA procedure, using the EM estimation (see table 4.6) in SPSS (2013). The researcher then substituted the EM estimation values for the missing values in the MAAS (Brown & Ryan, 2003a) posttest data set (Meyers, et al., 2013).

Table 4.6

Summary of EM Estimations for MAAS Posttest Data

Case	Item	All Values	EM Estimation
2	MAAS Posttest Item 9	3.92	3.91
35	MAAS Posttest Item 6	3.58	3.71

Assessing for univariate outliers. After addressing missing values within the MAAS (Brown & Ryan, 2003a) posttest data set, the researcher used SPSS (2013) to look for any univariate outliers. Univariate outliers are unusual or extreme values in a single variable (Meyers, et al., 2013). If an outlier is extreme, the case containing the extreme outlier should be

considered for possible deletion (Meyers, et al., 2013). To discover potential outliers, the researcher used SPSS (2013) software to produce boxplots for the posttest scores on the MAAS (Brown & Ryan, 2003a).

MAAS Posttest Outliers. Results from the boxplots (see Figure 4.2) generated by SPSS (2013) for the MAAS (Brown & Ryan, 2003a) posttest data showed no potential outliers.

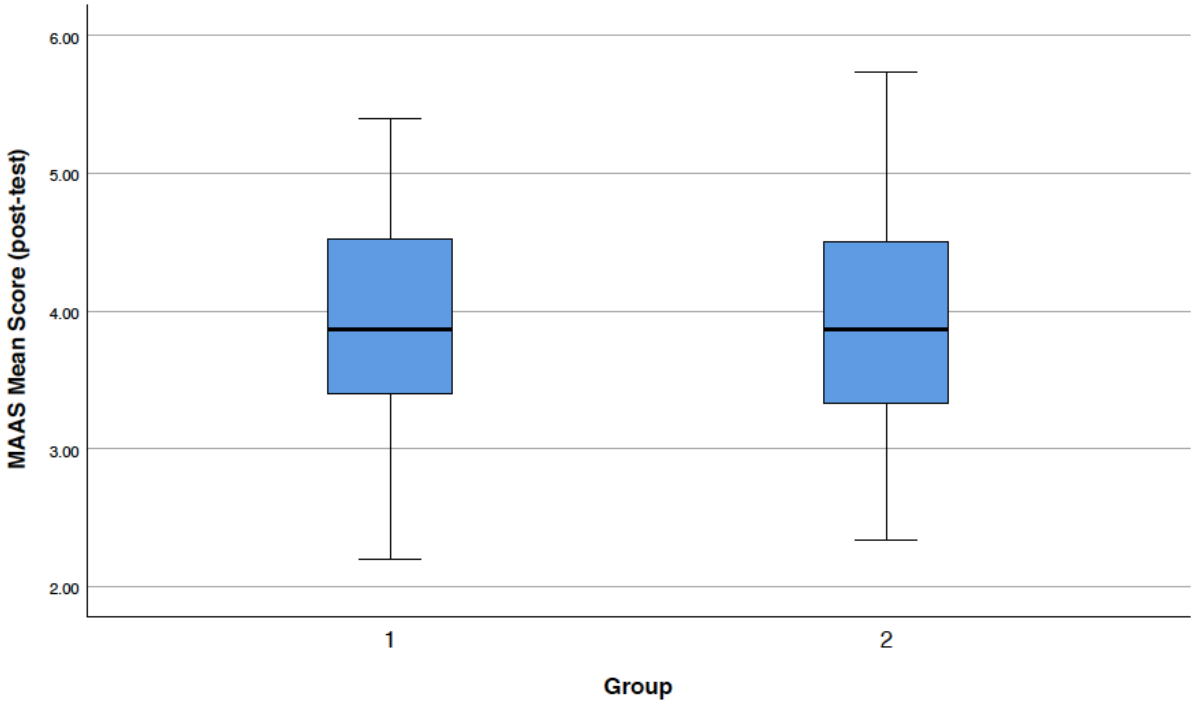

Figure 4.2. Boxplots of MAAS posttest data. This figure illustrates the boxplots for the MAAS posttest data. These boxplots indicate that these data contain no potential outliers in the treatment or comparison group.

Assumptions of the ANOVA. There are several assumptions that must be met before utilizing the ANOVA (Meyer et al., 2006). The assumptions consist of (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Assumption of Independence. When using the ANOVA, participants within each group must be independent of each other (Meyers et al., 2013). The researcher considered the assumption of independence by separating the treatment and comparison groups and having the

two groups be independent of each other. By having the treatment group take place during the spring of 2019 and the comparison group take place during the fall of 2019, participants within each group were unable to discuss intervention strategies. Thus, preservice teacher participants in each group were independent of each other. Therefore, the assumption of independence for this study was met.

Assumption of Normality. In order to pass the assumption of normality, the distribution of data for a variable should be a bell-shaped curve (Meyers et al., 2013). The researcher used SPSS (2013) software to find the skewness and kurtosis of the MAAS (Brown & Ryan, 2003a) posttest data to assess the normality.

Skewness refers to the symmetry of the distribution of the data and describes the mean relative to the center of the distribution (Meyers, et al., 2013). Kurtosis describes the peakedness of the distribution (Meyers, et al., 2013). Skewness and kurtosis values were considered acceptable if they fell within the range of -2.0 to +2.0 (D'Agostino & Belanger, 1990). All the MAAS (Brown & Ryan, 2003a) posttest data were found to be within the acceptable range of -2.0 to +2.0. Table 4.7 represents the skewness and kurtosis for MAAS (Brown & Ryan, 2003a) posttest data.

Table 4.7

Skewness and Kurtosis of the MAAS Posttest Data

Group	*n*	Mean	Standard Deviation	Skewness	Kurtosis
Treatment	17	3.9055	.81384	-.339	-.137
Comparison	23	3.8948	.82971	.131	-.173

The researcher further examined the normality of the MAAS (Brown & Ryan, 2003a) posttest data by performing a Shapiro-Wilk test of normality as a follow-up analysis. As

recommended (Meyers, et al., 2013) these tests were evaluated at a stringent alpha level of .001. The results of the Shapiro-Wilk test of normality indicated no statistical significance ($p < .001$). Therefore, the researcher deemed the normality to be acceptable (see Table 4.8).

Table 4.8

Shapiro-Wilk Test of Normality of MAAS Posttest Data

Group	Sig.
Treatment	.578
Comparison	.927

Homogeneity of variance. The researcher examined the assumption of equal variances among the comparison and treatment groups (Meyer, et al., 2006). The researcher examined the assumption of equal variance using the Levene's test for homogeneity of variance. The Levene's test showed that the variance based on the mean for the MAAS (Brown & Ryan, 2003a) posttest data were not significant, indicating homogeneity of variance, ($p < .05$; see Table 4.9).

Table 4.9

Levene's Test of Homogeneity of Variance for MAAS Posttest Data

Variable	Levene Statistic	*df`1*	*df2*	Sig.
MAAS	.034	1	38	.855

Analysis indicated that all assumptions for the ANOVA were met for the MAAS (Brown & Ryan, 2003a) posttest data. Therefore, the researcher proceeded forward with the analyses for research question one.

Posttest Data Analysis

The researcher conducted the ANOVA with the MAAS (Brown & Ryan, 2003a) posttest data to compare the means for the treatment and comparison groups. Results from the posttest

did not yield statistically significant results, $F(1) = .002$, $p = .968$. The results of the ANOVA for the MAAS (Brown & Ryan, 2003a) posttest are shown in Table 4.10. Since there was no significant result, this indicated that the treatment did not have an impact on posttest scores on the MAAS (Brown & Ryan, 2003a).

Table 4.10

Results of the ANOVA for the MAAS Posttest

Variable	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.001	1	.001	.002	.968

Research Question One Findings

The ANOVA was performed to address research question one: Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not? Results of the ANOVA showed no significant difference for the posttest mean scores on the MAAS (Brown & Ryan, 2003a) between the treatment and comparison groups, $F(1) = .002$, $p = .968$.

Research Question Two

The second research question was: Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not? The non-directional hypothesis for research question one proposed that there would be a statistically significant difference in mean scores for teachers' sense of self-efficacy between preservice teacher participants in the treatment group, who received a mindfulness-based coaching treatment, and preservice teacher participants in the comparison group, who did

not receive the treatment. To address this hypothesis, the ANOVA was performed to analyze differences in posttest scores of the TSES (Tschannen-Moran & Hoy, 2001) for participants in the treatment and comparison groups.

Pretest Data Preparation

The process of pretest data preparation for research question two involved data cleansing as well as an analysis of missing values. The researcher checked the data for outliers. The assumptions with respect to the ANOVA were then considered by the researcher. These assumptions included (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Code and value cleaning. To ensure a reliable and precise record of all data collected, the researcher created a database using Microsoft Excel. Numbers were assigned to each preservice teacher participant at random. The researcher then assigned a pseudonym to each number in order to protect the confidentiality of each preservice teacher participant. Within this database, the researcher recorded pretest data for the TSES (Tschannen-Moran & Hoy, 2001). The researcher manually transferred values from paper forms that preservice teacher participants used to record their responses to the TSES (Tschannen-Moran & Hoy, 2001) pretest.

Missing value analysis. After coding and entering all the data into Microsoft Excel, the researcher initially screened the data using a visual inspection process (Meyers, et al., 2013). The treatment group TSES (Tschannen-Moran & Hoy, 2001) pretest data contained no missing values. The comparison group TSES (Tschannen-Moran & Hoy, 2001) pretest data contained no missing values. The researcher then transferred all quantitative data from the Microsoft Excel spreadsheet into SPSS (2013) in order continue analyzing the missing values.

The researcher performed descriptive statistics to ensure the accuracy of all data (Meyers, et al. 2013). As anticipated, the descriptive statistics of the TSES (Tschannen-Moran & Hoy, 2001) pretest data showed no missing values.

Assessing for univariate outliers. After addressing missing values within the TSES (Tschannen-Moran & Hoy, 2001) pretest dataset, the researcher used SPSS (2013) to look for any univariate outliers. Univariate outliers are unusual or extreme values in a single variable (Meyers, et al., 2013). If an outlier is extreme, the case containing the extreme outlier should be considered for possible deletion (Meyers, et al., 2013). To discover potential outliers, the researcher used SPSS (2013) software to produce boxplots for the pretest scores on the TSES (Tschannen-Moran & Hoy, 2001).

TSES Pretest Outliers. Results from the boxplots (see Figure 4.3) generated by SPSS (2013) for the TSES (Tschannen-Moran & Hoy, 2001) pretest data showed three potential treatment group outliers within the TSES (Tschannen-Moran & Hoy, 2001) pretest data set. These outliers involved cases 3, 7 and 12.

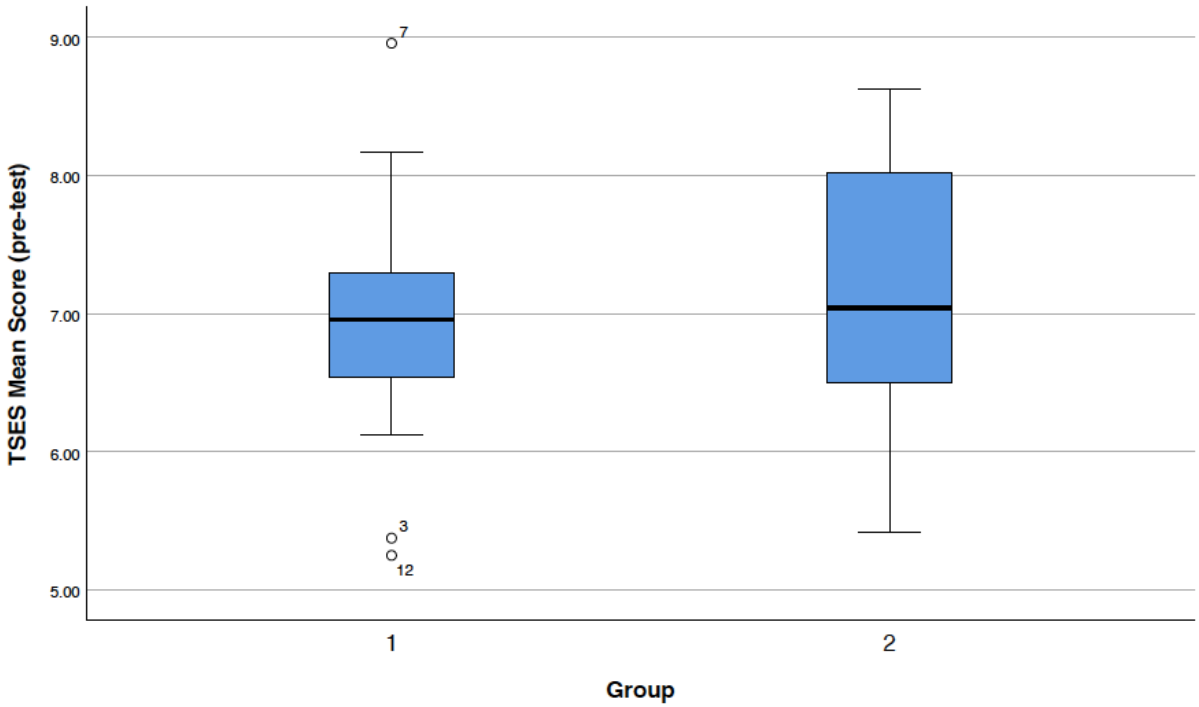

Figure 4.3. Boxplots of TSES pretest data. This figure illustrates the boxplots for the TSES pretest data. These boxplots indicate that these data contain three potential outliers in the treatment group, cases 3, 7, and 12.

Cases 3, 7, and 12. To further investigate case 3, 7, and 12 as potential outliers, the researcher examined Normal Q-Q plots of the treatment group pretest TSES (Tschannen-Moran & Hoy, 2001) data to assess the *z* score for these cases. Cases with a *z* score exceeding +2.5 or -2.5 may be considered extreme outliers (Meyers et al., 2013). Analysis of the Normal Q-Q plots showed that these data values fell within the acceptable range (Meyers, et al., 2013). Therefore, the researcher decided to include cases 3, 7, and 12 within the dataset.

Assumptions of the ANOVA. There are several assumptions that must be met before utilizing the ANOVA (Meyer et al., 2006). The assumptions consist of (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Assumption of Independence. When using the ANOVA, participants within each group must be independent of each other (Meyers et al., 2013). The researcher considered the

assumption of independence by separating the treatment and comparison groups and having the two groups be independent of each other. By having the treatment group take place during the spring of 2019 and the comparison group take place during the fall of 2019, participants within each group were unable to discuss intervention strategies. Thus, preservice teacher participants in each group were independent of each other. Therefore, the assumption of independence for this study was met.

Assumption of Normality. In order to pass the assumption of normality, the distribution of data for a variable should be a bell-shaped curve (Meyers et al., 2013). The researcher used SPSS (2013) software to find the skewness and kurtosis of the TSES (Tschannen-Moran & Hoy, 2001) pretest data to assess the normality.

Skewness refers to the symmetry of the distribution of the data and describes the mean relative to the center of the distribution (Meyers, et al., 2013). Kurtosis describes the peakedness of the distribution (Meyers, et al., 2013). Skewness and kurtosis values were considered acceptable if they fell within the range of -2.0 to +2.0 (D'Agostino & Belanger, 1990). All of the TSES (Tschannen-Moran & Hoy, 2001) pretest data were found to be within the acceptable range of -2.0 to +2.0. Table 4.11 represents the skewness and kurtosis for TSES (Tschannen-Moran & Hoy, 2001) pretest data.

Table 4.11

Skewness and Kurtosis of the TSES Pretest Data

Group	*n*	Mean	Standard Deviation	Skewness	Kurtosis
Treatment	17	6.9363	.92727	.185	.643
Comparison	23	7.1576	.90697	.101	-.901

The researcher further examined the normality of the TSES (Tschannen-Moran & Hoy, 2001) pretest data by performing a Shapiro-Wilk test of normality as a follow-up analysis. As recommended (Meyers, et al., 2013) these tests were evaluated at a stringent alpha level of .001. The results of the Shapiro-Wilk test of normality indicated no statistical significance ($p < .05$). Therefore, the researcher deemed the normality to be acceptable (see Tables 4.12).

Table 4.12

Shapiro-Wilk Test of Normality of TSES Pretest Data

Group	Sig.
Treatment	.717
Comparison	.296

Homogeneity of variance. Homogeneity of variance refers to equal variance among comparison and treatment groups (Meyer, et al., 2006). The researcher examined the assumption of equal variance using the Levene's test for homogeneity of variance. The Levene's test showed that the variance based on the mean for the TSES (Tschannen-Moran & Hoy, 2001) pretest data were not statistically significant, indicating homogeneity of variance, ($p < .05$; see Table 4.13).

Table 4.13

Levene's Test of Homogeneity of Variance for TSES Pretest Data

Variable	Levene Statistic	*df`1*	*df2*	Sig.
TSES	.165	1	38	.687

Analysis indicated that all assumptions for the ANOVA were met for the TSES (Tschannen-Moran & Hoy, 2001) pretest data. Therefore, the researcher proceeded forward with the analyses for research question two.

Pretest Data Analysis

The researcher performed the ANOVA on the TSES (Tschannen-Moran & Hoy, 2001) pretest data to compare the means for the treatment and comparison groups. Results from the pretest did no yield statistically significant results, $F(1) = .571$, $p = .454$. Results of the ANOVA for the TSES (Tschannen-Moran & Hoy, 2001) pretest are shown in Table 4.14. Since there was no significant result, this indicated that the treatment and comparison groups were not significantly different at the beginning of the treatment.

Table 4.14

Results of the ANOVA for the TSES Pretest

Variable	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	.479	1	.479	.571	.454

Posttest Data Preparation

The process of posttest data preparation for research question two involved data cleansing as well as an analysis of missing values. The researcher checked the data for outliers. The assumptions with respect to the ANOVA were then considered by the researcher. These assumptions included (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Code and value cleaning. To ensure a reliable and precise record of all data collected, the researcher created a database using Microsoft Excel. Numbers were assigned to each preservice teacher participant at random. The researcher then assigned a pseudonym to each number in order to protect the confidentiality of each preservice teacher participant. Within this database, the researcher recorded posttest data for the TSES (Tschannen-Moran & Hoy, 2001).

The researcher manually transferred values from paper forms that preservice teacher participants used to record their responses to the TSES (Tschannen-Moran & Hoy, 2001) posttest.

Missing value analysis. After coding and entering all data into Microsoft Excel, the researcher initially screened the data using a visual inspection process (Meyers, et al., 2013). The treatment group TSES (Tschannen-Moran & Hoy, 2001) posttest data contained one missing value. The comparison group TSES (Tschannen-Moran & Hoy, 2001) posttest data contained four missing values. The researcher then transferred all of the quantitative data from the Microsoft Excel spreadsheet into SPSS (2013) in order continue analyzing the missing values.

The researcher performed descriptive statistics to ensure the accuracy of all data (Meyers, et al. 2013). As anticipated, the descriptive statistics of the TSES (Tschannen-Moran & Hoy, 2001) posttest data showed five missing values in total, case 13 from the treatment groups and cases 23, 52, and 55 from the comparison group. To address this, the researcher followed an MVA procedure, using the EM estimation (see Table 4.15) in SPSS (2013). The researcher then substituted the EM estimation values for the missing values in the TSES (Tschannen-Moran & Hoy, 2001) posttest dataset (Meyers, et al., 2013).

Table 4.15

Summary of EM Estimations for TSES Posttest Data

Case	Item	All Values	EM Estimation
13	TSES Posttest Item 16	6.96	6.89
23	TSES Posttest Item 16	6.96	6.89
52	TSES Posttest Item 13	7.10	6.98
55	TSES Posttest Item 14	7.06	7.00
55	TSES Posttest Item 18	7.35	7.35

Assessing for univariate outliers. After addressing missing values within the TSES (Tschannen-Moran & Hoy, 2001) posttest dataset, the researcher used SPSS (2013) to look for

any univariate outliers. Univariate outliers are unusual or extreme values in a single variable (Meyers, et al., 2013). If an outlier is extreme, the case containing the extreme outlier should be considered for possible deletion (Meyers, et al., 2013). To discover potential outliers, the researcher used SPSS (2013) software to produce boxplots for the posttest scores on the TSES (TSES; Tschannen-Moran & Hoy, 2001).

TSES Posttest Outliers. Results from the boxplots (see Figure 4.4) generated by SPSS (2013) for the TSES (Tschannen-Moran & Hoy, 2001) posttest data showed no potential outliers.

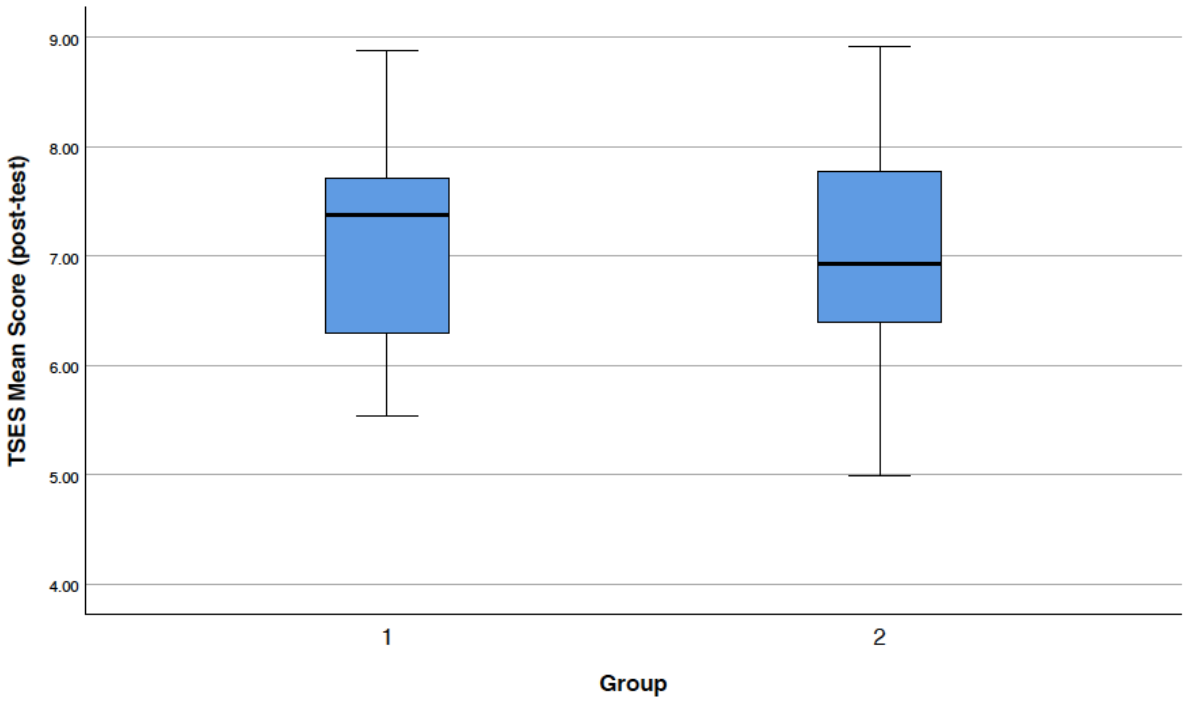

Figure 4.4. Boxplots of TSES posttest data. This figure illustrates the boxplots for the TSES posttest data. These boxplots indicate that these data contain no potential outliers in the treatment or comparison group.

Assumptions of the ANOVA. There are several assumptions that must be met before utilizing the ANOVA (Meyer et al., 2006). The assumptions consist of (a) independence, (b) normality, and (c) homogeneity of variance (Meyers et al., 2013).

Assumption of Independence. When using the ANOVA, participants within each group must be independent of each other (Meyers et al., 2013). The researcher considered the assumption of independence by separating the treatment and comparison groups and having the two groups be independent of each other. By having the treatment group take place during the spring of 2019 and the comparison group take place during the fall of 2019, participants within each group were unable to discuss intervention strategies. Thus, preservice teacher participants in each group were independent of each other. Therefore, the assumption of independence for this study was met.

Assumption of Normality. In order to pass the assumption of normality, the distribution of data for a variable should be a bell-shaped curve (Meyers et al., 2013). The researcher used SPSS (2013) software to find the skewness and kurtosis of the TSES (Tschannen-Moran & Hoy, 2001) posttest data to assess the normality.

Skewness refers to the symmetry of the distribution of the data and describes the mean relative to the center of the distribution (Meyers, et al., 2013). Kurtosis describes the peakedness of the distribution (Meyers, et al., 2013). Skewness and kurtosis values were considered acceptable if they fell within the range of -2.0 to +2.0 (D'Agostino & Belanger, 1990). All of the TSES (Tschannen-Moran & Hoy, 2001) posttest data were found to be within the acceptable range of -2.0 to +2.0. Table 4.16 represents the skewness and kurtosis for TSES (Tschannen-Moran & Hoy, 2001) posttest data.

Table 4.16

Skewness and Kurtosis of the TSES Posttest Data

Group	*n*	Mean	Standard Deviation	Skewness	Kurtosis
Treatment	17	7.0463	1.00226	.020	-1.016
Comparison	23	7.0705	1.06538	.036	-.576

The researcher further examined the normality of the TSES posttest data by performing a Shapiro-Wilk test of normality as a follow-up analysis. As recommended (Meyers, et al., 2013) these tests were evaluated at a stringent alpha level of .001. The results of the Shapiro-Wilk test of normality indicated no statistical significance ($p < .05$). Therefore, the researcher deemed the normality to be acceptable (see Table 4.17).

Table 4.17

Shapiro-Wilk Test of Normality of TSES Posttest Data

Group	Sig.
Treatment	.329
Comparison	.832

Homogeneity of variance. Homogeneity of variance refers to equal variance among comparison and treatment groups (Meyer, et al., 2006). The researcher examined the assumption of variance using the Levene's test for homogeneity of variance. The Levene's test showed that the variance based on the mean for the TSES (Tschannen-Moran & Hoy, 2001) posttest data was not statistically significant, indicating homogeneity of variance, ($p < .05$; see Table 4.18).

Table 4.18

Levene's Test of Homogeneity of Variance for TSES Posttest Data

Variable	Statistic	*df`1*	*df2*	Sig.
TSES	.000	1	38	.995

Analysis indicated that all assumptions for the ANOVA were met for the TSES (Tschannen-Moran & Hoy, 2001) posttest data. Therefore, the researcher proceeded forward with the analyses for research question two.

Posttest Data Analysis

The researcher performed the ANOVA on the TSES (Tschannen-Moran & Hoy, 2001) posttest data to compare the means for the treatment and comparison groups. Results from the posttest did not yield significant results, $F(1) = .005$, $p = .942$. Results of the ANOVA for the TSES (Tschannen-Moran & Hoy, 2001) posttest are shown in Table 4.19. Since there was no significant result, this indicated that the treatment did not have an impact on posttest scores on the TSES (Tschannen-Moran & Hoy, 2001).

Table 4.19

Results of the ANOVA for the TSES Posttest

Variable	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.006	1	.006	.005	.942

Research Question Two Findings

An ANOVA was performed to address research question two: Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not? Results of the ANOVA showed no significant difference for the posttest mean scores on the TSES (Tschannen-Moran & Hoy, 2001) between the treatment and comparison groups, $F(1) = .005$, $p = .942$.

Results of Qualitative Data Analysis

The qualitative component of this study utilized data relating to beliefs about self-efficacy of preservice teacher participants. Data was collected via coaching sessions, written reflections, semi-structured interviews, and observations following researcher-adapted protocols (see Appendices D, E, K, & O). These data were analyzed to address research question three.

Research Question Three

Research question three was: What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment?

Research Question Three Findings

To address research question three, the researcher followed an iterative coding process, which utilized both deductive and inductive coding (Saldaña, 2010). The researcher utilized codes informed by the literature, employing Bandura's (1986, 1994, 1997, 2000) four ways to cultivate a strong sense of self-efficacy (master experiences, vicarious experiences, social encouragement, and emotional arousal) to frame the preliminary coding. This approach was expanded upon with inductive codes that arose from the data as patterns became evident. The original codes were grouped into categories and subthemes, which were then organized into three themes. These themes were then connected to one another within a single finding statement (see Appendix S; see Figure 4.5). Analysis of the qualitative data resulted in the following finding statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers.

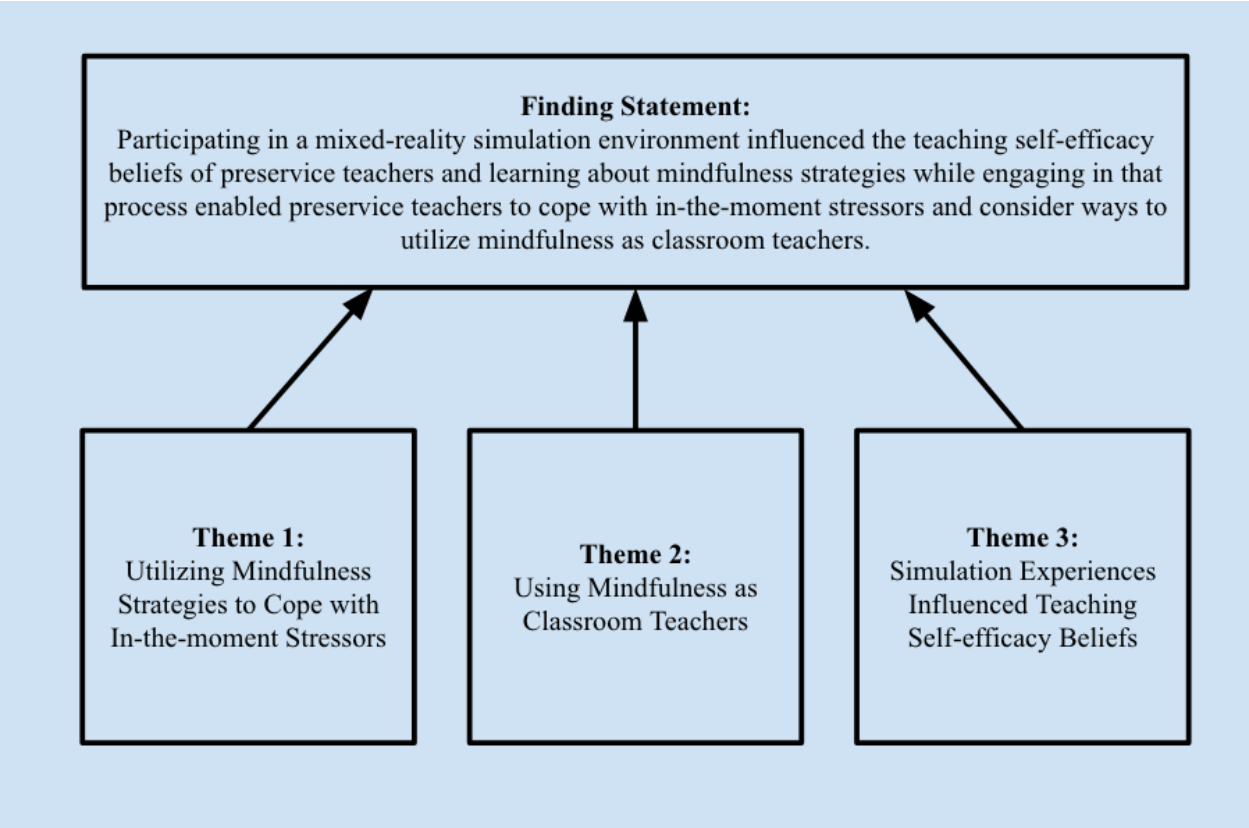

Figure 4.5. Qualitative findings. This figure illustrates the three themes, utilizing mindfulness strategies to cope with in-the-moment stressors, using mindfulness as classroom teachers, and simulation experiences influenced teaching self-efficacy beliefs, which comprise the findings statements.

Theme one refers to scenarios in which certain preservice teacher participants within the treatment group were able to leverage mindfulness strategies discussed in coaching sessions to cope with in-the-moment stressors associated mixed-reality simulation experiences. Utilizing these strategies often resulted in mastery experiences, which increased their overall sense of teaching self-efficacy. Theme two refers to the ways in which preservice teacher participants within the treatment group, who learned about mindfulness throughout the coaching experience, perceived that they acquired tools that they could utilize in the future when serving as classroom teachers. This perception made them feel more confident and increased their overall sense of teaching self-efficacy. Theme three speaks to the mixed-reality simulation experiences

completed by all participants and the ways in which these experiences impacted their overall sense of teaching self-efficacy.

Theme 1: Utilizing mindfulness strategies to cope with in-the-moment stressors. In certain instances, preservice teachers that received a mindfulness-based coaching treatment were able to utilize mindfulness strategies to cope with in-the-moment stressors associated with mixed-reality simulations and this resulted in mastery experiences which increased their overall sense of teaching self-efficacy. Rhonda, a freshman studying elementary education, captured the essence of this theme through a journal entry in which she wrote:

> I used the BCOOL [strategy] when I got up to the screen. I almost passed out, but I did the steps and it helped me. When something doesn't go how I plan, I just remind myself to BCOOL! Better things will come. After I did my part, I started to question myself about my ability to teach. Some really nasty negative thoughts came to my mind, but I took a breath and let it go, and realized that I am able. If others can, why not me?"

In this example, the participant experienced a physical and emotional stress response when engaging in a mixed-reality simulation experience. Rhonda utilized a strategy taught during the coaching session, BCOOL (see Appendix N). This strategy refers to an acronym, which prompts the preservice teacher to: **B**reath, **C**alm down, **O**bserve what's happening, understand that everything is **O**kay, and hold the situation with **L**ove. Using this strategy resulted in a positive simulation experience and strengthened Rhonda's sense of confidence in herself as an educator. Allison, a sophomore studying music education, shared during a coaching session, "I was sitting, I was just like deep breathing. And I kept reminding myself that like, the situation is okay." For many of the treatment group participants, the mindfulness strategies served as tools that anchored them through the simulation experience. Preservice teacher participants from the treatment

group that embraced the coaching and employed mindfulness strategies during simulations felt positive about those experiences. However, not all the preservice teacher participants within the treatment group embraced the coaching. Three of the treatment group participants did not embrace the coaching nor did they attempt to incorporate the mindfulness strategies discussed during the coaching sessions. The experiences of these participants are discussed in one of the subsections for this theme. Participants who did embrace the coaching felt empowered by those experiences and this espousal was characterized by not only using the mindfulness strategies, but also displaying an understanding of the construct of mindfulness itself. The theme of utilizing mindfulness strategies to cope with in-the-moment stressors was comprised of two subthemes: (a) mindfulness during simulations and (b) feeling empowered by mindfulness strategies.

Theme 1, Subtheme 1: Mindfulness during simulations. Many preservice teachers that embraced the mindfulness-based coaching successfully employed mindfulness strategies during simulation experiences. During a coaching session, Ruth, a junior studying music education, said:

> Yeah, I was hardcore like mindful breathing pretty much the entirety of the time from when we entered the classroom to when I started. I was physically and emotionally reacting. So, I really needed to just like let myself calm down and be a teacher.

In this instance, Ruth identified that she was experiencing challenging emotions and sensations and employed a breathing strategy taught during the coaching session to manage these difficult feelings. When she used the words, "be a teacher," she encapsulated an essential component to the mindfulness coaching, the notion that using mindfulness helps one teach more effectively by promoting present-moment awareness. Ruth is an example of a treatment group participant that willingly adopted concepts and strategies discussed during coaching sessions. The subtheme of

mindfulness during simulations emerged from two code categories: (a) embracing coaching and (b) not embracing coaching.

Theme 1, Subtheme 1, Code Category 1: Embracing coaching. The overwhelming majority of preservice teacher participants within the treatment group embraced the coaching experience. They found value in the opportunity to debrief and discuss the simulation experiences and they also saw worth in learning about different mindfulness strategies that they could implement throughout the simulations. For example, during a coaching session, David, a sophomore studying music education, shared:

> When I'm put into those situations there is a bit of like stress or anxiety just because it's basically a performance. You're being put in front of something and you are sort of being graded for it also. That definitely makes it anxiety ridden. But then using the mindfulness strategies and then talking afterwards about what could have gone better, I think that helped me in the long run, when it came to knowing what I should do beforehand and then what I can do better while I'm actually doing the simulation.

Again, this participant felt that the mindfulness strategies helped him cope with simulation experience, which he characterized as being full of anxiety for a variety of reasons. Having the opportunity to talk about the strategies during coaching sessions in between simulation experiences helped David think through methods and strategies to try in the future. Similarly, about the coaching, Jennifer, a freshman studying secondary education with a math focus, said:

> Um, [the coaching] was helpful because it made me calm down and talk to myself and be like, "Oh, it's not going to be as stressful as you think." You know what I mean? So, I feel like it really brought out my teaching in a better way.

In this case, the coaching sessions helped the participant engage in more positive self-talk, which enabled her to keep the simulation experiences in perspective. Jennifer believed that going into the experience with a calmer attitude allowed her to be a better teacher in the simulation.

Robin, a sophomore studying secondary education with a science focus, also responded positively to the overall coaching experience. During her semi-structured interview, when asked about how the coaching experience impacted her overall sense of teaching self-efficacy, she said:

> Yes, definitely. It helped. The support that you were, it was kind of just like, support, you know? Like a cushion to lay back on and someone to ask, like a resource. Someone like a friend, you know, like someone who is there for you.

In her case, the coach took on the role of support friend, "like a cushion." The coach was a useful and kind resource. She elaborated by saying, "I had someone to go and ask a question. Or like if I didn't feel comfortable asking my teacher, or if I didn't have time. I can't be texting my professor." Robin found the coaching sessions to be valuable because they presented a safe space for her to ask questions.

When asked if learning about the different mindfulness strategies impacted her overall sense of teaching self-efficacy during her semi-structured interview, Samantha, a sophomore studying secondary education with an English focus, shared, "Yes, in a positive way. It helped me learn that even if things aren't okay in the moment, they will be okay. And in a way, I can just do [a mindfulness practice] quickly and just get a little refresh on the situation and come back better." Like many other participants within the treatment group, Samantha found value and worth in the mindfulness strategies that she learned about. The mindfulness strategies were useful tools that made her feel better in various situations. While most of the preservice teacher

participants within the treatment group displayed an appreciation for the mindfulness-based coaching, this was not the case for all of them.

Theme 1, Subtheme 1, Code Category 2: Not embracing coaching. Three of the treatment group participants did not embrace the mindfulness strategies offered through the coaching experiences. When asked about how the mindfulness coaching impacted her self-efficacy, Catherine, a sophomore studying elementary education, answered, "I think it was helpful, but neutral at the same time. [Because] I'm just not really someone who, like, I don't think I'd really use like the mindful breathing and stuff. No offense." Later in the semi-structured interview, she revisited these thoughts. She said, "Yeah, you know, I could see how it could help other people who need that kind of thing to bring them back kind of. But it's not useful to me." Throughout the research study, this treatment group participant did not incorporate or try out any of the mindfulness strategies. As such, the strategies had no impact on her sense of teaching self-efficacy. Believing that she was already a very "calm" person, Catherine did not see how mindfulness could help her. She held the belief that mindfulness was only for "stressed out" people.

Rachel, a sophomore studying secondary education with a math focus, who approached the mindfulness strategies with a sense of incredulity, shared a similar impression. During a coaching session, she said:

> I think a lot of the, a lot of the tools you gave me were for like when you're feeling stressed out about something. They kind of, like you said at the beginning, they bring you back to the positive thinking. And it was like I was already thinking positive. So, I didn't really have to stop and like gather myself.

While Rachel saw more value in the mindfulness strategies than Catherine, she also arrived at an understanding that mindfulness was exclusively intended as a reactive tool for situations wherein one feels stressed or uneasy. On one occasion, Rachel shared in a journal entry about using a breathing strategy during a simulation. She wrote that it helped her at that moment. For the most part, however, this participant did not embrace the mindfulness strategies.

When asked how he felt about the mindfulness component of the coaching, Ben, a sophomore studying music education, sheepishly uttered, "It felt like a waste of time." While he appreciated the overall coaching experience, he did not see value in the mindfulness strategies themselves. He went on to say, "So, they seem like good practices. But, if you don't use them, it's like, what's the point?" Ben did not incorporate any of the strategies into the simulation experiences or his personal life. Not all aspects of the coaching experience were deemed a waste of time by Ben, however. For example, when asked about how meeting for the coaching sessions impacted his self-efficacy, Ben said, "I feel like it made me a lot more aware of my sessions. Because when I am in the sessions themselves and receiving feedback, a lot of it goes right over my head. And I didn't write it down." Ben believed that the coaching sessions offered him a space to process and think about his simulation experiences. In that way, they added value to his experiences. However, the mindfulness strategies, in and of themselves, Ben felt were of no use to him. Like Rachel and Catherine, Ben also identified as a "chill" person that didn't really "need" mindfulness. The preservice teacher participants that did embrace the mindfulness strategies often spoke about the positive effects. These experiences connected to the subtheme of feeling empowered by mindfulness strategies.

Theme 1, Subtheme 2: Feeling empowered by mindfulness strategies. Preservice teachers that embraced the mindfulness-based coaching felt empowered by having mindfulness

strategies in their "toolbox." Stacey, a sophomore studying secondary education with an English focus, got at the heart of this subtheme in a journal entry where she wrote:

> Mindfulness strategies that I used were simply breathing. I took several deep breaths before my simulation in an attempt to remind myself that I would be totally fine. I found it to be helpful because even though I was still nervous, I had the conscious thought that the outcome would be a good one and I would survive the situation, instead of getting wrapped up in my nerves.

For this participant, turning to mindfulness shifted her outlook. Before even starting the simulation, she decided to make the experience "a good one." When asked if learning about mindfulness impacted his sense of teaching self-efficacy, David shared, "Yeah, I think so. I think me being able to kind of stay a little more mindful and relaxed helps me kind of feel more secure when it came to teaching. Like, it kept me grounded." For this participant, having access to the mindfulness strategies offered him a sense of comfort and security. Rhonda possessed similar thoughts. During her semi-structured interview, she said:

> It helped me emotionally and mentally to be ready for it, like the strategies you gave me. Me actually applying them during and in between the [simulations], it was very helpful because it gave me the set mind to go in and like focus.

Later in the interview, Rhonda revisited this sentiment. She said, "[The strategies] helped me relax more internally and not be so nervous." The sense of empowerment experienced by the participants stemmed from instances when they utilized mindfulness strategies and had positive results as well as the perception of grounding that came from intellectually understanding guiding principles of mindfulness. The subtheme of feeling empowered by mindfulness

strategies came out of two code categories: (a) mindfulness strategies and (b) understanding mindfulness.

Theme 1, Subtheme 2, Code Category 1: Mindfulness strategies. One of the strategies that preservice teacher participants learned about was noting. This strategy prompts one to label and organize thoughts into categories, using mental notes. About this strategy, Andrew, a junior studying secondary education with a math focus, said, "I like it because you are focusing on something and then some random thought enters your mind and then you can be like that is for later. I am going to put it away." New to mindfulness generally, Andrew found the process of labelling and organizing his thoughts very helpful.

Another commonly discussed and written about strategy was a simple breathing practice. In a journal entry, Megan, a freshman studying secondary education with a science focus, wrote, "I remembered to BREATHE! I took frequent pauses for myself and for student questions." For this participant, something as simple as providing oneself with reminders to breathe had a noticeable impact on the simulation experience outcomes.

Lenny, a sophomore studying secondary education with a social studies focus, a participant that struggled a good deal with nervousness that resulted in forgetfulness and visible anxiety during simulations, also noted using a breathing strategy in one of his reflections. He stated, "I feel that tonight's simulation went well. Prior to beginning the simulation, I stepped out of the room and controlled my breathing." Using a breathing exercise as a strategy helped the participant work through the experience. In this case, this choice contributed to a successful simulation experience. This sentiment was echoed by Courtney, a freshman studying elementary education, in one of her journal entries. She wrote, "Before my TeachLivE, I did try to BCOOL and breathe. These strategies did help me to calm down." And again, by Jennifer when she

wrote, “I used BCOOL during this experience and it actually helped. I hope to learn more strategies about mindfulness to use during my next section.” Participants repeatedly shared about effectively using mindfulness strategies that we spoke about during the coaching sessions. In a journal entry, David wrote:

> I actually used the breathing technique from the mindfulness strategies. It helped me kind of relax a little bit more before having to teach and I think it helped me keep a calm composure. I have definitely been meditating more often than usual just to keep myself more calm and able to think through problems or situations better and it has actually helped me pretty exponentially.

David was able to use the strategies and underscored how much they helped him.

When debriefing on her first simulation experience during her second coaching session, Samantha remarked up on how mindful breathing helped ground her and helped her get through the simulation. She shared:

> I think I did [mindful breathing]. I put [a reminder] on the paper, like when they were talking between each other for a moment. So, basically like after I was like “Okay, you guys can start talking,” I was like counting in my head. I made sure I was grounded. I pressed my feet a little more firmly into the ground. I was like, “Deep breath in and out, like everything is fine. You’re doing well. You didn’t mess anything up. You’ve recovered if you have. You’re good.”

Samantha intentionally wrote herself a reminder to utilize deep breathing during her simulation and even coupled this strategy with a mental pep talk that she gave to herself. While focusing on her breath, she reassured herself by saying, “You’re good.” Later during the coaching session,

Samantha added, "I wrote something out because I knew I was probably going to be nervous. I need that breather."

One participant, Robin, really connected with the strategy of mindful walking (see Appendix N). This strategy prompts one to bring present moment awareness to the act of walking, intentionally taking in feelings and sensations through nonjudgmental observation. When learning about this strategy during her third coaching session, Robin shared:

> I feel like I do this a lot. Just right now, I was just walking over from the science building and I was like "Oh, it's so cold. Like, I want to get to the library because it will be warmer." And I took in that it was breezy. Yeah, I am very perceptive and aware of like the environment.

Robin naturally gravitated to this strategy and found that she even practiced it prior to officially learning about it.

While many of the participants within the treatment group successfully implemented different mindfulness strategies throughout the semester, some of those participants demonstrated a particularly keen understanding of mindfulness principles that were discussed during the coaching sessions. These instances composed the next code category, understanding mindfulness.

Theme 1, Subtheme 2, Code Category 2: Understanding mindfulness. When asked about how the mindfulness coaching impacted her simulation performances during a semi-structured interview, Allison shared:

> Um, well, something that really struck me throughout the whole thing was not judging your thoughts and reminding yourself that the situation is okay. That's something that I

never really paired with deep breathing. And that helped me a lot. So, I think I would have been a little bit more wired if I didn't have these techniques.

In speaking about the notion of not judging one's thoughts, Allison displayed a nuanced understanding of one of the more complex mindfulness principles discussed during the coaching sessions, understanding and trusting that the situation is okay when engaging in mindful breathing. Talking about mindfulness in this way indicated that this participant understood the concept in a deep way, more so than some of her peers. She connected this concept to prior experiences with breathing and then subsequently experienced breathing exercises in a more dynamic manner. During this same coaching session, Allison further qualified her thinking around mindfulness. She said, "Um, I guess in my head, it just means like actually putting thought into something. Being mindful. Like thinking, not just like an automatic reflex response." Allison was able to articulate the meaning of mindfulness in her own words.

In a journal entry, Ruth wrote, "I keep thinking about being kind to not only myself, but also the situation. It has helped me be more rational." In expressing this, Ruth showed that she understood elements of the coaching experience beyond displaying the ability to try out or describe one of the mindfulness strategies. Being kind to oneself is not a strategy so much as it is an overarching principle that undergirds all mindfulness practices. In this way, this participant understood the larger purpose and intention behind the mindfulness practices. In her semi-structured interview, when reflecting on the coaching experience overall, Ruth also said:

> You've helped me grow my vocabulary on [mindfulness]. You used the word neuroplasticity. And I thought it was really strange that I didn't know anything about it considering everything that I've been through. And it was really helpful for me to have

> that knowledge because after we started talking about it here, I was looking into it more and seeing how it plays into like posttraumatic stress disorder.

Again, this participant demonstrated a keen understanding of mindfulness when she related her newfound knowledge of neuroplasticity to experiences with posttraumatic stress disorder. The concept of neuroplasticity and the brain science behind mindfulness was discussed during the coaching sessions. This was one of the more challenging topics and Ruth was able to speak about it articulately.

During her first coaching session, Samantha spoke articulately about responding versus reacting, which was one of the key teaching points for the coaching session. Onto the teaching point, she added:

> Okay, yeah. So you have time to sit, sort of take yourself out of the situation. Think about it and put yourself back in…I've had teachers who haven't done that. And they, they end up having no filter because of that, because they don't have time to sit back and think about it. And [it] never ended up well. Well, they might say or do something that they ultimately regret. And they wish they had taken a moment to slow down. Yes, that's definitely happened before.

By elaborating on what the coach had shared about the notion of responding versus reaction, Samantha displayed that she really understood this essence of this concept. Not only did she restate the idea back to the coach, she also called to her mind scenarios when her own teachers reacted rather than responded. Samantha understood how reacting without thinking could result in negative outcomes in a classroom setting. The next theme that emerged from the data was using mindfulness as classroom teachers.

Theme 2: Using mindfulness as classroom teachers. Preservice teachers that received a mindfulness-based coaching treatment believed that they acquired tools, which they could utilize in the future when serving as classroom teachers and this increased their overall sense of teaching self-efficacy. The theme of using mindfulness as classroom teachers, the data illustrated, incorporated two subthemes: (a) mindfulness as self-care and (b) mindfulness with students.

Theme 2, Subtheme 1: Mindfulness as self-care. Preservice teachers within the treatment group spoke about using mindfulness for themselves as self-care to cope with the challenges of teaching and life in general. The subtheme of mindfulness as self-care related to two code categories: (a) self-care practices and (b) extending mindfulness to other aspects of life.

Theme 2, Subtheme 1, Code Category 1: Self-care practices. Throughout the study, during the coaching sessions especially, participants referenced different self-care practices that they implemented. During a coaching session, David shared:

> I tend to do the meditation a lot more than anything. Just because I find that it's easier for me when I sit down and then find a little bit of silence and then just breathe and kind of put myself to a less judgmental place. Which is perfect… I've been feeling more relaxed as a person.

David was an example of a participant who adopted elements of the mindfulness coaching as self-care practices for himself. Inspired by learning more about mindfulness, he developed a meditation practice. In a journal entry, David reiterated these sentiments. He wrote:

> I tend to gravitate a lot towards meditating when it comes to mindfulness strategies and it tends to help pretty immensely. This past week has been particularly stressful with mid-

terms and travelling home. So, I needed to take a few minutes every day to put myself in a more mindful state of mind to get through the stress.

For David, the impact of the mindfulness component of the coaching extended far beyond the mixed-reality simulation learning environment. He developed self-care practices that shaped his daily experiences.

Another participant, Reese, a sophomore studying secondary education with an English focus, spoke about a self-care practice that grew out of the mindfulness-coaching experience. In a journal entry, Reese shared:

> The main mindfulness strategy that I feel like I will always use is the simple breathing exercise. This is something I will always use when it comes to feeling nervous or if my heart is being faster than usual. This will forever be useful to me because it would help me out in the long run.

For this participant, the coaching experience allowed her to discover a self-care practice that she intended to use "forever." During a coaching session, Rhonda spoke about prior experience she had with breathing exercises. She shared, "[Breathing] is good. It helps me sleep. Yeah, and like disconnect from the world." In this instance, the participant brought to the coaching preexisting knowledge of and experience with a regular self-care practice.

During her first coaching session, when learning about mindful breathing, Samantha shared that she already knew a lot about this practice. She said:

> I've gotten this strategy because I've had anxiety attacks and panic attacks because it's sort of something in my family. So, I've been able to use that before and it is very helpful. I've even helped other people with that. Yeah, I've helped other people who have been in similar situations. That's one of the things I've given them to help them.

For Samantha, mindful breathing was a self-care practice that she already had in place. She found so much value in this practice that she even shared it with other people when it seemed like they needed support. All the preservice teacher participants understood these self-care practices to be tools that they would use in the future when serving as classroom teachers. Related to the code category of self-care practices was the code category of extending mindfulness to other aspects of life.

Theme 2, Subtheme 1, Code Category 2: Extending mindfulness to other aspects of life. Many of the participants within the treatment group extended elements of the mindfulness coaching to domains of their life outside of the simulation experiences. They embraced the practices during the simulation and in other contexts. When initially learning about mindfulness during a coaching session, Andrew stated, "I think I really need this because, you know, sometimes I work at a gas station and sometimes some people are rude and like that. But like you are saying, I take a deep breath and try to act nice." In this case, the participant was considering using one of the mindfulness strategies.

During a coaching session, when asked about whether she had been using any of the mindfulness strategies in her personal life, outside of the simulations, Kendall, a freshman studying elementary education, shared:

> When I'm walking places, I remember we talked about how you have different mindful things. Like you could do mindful walking. You're walking. You're like taking in your surroundings. When I am walking places, I am definitely noticing more. Like, I'm thinking when I am walking.

In this scenario, Kendall found herself using and enjoying one of the strategies, mindful walking, in her personal life, outside of the mixed-reality learning environment. Extending these different

mindfulness strategies to other aspects of life showed that these participants were truly embracing the practices. It also created additional opportunities for them to practice and better understand the strategies themselves.

Robin also spoke about utilizing some of the strategies outside of simulation contexts. During her semi-structured interview, Robin specifically referenced mindful walking when asked about mindfulness practices that utilized outside of TeachLivE. She said:

> Literally, mindful walking, when walking to class, specifically the science building. I'm literally like thinking, "Okay, like, I need to this. I need to do that." Especially on Tuesdays. Those days are really long for me. And so, I'm kind of like just thinking about it as I'm walking. I'm preparing and setting my mind.

Like Kendall, Robin also found mindful walking to be a useful strategy that extended into aspects of her life outside of the mixed-reality learning environment.

During her third coaching session, when asked if she found herself using mindful breathing in contexts outside of the mixed-reality simulations, Samantha shared about using mindful breathing to help with a presentation for a different class. She said:

> I definitely tried it when prepping for other things. Like, I had a presentation on Tuesday. I was doing [breathing] even during it. It was a teaching writing class and I was just doing a presentation. Yeah, it was a presentation on some writing aspect. I did [breathing] before, during, and after.

In this case, Samantha extended her knowledge of a mindful breathing practice to a context outside of what was explicitly discussed during the coaching sessions. She even went on to add, "I've also done it when I've been doing been doing big homework sessions because I have two 10-page papers to do by the end of the semester. So, it's like: breathe, ground yourself, you're

good." So, in many more than one type of situation, Samantha had the thought to use one of the strategies outside of the simulation environment. Within the theme of using mindfulness as classroom teachers, the other subtheme was mindfulness with students.

Theme 2, Subtheme 2: Mindfulness with students. Preservice teachers spoke about using mindfulness with students to cultivate a healthy classroom culture. During her final coaching session, when considering ways to potentially use mindfulness with students in the classroom, Samantha, who intends to become a high school English teacher, really gravitated towards the strategy of mindful writing. She shared:

> I think [mindful writing] sounds like definitely something I'd actually like. Because I have a class right now that's teaching writing and high schools. My teacher gave me a book about free writing and everything for a book report. And one of the things that I talked about was that free writing was so good because you can get your unconscious thoughts out and explore those ideas. And that's definitely something I want to implement as a warm-up or bell activity.

Interestingly, this participant was able to relate a conversation during a coaching session to her learning within one of her teacher education program courses. When discussing ways to integrate mindfulness into the classroom, she quickly formed this connection and described how she felt that this could benefit students and what it might look like in her classroom. She went on to recall her own experiences with mindful writings. She said, "It makes me feel better and flushes out my thoughts." The subtheme of mindfulness with students emerged out of two code categories: (a) using mindfulness with students, and (b) cultivating positive relationships with students.

Theme 2, Subtheme 2, Code Category 1: Using mindfulness with students. When preservice teaching participants spoke about ways in which they might incorporate mindfulness into their professional lives when they become teachers, they sometimes spoke about the notion of using mindfulness directly with students. During a coaching session, Rhonda thought aloud about this idea. She said:

> Now, as one example for benefitting the student, me thinking in my head, was like, let's say if we were going to be writing. We can put like meditation music on while they do the writing workshop or something like that.

She elaborated further: "Somehow, their brains will like calm down and will be more open too." When learning about mindfulness as part of the coaching experience, this participant naturally and quickly connected the practices to a classroom context, envisioning ways to incorporate mindfulness in developmentally appropriate ways. This sentiment was shared by Ben, one of the treatment group participants who himself did not feel a desire or need to try out any mindfulness strategies. When asked about finding any value in the mindfulness strategies, he did remark that these could be useful tools for his students. He said:

> But I mean on the other hand, there could be something here when I can open up a classroom. So, it's like, it's like I could use this as a resource. So, if, let's say, like one of my kids needs something when they get performance anxiety.

While not personally interested in practicing mindfulness, Ben thought these strategies could help some of his music students.

During her initial coaching session, when speaking generally about the meaning of mindfulness and the value of integrating mindfulness into classrooms, Samantha shared:

> Oh, yeah! I went into a classroom one semester my freshman year and like even just seeing, like a teacher, like telling the kids to like focus on their breath to make sure they calm and everything before they started working. I was like, I wish I had that when I was in school. I want to do that with my students.

Samantha was able to personally recall a time when one of her college professors utilized a mindfulness strategy. She wished that she has more experiences like that in her own education and hoped to offer mindfulness to her future students. Samantha later qualified her interest in using mindfulness with students when she said, "Yeah, because you never know what is going on in their heads." She understood mindfulness to be a tool to assess the emotional state of her students as well as a way for students to prepare themselves for learning. The code category of using mindfulness with students related closely to the other code category, cultivating positive relationships with students, both under the subtheme of mindfulness with students.

Theme 2, Subtheme 2, Code Category 2: Cultivating positive relationships with students. When asked about how learning about mindfulness impacted his sense of teaching self-efficacy, David said:

> I think it helps. It makes me aware of ways to kind of calm myself when I'm feeling nervous about teaching, which I know, you know, the way you teach can kind of effect students. So, being able to stay calm and kind of be a little more mindful of everything going on around you while also trying to teach definitely makes it a little easier for you as well as for whoever will be my students.

When reflecting on the overall coaching experience, David expressed the notion that anything he could do to be more mindful would not only benefit him, but also his students. He understood

that the way he teaches, would influence his students. When conceptualizing himself as a teacher, this participant was considering dynamics and relationships with students.

Inspired by the mindfulness coaching experience, Rhonda shared an idea that she developed during one of our coaching sessions. She said:

> Yeah, I was thinking of doing like a comment, like a kind comment. Just to create that like loving environment in the class. Yeah, it could be like, let's take the first few minutes of the class, like one minute to write down a kind word for the person next to you.

Rhonda underscored this conviction to integrate mindfulness practices with her students into her future classroom later again in the same coaching session. She reiterated, "Yeah, I want to do the mindful minute with them. I think it's really crucial for them to have that peace of mind. Yeah, especially as they progress, like in school or throughout the day." The practices that Rhonda learned about throughout the mindfulness coaching experiences became tools that she intended to use with her students when she became a teacher. Further, having access to these strategies enabled Rhonda to begin the process of visualizing herself as a classroom teacher carrying out these practices.

Cultivating positive relationships with students was the final code category within the subtheme of mindfulness with students, which related to the theme of using mindfulness with students. The third and final theme that emerged from the data was simulation experiences influenced teaching self-efficacy beliefs.

Theme 3: Simulation experiences influenced teaching self-efficacy beliefs. Preservice teachers from the treatment and comparison groups felt that participating in the mixed-reality simulation environment approximated the experience of teaching and this influenced their

teaching self-efficacy beliefs. When asked about how the simulation experiences impacted her self-efficacy, Rhonda said, "I feel like [the simulations] brought me more confidence."

The theme of simulation experiences influencing teaching self-efficacy beliefs materialized from two subthemes found within the data: (a) increased teaching self-efficacy beliefs, and (b) decreased teaching self-efficacy beliefs.

Theme 3, Subtheme 1: Increased teaching self-efficacy beliefs. In certain instances, participating in the mixed-reality simulation environment increased teaching self-efficacy beliefs. During her semi-structured interview, Robin referred to her own increased sense of self-efficacy. She said:

> Before TeachLivE, I literally had no other exposure to standing and talking in front of a class of students. And so, with TeachLivE I was exposed to that. And I kind of learned different techniques from myself and other people, other students, to use in the classroom and how to approach students in an appropriate way.

In this instance, Robin referred to mastery experiences as well as learning through peer observation, two key components of the mixed-reality simulations. The subtheme of increased teaching self-efficacy beliefs was based upon two code categories: (a) mastery experiences and (b) learning from peers.

Theme 3, Subtheme 1, Code Category 1: Mastery experiences. Engaging in the simulation experiences created opportunities for the preservice teachers to approximate teaching in a safe space and then reflect on how it went. Instances when preservice teachers were successful constituted a mastery experience, which is one of Bandura's (1986, 1994, 1997, 2000) four ways to increase self-efficacy. In a reflection, Megan wrote:

> I am relieved that the first TeachLivE presentation is over with and now I feel more confident in the upcoming simulations. In terms of what went well, I feel as if I was able to keep the flow of the class going without too much blatant disruption. However, I feel as if I need to work on talking more clearly and more slowly.

In this instance, Megan recognized feeling more confident and upon reflection was able to identify specific teaching moves that went well as well as explicit teaching behaviors to focus on improving in the future. Another participant, Kendall, shared a similar sentiment in a journal entry. She wrote:

> I felt confident after my first Mursion simulation. I was nervous going into it, but I prepared to talk to the classroom. I felt like my rapport exercise went well, the students seemed engaged and I got to learn more about my students and connect with them to build a comfortable classroom setting. There is room for growth. I would like to have better posture and be prepared to respond to random questions and comments that student have.

Like Megan, Kendall felt a sense of accomplishment and was pleased with how her simulation went. She too was able to critically reflect on her process and pinpoint areas for growth, all within the context of generally feeling proud of her performance and progress so far.

In a journal entry, Samantha wrote, "TeachLivE helped prove that I do want to become a teacher. These reflective sessions are a good way to, well, reflect and improve." For this participant, mastery experiences within the mixed-reality environment affirmed her decision to become a teacher. David also experienced encouraging mastery experiences within the context of the mixed-reality simulation learning environment. In his semi-structured interview, David shared:

> It made me feel good to know that what I was trying to accomplish came across in terms of trying to maintain a pretty relaxed and outgoing teaching perspective, while also kind of being professional and being a teacher to students, I guess, if that make sense. Kind of my main goal, I think, through all of this was knowing that what I'm trying to do is what I'm capable of doing. And then when I did the first one with the rapport building, one comment that someone made was that I seem to talk to them like a human being. And I felt good about that. And so I'd say [the simulations] kind of boosted [my self-efficacy] a little.

When speaking about the impact that the simulation experience had upon his teaching self-efficacy, David recalled a mastery experience and associated positive peer feedback from many months prior. Experiencing success, being able to come across as the kind of teacher that David aspired to become, positively impacted his feelings about himself as a future educator. The mixed-reality simulation experience facilitated the development of these feelings. David also touched upon the powerful influence of peer learning throughout the mixed-reality simulation experiences. In his semi-structured interview, Lenny spoke about the positive impact that a mastery experience had upon his self-efficacy. He said:

> The first two kind of were almost negative, I guess in that way. But this third one has been really positive for me. I guess I judge myself entirely on like how I perform. I just wasn't performing in a way I found satisfactory for the first [two simulations]. [The third simulation] more than made up for the first two.

This participant experienced a good deal of challenge and frustration with the simulation experiences. In his first simulation, he was visibly nervous and struggled to communicate with the avatars. During the second simulation, he lost his train of thought and grew so nervous that

he had to pause the simulation to reference notes and catch his breath. However, after struggling a good deal with the first two simulation experiences, one very positive mastery experience during the third simulation was enough to offset two unsuccessful simulation attempts.

Participants within the comparison group also referenced mastery experiences when reflecting on the impact of the simulation experiences on their self-efficacy and teaching confidence. Beth, a junior studying music education, shared:

> Going into it, I was pretty scared, especially the first time, because I didn't know like what was going to happen. I wasn't sure if I was going to like do a good job. But going in and like being able to like tackle it has kind of boosted my confidence, I think.

Like so many of the participants, Beth spoke about this initial fear of the unknown and worries associated with trying something new, and potentially scary, for the first time. Because it was "scary," however, overcoming that fear and successfully completing the simulation made those experience more rewarding and confidence-boosting. The other code category within the subtheme of increased teaching self-efficacy beliefs was learning from peers.

Theme 3, Subtheme 1, Code Category 2: Learning from peers. Repeatedly throughout the semi-structured interviews, participants shared about the positive impact of learning from their peers. This peer learning took on four forms: (a) learning from peer observation, (b) learning from peer feedback, (c) vicarious experiences, and (d) social encouragement. The fishbowl nature of the mixed-reality simulation learning environment played a major role in increasing the teaching self-efficacy of the preservice teachers as did the built-in feedback component of the experiences. During his semi-structured interview, Ben shared:

> I would go into the TeachLivE and watch everyone else go before I figured out completely where I wanted to go with my lesson. Like for the last lesson, I had a general

> idea of what I wanted to do. But then I listened to everyone and I was THAT, I want to use that.

As an observer, Ben was able to identify mastery experiences amongst his peers and then apply those methods or strategies to his own lesson. When asked about how observing his peers impacted his sense of teaching self-efficacy in his semi-structured interview, David also spoke about how peer observation helped him. He said:

> I know there were a few times when I saw someone do something and it was kind of like not really how I would have approached it. But then there were times were people did something and I was like, "Oh! That's a lot better than anything I would have thought of doing." And I guess I took that in, whether it be just like their mannerism or their ideas. And so I guess it kind of went both ways. But ultimately, I think it helps. So, I would say [observing peers] boosted [my self-efficacy] a little bit.

In David's case, when observing his peers, he was able to identify specific behaviors or teaching moves that he liked as well as behaviors that he did not like. Ultimately, he absorbed ideas, and this increased his self-efficacy. Geralin, a sophomore studying music education, shared similar thoughts. She said:

> It was nice to watch my peers teach because I was able to learn alongside and see how other people were doing things like the building rapport or the classroom rules and teaching that to your students. It was nice to see what other people thought was important. So, I think it was definitely really helpful and like seeing one of my peers make a mistake or if something didn't work. It was nice to see that and be like, "Okay, if I do that, that's how it may play out." It was all helpful for me to learn and get inspiration for teaching in a classroom.

Like David, Geralin was able to learn from the successes and failures of her peers. Ultimately, for her a very positive benefit from the overall simulation experiences were the ideas and inspirations that she gained through peer observation.

In addition to peer observation, peer feedback played a critical role when it came to learning from fellow students. When asked about the impact of peer feedback during her semi-structured interview, Beth remarked upon the timeliness and how this was helpful. She said:

> I thought it was really interesting because it was like so immediate. Like, when you're in an actual classroom, you don't really get that. With getting feedback from the professor and students it's like, "Okay, this is what you did. This is what you might need to work on." And that was right away.

For this participant, the immediate nature of the feedback was important. This helped her understand, while the experience was still fresh in her mind, what transpired and what she could work on in the future. This immediacy facilitated reflection and helped her grow as an educator.

When asked about learning from peers during her semi-structured interview, Allison touched upon the concept of vicarious experiences. She imparted:

> Because I talked to them beforehand, and we're all pretty close as a class, I know that everybody's like super nervous. And just to see them get through it kind of gave me a little boost. Yeah, because we're all nervous together. And like we're really supportive of each other. So, to see my classmate surviving, that, that works.

In this case, developing meaningful connections with her preservice teacher peers enabled Allison to relate her own simulation experience to her peers. Seeing her peers succeed helped Allison believe that she could also succeed. This phenomenon, described by Bandura (1986, 1994, 1997, 2000) as vicarious experiences, is one of the four ways that people can grow their

own sense of self-efficacy. During a coaching session, Jennifer also spoke in ways that connected to vicarious experiences. She said:

> The girl that went ahead of me was really scared. Yeah. Okay, so like that made me think I'm not the only to be like in this situation and be scared. So, like, that's how [my peers] calmed me down. Because, like, she was also scared.

Knowing that she was not alone in her fear, and then seeing a peer that also felt scared successfully complete a simulation helped Jennifer find the courage and confidence that she needed in the moment.

Robin also grew her sense of teaching self-efficacy through vicarious experiences. After the first simulation experience, during her second coaching session, she said:

> So, going into it, before even getting there, and like just waiting outside for the door to open, up to that point, I was pretty nervous. And just like, I was just nervous because I didn't know what to expect. And I didn't know how it was going to be. But once I went in and like I saw my other classmates do it, I kind of was like, "Okay, yeah, this doesn't seem so bad. I can do that." So, and when I was I up there, I just did it. And it wasn't as bad as I thought. Like, it wasn't even bad. Like, I was fine.

For Robin, having the opportunity to observe her peers before her first simulation made her feel more confident about her own ability to successfully complete the experience. Her enduring takeaway from seeing others go was, "I can do that."

Social encouragement from peers also played a role in growing the self-efficacy of preservice teacher participants. During her semi-structured interview, Robin shared:

> Honestly, I've never felt so comfortable with a group of people. It's probably because there was just like eight or nine of us. At the first one I was really nervous. Because,

> like, you know, they're going judge me because I stutter. But, like going into it, the reality was that everyone is literally just supportive. I've never been so comfortable with a group when doing a presentation or like being up there like exposing myself.

For Robin, the nonjudgmental culture amongst her classmates was essential to her success. She was able to feel comfortable performing in front of her peers and felt supported and encouraged, even in the face of personally struggling with a stutter. During her semi-structured interview, she elaborated even further. She said, "We were able to relate. I was feeling the same things they were saying and thinking." The experience of her peers was relatable, and this was comforting to Robin.

During her semi-structured interview, Samantha also referenced the role of social encouragement shaping her overall experience. When asked how the simulations impacted her overall sense of teaching self-efficacy she said:

> It sort of helped me build more confidence and have a free space where the only judgment you get is from your peers. And we're also going through the same thing…Yeah that definitely helped because we're all on the same level. It's not like they will be like, "Oh my gosh, you're so terrible." It's more like everyone is here to listen and to learn and to help.

Like Robin, Samantha noted the comfort that came out of knowing that everyone was going through the same thing. Rather than being negative or overly critical of each other, Samantha felt that her peers were there to "help." Learning from peers was the final code category within the subtheme of increased teaching self-efficacy beliefs. The other subtheme under the theme of simulation experiences influenced teaching self-efficacy beliefs was decreased teaching self-efficacy beliefs.

Theme 3, Subtheme 2: Disequilibrium of teaching self-efficacy beliefs. In certain instances, participating in the mixed-reality simulation environment resulted in a disequilibrium of teaching self-efficacy beliefs. The subtheme of disequilibrium of teaching self-efficacy beliefs was established by two code categories: (a) frustrating experiences and (b) challenging feedback.

Theme 3: Subtheme 2, Code Category 1: Frustrating experiences. In a journal entry, Rhonda wrote:

> Well, tonight I felt like I really sucked! I let my problems get the best of me. Even when I tried the BCOOL strategy my body completely shut down and went into full stress mode. I was surely surprised to catch myself being so nervous and then crying!

Rhonda wrote this after her third simulation experience. For Rhonda, finishing out the series of three simulations with a negative experience rattled her confidence in herself. Rather than witnessing a positive progression, she was caught off guard by a decline in her growth during her final simulation experience. Similarly, in a journal entry, Jennifer shared, "I feel like I did horrible. I need to be more prepared. I'm upset with my performance." In this scenario, the participant identified that she was not successful and attributed this outcome to a lack of preparation. Like Rhonda, this was difficult for the participant because this experience followed her first simulation where she felt successful. Experiencing setbacks or failures after earlier positive experiences was particularly difficult for some participants because it potentially indicated backwards progress.

When asked about how the simulation experiences impacted her confidence in her teaching abilities, Gwen, a sophomore studying elementary education, shared:

> Honestly, I think it decreased it a little bit. I was one of the ones that, I feel like each time I did it, I got worse at it. And I don't really think I have an understanding as to why. I think my nerves played a huge role in…Each time I just kind of got so nervous that I would stumble over my words. At the last time I kind of giggled at myself and that threw me off because I was embarrassed. And I think that obviously doing it in front of a classroom of your peers plays a role your confidence. If you do a great job, then it increases your confidence. But for me, I didn't do as well as I hoped to, so it obviously did the reverse.

Unfortunately for Gwen, struggling with the simulation experiences decreased her confidence in her teaching abilities. In this case, she did not achieve the mastery experiences that she had aspired. Coupled with nervous feelings and the stress of being observed by her peers, this had an overall negative impact on her sense of teaching self-efficacy. Another factor that contributed to decreased teaching self-efficacy for some of the preservice teachers was challenging feedback.

Theme 3: Subtheme 2, Code Category 2: Challenging feedback. At times participants shared about the feedback component of the simulation experience. While the majority of participants found the feedback to be helpful and eye-opening even, some participants struggled with it. When asked about the experience of receiving feedback from his professor and peers, Ben shared:

> [It is] scary! Well, I mean, it depends on the person. Like one of my peers would say something. Usually, like, I'm like, okay, okay, that's cool. I'd think about it. And like you're right. But when the professor says something to me, I'm like, too scared to take everything in because I'm like AHH! Yeah. She's not like the person who give those sandwich compliments.

For Ben, it was difficult to hear the feedback from his professor because she was direct and focused more on critical feedback rather than on complimentary observations.

Gwen also shared her thoughts on the feedback component to the simulation experiences. She said:

> There is always a negative and positive approach to the feedback that we get. And I feel like usually the negative sticks a little more because we're hard on ourselves. At the end of class when were asked to say one thing we liked about our peers and one thing we liked about ourselves, it was usually the same four people being complimented. So that kind of a plays a role. Like is anyone going to pick me? Did I do anything okay? And you know at the end of the day, most of the people in the class are not picked for something positive by others… Many students walk out feeling like they didn't accomplish much, including myself.

In Gwen's case, she described hurt feelings for being passed over and not recognized for anything positive during her simulation. Gwen referenced an exercise wherein the professor prompted each student to share one thing they liked from their own simulation and one thing that they noted from one of their peer's simulations. During this exercise, Gwen was not recognized by any of her peers and this left her feeling unaccomplished and decreased her confidence in her own teaching abilities.

Lenny had a slightly different reaction the feedback experience. He said, "The feedback in class was kind of all over the place. It was like over really quickly and you had several ideas being thrown back and forth within the space of like five minutes." For Lenny, the feedback was challenging because it was unfocused and very quick. To Lenny, this felt chaotic and it was difficult for him to process this information in a meaningful way. This resulted in feeling unsure

about himself and second-guessing what transpired. Challenging feedback was the final code category within the subtheme of disequilibrium of teaching self-efficacy beliefs.

Summary of Findings

The qualitative data analysis revealed that participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers. Self-efficacy was most shaped by three of the four methods outlined by Bandura (1986, 1994, 1997, 2000): mastery experiences, vicarious experiences, and social encouragement. While most preservice teachers felt that the simulation experiences increased their overall sense of teaching self-efficacy, some experienced a disequilibrium regarding their overall sense of teaching self-efficacy. These preservice teachers did not have as many mastery experiences, leaving them with feelings of frustration. Further, these participants struggled with the feedback process.

Preservice teacher participants within the treatment group supplemented their simulation experiences with mindfulness-based coaching. For all but three of the participants in the treatment group, these coaching sessions and the associated mindfulness strategies impacted the way the preservice teachers' self-efficacy grew and developed. The mindfulness strategies facilitated mastery experiences, which increased self-efficacy beliefs. Furthermore, having access to the strategies empowered the preservice teachers and generally made them feel more confident.

For the purposes of this study, the quantitative and qualitative findings were compared and contrasted as a form of data triangulation (Creswell, 2003). Quantitative findings indicated that the mindfulness coaching treatment did not have a statistically significant effect on

mindfulness or the teaching self-efficacy beliefs of the preservice teacher participants, when considered against the comparison group. However, qualitative findings indicated that treatment group participants perceived the mindfulness coaching to be effective and believed that it increased their own mindfulness as well as their sense of teaching self-efficacy. Furthermore, there were even instances where participants articulated that their sense of self-efficacy increased and yet their scores on the TSES (Tschannen-Moran & Hoy, 2001), which measure teaching self-efficacy, decreased.

These conflicting results brought to the forefront questions related to the efficacy of the instruments utilized within this research study. These questions are discussed in Chapter Five. Also discussed in Chapter Five are unanticipated factors, such as end-of-semester stress and new-found knowledge of self-efficacy and mindfulness, and their impact on the post-assessment results.

In summary**,** the purpose of this mixed methods study was to understand the effect of a mindfulness-based coaching treatment on preservice teachers' mindfulness and sense of teaching self-efficacy within the context of a mixed-reality simulation learning environment. Three research questions were developed to guide this investigation. Analysis of the quantitative data showed no statistically significant relationships between receiving the mindfulness-based coaching and measures of mindfulness or teaching self-efficacy. Analysis of the qualitative data revealed three themes that led to a single finding statement. Recommendations for educators and suggestions for future research are discussed in Chapter Five.

CHAPTER FIVE: SUMMARY AND CONCLUSIONS

This chapter presents a summary of the results and conclusions in this chapter. The purpose of this study was two-fold: (a) to investigate the impact of a mindfulness-based coaching treatment on preservice teachers' sense of self-efficacy and mindfulness and, (b) to understand the perceptions regarding self-efficacy of preservice teachers participating a mixed-reality simulation environment. To address this, three research questions related to self-efficacy and mindfulness provided the focus for this study. Data were collected across multiple mediums. This chapter, the summary and conclusions, includes the following sections: (a) overview of the study, (b) discussion of results, (c) limitations of the study, and (d) conclusion.

Overview of the Study

Close to one third of teachers leave the profession within their first three years of teaching, citing reasons such as feelings of isolation and stress, insufficient feedback and support from administrators, and inadequate professional development (Headden, 2014). Teachers with high self-efficacy for teaching are more satisfied with their job (Caprara et al., 2006; Klassen et al., 2009; Skaalvik & Skaalvik, 2010) and less prone to burnout (Betoret, 2006; Skaalvik & Skaalvik, 2010). Mindfulness is one strategy and wellness practice that teacher educators and school administrators can offer in-service and preservice teachers to help them cope with challenges associated with the profession (Dorman, 2014; Gerstenschlager & Tassell, 2017; Hue & Lau, 2015; Schonert-Reichl, 2017; Wong, 2017). Broderick and Jennings (2012) posit that mindfulness has the potential to enhance perceived self-efficacy through cultivating positive emotional states and performance accomplishments made possible through increased self-regulation abilities. This study explored how mixed-reality simulations, coupled with the

presence of mind fostered by mindfulness coaching, allowed for preservice teachers to grow and to develop their self-efficacy for teaching.

A mixed-methods concurrent embedded (Creswell & Plano Clark, 2011) design was used to discover effects on and perceptions of self-efficacy amongst preservice teachers when receiving mindfulness-based coaching while participating in a mixed-reality simulation learning environment. The research questions used to guide this study were as follows.

1. Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' perceptions of mindfulness during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.
2. Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not?
    a. *Non-directional Hypothesis*: There is a statistically significance difference in mean scores for preservice teachers' sense of self-efficacy during a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.

3. What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment?

The quantitative component of the study employed a quasi-experimental design (Gall et al., 2007). A sample of convenience (Gall et al., 2007) was used from four intact groups of students enrolled in ED 206 Introduction to Education, an introductory course in the undergraduate preservice teacher program, for the treatment and comparison groups. The qualitative research design was an exploratory case study bound by preservice teacher candidates enrolled in ED 206 Introduction to Education (Creswell, 2017).

Discussion of Results

During the spring semester of 2019, the researcher provided a mindfulness-based coaching treatment to preservice teacher participants in the treatment group (n = 17). Quantitative data for the treatment group was collected via pretest, posttest, and demographic survey. Qualitative data for the treatment group was collected via coaching sessions, mixed-reality simulation experience observations, written reflections, and semi-structured interviews. The researcher attended and observed three mixed-reality simulation learning environment experiences. Participants responded to a short reflection prompt after each simulation experience. The researcher provided four one-to-one mindfulness-based coaching sessions to 16 participants in the treatment group. One participant only attended three coaching sessions. Semi-structured interviews were conducted with all 17 participants in the treatment group.

During the fall semester for 2019, the researcher collected data from participants in the comparison group (n = 23). No mindfulness-based coaching treatment was provided to participants in the comparison group. Quantitative data for the comparison group was collected

via pretest, posttest, and demographic survey. Qualitative data for the comparison group was collected via mixed-reality simulation experience observations, written reflections, and semi-structured interviews. The researcher attended and observed three mixed-reality simulation learning environment experiences. Participants responded to a short reflection prompt after each simulation experience. Semi-structured interviews were conducted with all 23 of the participants in the comparison group.

Following the data collection, all quantitative data were cleansed, and assumptions were addressed. An analysis of variance (ANOVA) was performed twice to address research questions one and two (Gall et al, 2003; Meyers et al., 2013). The researcher sought to investigate the effects of a mindfulness-based coaching treatment on preservice teachers' mindfulness and sense of teaching self-efficacy. The researcher performed the ANOVAs, which revealed no statistically significant differences in mindfulness scores, $F(1) = .002$, $p = .968$, or sense of self-efficacy scores, $F(1) = .005$, $p = .942$, between those who received the mindfulness-based coaching treatment and those who did not.

Concurrent to the quantitative data analysis, qualitative data were analyzed and interpreted to address research question two. The researcher utilized a deductive and inductive coding process (Saldaña, 2010). The original codes were grouped into categories and subthemes, which were then organized into three themes. These themes were then analyzed to generate the following finding statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers.

Findings and Implications

In this section, the findings and implications from the statistical analyses of quantitative data collected and then the analysis of the qualitative data completed in Chapter Four are presented. It also includes a discussion and proposes implications for each research question related to the results.

Research Question One. The first research question was: Is there a statistically significant difference in mean scores for preservice teachers' perceptions of mindfulness during the semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not? The non-direction hypothesis for research question one proposed that there would be a statistically significant difference in mean scores for teachers' perceptions of mindfulness between preservice teacher participants in the treatment group, who received a mindfulness-based coaching treatment, and preservice teacher participants in the comparison group, who did not receive the treatment.

To address this hypothesis, an ANOVA was performed to analyze differences in posttest scores of the MAAS (Brown & Ryan, 2003a) for participants in the treatment and comparison groups. Results of the ANOVA showed no significant difference between the mean scores for the treatment and comparison groups, $F(1) = .002$, $p = .968$. When interpreting the results for research question one, the researcher compared these results again current literature and considered implications for educators and suggestions for future research. This information is summarized in Table 5.1.

Table 5.1

Summary of Discussion of Results for Research Question One

Findings	Related Literature	Implications for Educators	Suggestions for Future Research
Results of the ANOVA showed no significant difference for posttest measures of preservice teachers' perceptions of mindfulness (MAAS) between the treatment and comparison groups, $F(1) = .002$, $p = .968$.	Hue and Lau (2015) conducted a study to understand the impact of a six-week mindfulness program on the mindfulness, well-being, stress, and depressive symptoms of preservice teachers. Findings from the analyses showed a statistically significant increase in well-being for participants in the treatment group. Mindfulness scores on the MAAS also increased significantly. The qualitative data revealed that participants had positive experiences with the program and that they felt it helped them reduce stress, arouse compassion, and cultivate more awareness. Brown (2017) conducted a study to examine the impact of mindfulness instruction on preservice elementary teachers. Findings from the analyses showed a statistically significant decrease in mindfulness scores on the MAAS and a statistically significant increase in stress from pretest to posttest, suggesting that the mindfulness instruction was insufficient to increase mindfulness and reduce stress. However, findings from the qualitative data revealed that participants found mindfulness practices to be beneficial.	Since there were no significant differences in posttest mean scores of preservice teachers' perceptions of mindfulness, this treatment did not detract from the regular mixed-reality simulation learning environment experience; therefore, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum with little risk of harm to the preservice teachers.	Brown (2017) also conducted a study using the MAAS that did not show significant quantitative findings, however qualitative data revealed that participants found mindfulness practices to be beneficial; therefore, the MAAS may not have captured some of the changes in preservice teachers' perceptions of mindfulness, so future researchers could consider using a different instrument to measure perceptions of mindfulness. The timing of the posttest data collection overlapped with final exams and this could have impacted results on the MAAS posttest; therefore, future researchers could conduct a similar study wherein the posttest data is collected earlier in the semester.

Related Literature. Findings for research questions one relates to some of the current literature related to mindfulness and preservice teachers. Hue and Lau (2015) conducted a study to understand the impact of a six-week mindfulness program on the mindfulness, well-being, stress, and depressive symptoms of preservice teachers and to evaluate the feasibility of such a program in China. Findings from the analyses showed a statistically significant increase in well-being for participants in the treatment group. Hue and Lau (2015) also utilized the MAAS (Brown & Ryan, 2003a) to measure mindfulness and found that scores on the MAAS (Brown & Ryan, 2003a) increased significantly. Mindfulness was found to be positively correlated with well-being and negatively correlated with depression, anxiety, and stress. Regarding depressive symptoms and stress, no significant differences between the groups were found, indicating that the treatment did not impact those variables. The qualitative data revealed that participants had positive experiences with the program and that they felt it helped them reduce stress, arouse compassion, and cultivate more awareness. The mindfulness program utilized with the preservice teachers in Hue and Lau's (2015) study did have a significant impact on mindfulness, while the mindfulness-based coaching treatment utilized in this study did not have a significant impact on mindfulness. The qualitative findings from Hue and Lau's (2015) study indicated that participants had a positive experience, which is similar to the findings for the current study. The duration of the treatment in Hue and Lau's study was 6 weeks, while the duration of the treatment in the current study was closer to 15 weeks. It would be interesting to further explore similarities and differences between to two mindfulness treatments to understand why one had a significant impact and the other did not. Brown conducted a study in 2017, which also yielded results that relate to the findings for research question one of the current study.

Brown (2017) conducted a study to examine the impact of mindfulness instruction on

preservice elementary teachers. Findings from the analyses showed a statistically significant decrease in mindfulness scores on the MAAS (Brown & Ryan, 2003a) and a statistically significant increase in stress from pretest to posttest, suggesting that the mindfulness instruction was insufficient to increase mindfulness and reduce stress. However, findings from the qualitative data revealed that participants found mindfulness practices to be beneficial. Like the current study, Brown (2017) utilized the MAAS (Brown & Ryan, 2003a) to measure mindfulness. Brown (2017) found a statistically significant decrease in mindfulness while the current study found no significant changes in mindfulness. However, both studies were carried out anticipating a statistically significant increase in mindfulness. Despite not finding statistically significant increases in mindfulness, both the current study and Brown's (2017) study yielded qualitative findings which indicated that participants found the treatments to be beneficial. These research studies present an interesting dichotomy between quantitative and qualitative findings calling into question the efficacy of the mindfulness treatments as well as the ability of the MAAS (Brown & Ryan, 2003a) to fully capture changes in mindfulness. After relating the findings for research question one to current literature, the researcher then considered the implications of the findings for educators.

Implications for Educators. Since there were no significant differences in posttest mean scores of preservice teachers' perceptions of mindfulness, this treatment did not detract from the regular mixed-reality simulation learning environment experience; therefore, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum with little risk of harm to the preservice teachers. While the mindfulness-based coaching treatment did not significantly increase mindfulness, it did not significantly decrease mindfulness. Therefore, it is unlikely that offering this type of treatment to other preservice

teachers would detract from their overall experience. Especially since the qualitative findings indicated that many of the preservice teachers found value in the mindfulness-based coaching treatment, this could be a beneficial addition to teacher preparation programs. The results for research question one led the researcher to develop suggestions for future research.

Suggestions for Future Research. Similar to the current study, Brown (2017) conducted a study using the MAAS (Brown & Ryan, 2003a) that did not show significant quantitative findings. However, qualitative data revealed that participants found mindfulness practices to be beneficial. Therefore, the MAAS (Brown & Ryan, 2003a) may not have captured some of the changes in preservice teachers' perceptions of mindfulness, so future researchers could consider using a different instrument to measure perceptions of mindfulness. Many other instruments that measure mindfulness already exist. Alternatively, future researchers with the relevant background in mindfulness could consider developing a new instrument, perhaps one that is specifically intended for use with preservice teachers.

In addition to exploring other instruments for measuring mindfulness, future researchers could also rethink the timing of the current study. Within the current study, the timing of the posttest data collection overlapped with final exams and this could have impacted results on the MAAS (Brown & Ryan, 2003a) posttest. It is reasonable to expect that experiencing final exams would have an impact on stress levels, which is negatively correlated with mindfulness. Therefore, future researchers could conduct a similar study wherein the posttest data is collected earlier in the semester.

Research Question Two. The second research question was: Is there a statistically significant difference in mean scores for preservice teachers' sense of self-efficacy during the course of a semester, using a mixed-reality simulation environment, where one group receives a

mindfulness-based coaching treatment and the other does not? The non-direction hypothesis for research question two proposed that there would be a statistically significance difference in mean scores for preservice teachers' sense of self-efficacy during the course of a semester, using a mixed-reality simulation environment, where one group receives a mindfulness-based coaching treatment and the other does not.

To address this hypothesis, an ANOVA was performed to analyze differences in posttest scores of the TSES (Tschannen-Moran & Hoy, 2001) for participants in the treatment and comparison groups. Results of the ANOVA showed no significant difference between the mean scores for the treatment and comparison groups, $F(1) = .005$, $p = .942$. When interpreting the results for research question two, the researcher compared these results with current literature and also considered implications for educators and suggestions for future research. This information is summarized in Table 5.2.

Table 5.2

Summary of Discussion of Results for Research Question Two

Findings	Related Literature	Implications for Educators	Suggestions for Future Research
Results of the ANOVA showed no significant difference for posttest measures of preservice teachers' sense of self-efficacy (TSES) between the treatment and comparison groups, $F(1) = .005$, $p = .942$.	Bautista and Boone (2015) conducted a study to investigate the impact of a mixed-reality simulation learning environment on the science teaching self-efficacy of preservice teachers. Findings from the quantitative data analysis showed that science teaching self-efficacy and science teaching outcome expectations increased significantly over the course of the semester. Participants' confidence in their ability to teach science decreased after the first simulation. However, after the third simulation, most of the participants felt more confident. Additionally, a lack of familiarity with the mixed-reality simulation learning environment software negatively impacted preservice teachers' emotional state and this in turn lowered their self-efficacy. Participants found the peer observation and instructor modelling to be helpful and valuable.	Since there were no significant differences in posttest mean scores of preservice teachers' sense of self-efficacy, this treatment did not detract from the regular mixed-reality simulation learning environment experience; therefore, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum with little risk of harm to the preservice teachers.	The TSES is primarily intended for use with in-service teachers (Tschannen-Moran & Hoy, 2001); therefore, future researchers could consider using a different instrument to measure the sense of self-efficacy of preservice teachers. Since the participants in this study were preservice teachers that were just beginning a teacher preparation program, the TSES may have been unable to measure the preservice teacher's sense of self-efficacy, therefore future researchers could conduct a similar study with preservice teachers that are further along in their program.

(continued)

Table 5.2

Summary of Discussion of Results for Research Question Two

Findings	Related Literature	Implications for Educators	Suggestions for Future Research
	Gundel, Piro, Straub, and Smith (2019) conducted a study to examine the effects of a mixed-reality simulation learning environment on preservice teachers' sense of self-efficacy. The researchers followed a repeated measures method, which involved a quasi-experimental, one group with three levels, pretest/posttest design. Findings from the analyses showed a significant main effect for total exposure time. Of note, the researchers found a drop in self-efficacy among participants after 60 minutes of exposure time, a finding that has also been observed in other studies (Bautista & Boone, 2015). Dever and Clement (2016) conducted a study to examine the impact of an authentic science teaching experience on preservice teachers' self-efficacy and their beliefs about their outcomes with middle school students. Results of the analyses showed a significant negative change in self-efficacy from beginning to end of the experience. There was not a significant change in beliefs about preservice teachers' outcomes of teaching science. Overall, results showed that placing students in authentic learning experiences does not automatically result in increased teaching self-efficacy.		The timing of the posttest data collection overlapped with final exams and this could have impacted results on the TSES posttest; therefore, future researchers could conduct a similar study wherein the posttest data is collected earlier in the semester.

Related Literature. Bautista and Boone (2015) conducted a study to investigate the impact of a mixed-reality simulation learning environment on the science teaching self-efficacy of preservice teachers. This study was similar to the current study because it also focused on the construct of teaching self-efficacy and utilized a mixed-reality simulation environment context. Findings from the quantitative data analysis showed that science teaching self-efficacy and science teaching outcome expectations increased significantly over the course of the semester. Participants' confidence in their ability to teach science decreased after the first simulation. However, after the third simulation, most of the participants felt more confident. These findings contrast with the current study, wherein there was not a significant change in teaching self-efficacy. Interestingly, Bautista and Boone (2015) specifically looked at science teaching self-efficacy, while the current study focused on teaching self-efficacy generally. Additionally, Bautista and Boone (2015) found that a lack of familiarity with the mixed-reality simulation learning environment software negatively impacted preservice teachers' emotional state and this in turn lowered their self-efficacy. Participants found the peer observation and instructor modelling to be helpful and valuable. The findings related to peer observation align closely with qualitative findings from the current study wherein participants noted that learning through peer observation and peer feedback increased their overall sense of teaching self-efficacy.

Gundel, Piro, Straub, and Smith conducted a study in 2019, which also yielded results that relate to the findings for research question two of the current study. Gundel, et al (2019) examined the effects of a mixed-reality simulation learning environment on preservice teachers' sense of self-efficacy. Like the current study, this research study also focused on the construct of teaching self-efficacy within a mixed-reality simulation learning environment context. The researchers followed a repeated measures method, which involved a quasi-experimental, one

group with three levels, pretest/posttest design. Findings from the analyses showed a significant main effect for total exposure time. Of note, researchers found a nonsignificant drop in self-efficacy among participants after 60 minutes of exposure time, a finding that has also been observed in other studies (Bautista & Boone, 2015). Findings from this study could help explain why there were no significant changes in teaching self-efficacy after receiving a mindfulness-based coaching treatment over the course of one semester. The study conducted by Gundel et al. (2019) suggested that longer exposure time may be required to result in significant changes in teaching self-efficacy. Dever and Clement conducted a study in 2016, which also yielded results that relate to the findings for research question two of the current study.

Dever and Clement (2016) examined the impact of an authentic science teaching experience on preservice teachers' self-efficacy and their beliefs about their outcomes with middle school students. Results of the analyses showed a significant negative change in self-efficacy from beginning to end of the experience. There was not a significant change in beliefs about preservice teachers' outcomes of teaching science. Results of this study are interesting when considered alongside the current study because these findings suggest that placing students in authentic learning experiences does not automatically result in increased teaching self-efficacy. These data could help explain why there were no significant changes in teaching self-efficacy within the current study. Interestingly, Dever and Clement (2016) found a significant decrease in teaching self-efficacy, while the current study found no significant change in teaching self-efficacy. After relating the findings for research question two to current literature, the researchers then considered the implications of the findings for educators.

Implications for Educators. Since there were no significant differences in posttest mean scores of preservice teachers' sense of self-efficacy, the mindfulness-based coaching treatment

did not detract from the regular mixed-reality simulation learning environment experience. Therefore, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum with little risk of harm to the preservice teachers. While the mindfulness-based coaching treatment did not significantly increase teaching self-efficacy, it did not significantly decrease teaching self-efficacy. Therefore, it is unlikely that offering this type of treatment to other preservice teachers would detract from their overall experience. Especially since the qualitative findings indicated that many of the preservice teachers believed that learning about mindfulness increased their overall sense of teaching self-efficacy, this could be a beneficial addition to teacher preparation programs. Findings for research question two led the researcher to develop suggestions for future research.

Suggestions for Future Research. A suggestion for future researchers to consider is that the TSES (Tschannen-Moran & Hoy, 2001) is primarily intended for use with in-service teachers (Tschannen-Moran & Hoy, 2001). Therefore, future researchers could consider using a different instrument to measure the sense of self-efficacy of preservice teachers. The preservice teacher participants within the current study answered questions about beliefs about their teaching abilities prior to any exposure to the mixed-reality simulation learning environment or any classroom teaching experiences. For this reason, they may have lacked the necessary context to consider and address the items within the instrument. As such, it is possible that pretest scores were skewed in some way. If it does not already exist, future researchers could consider developing an instrument that is specifically intended for use with preservice teachers in the early stages of teacher preparation programs.

Since the participants in this study were preservice teachers that were just beginning a teacher preparation program and TSES (Tschannen-Moran & Hoy, 2001) may have been unable

to accurately measure the preservice teacher's sense of self-efficacy, future researchers could conduct a similar study with preservice teachers that are further along in their program. Rather than finding or developing an instrument that can measure the teaching self-efficacy of such inexperienced preservice teachers, researchers could conduct this same study with preservice teachers that are in the final stages of their teacher preparation programs. This would mean that the preservice teacher participants would have many more personal experiences to pull from when answering items on the TSES (Tschannen-Moran & Hoy, 2001) and would therefore be better at determining their own overall sense of teaching self-efficacy.

In addition to exploring other instruments for measuring teaching self-efficacy or working with more experienced preservice teachers, future researchers could also rethink the timing of the current study. Within the current study, the timing of the posttest data collection overlapped with final exams and this could have impacted results on the TSES (Tschannen-Moran & Hoy, 2001) posttest. It is reasonable to expect that experiencing final exams would have an impact on stress levels and this could have screwed the results on the posttest measure of teaching self-efficacy. Therefore, future researchers could conduct a similar study wherein the posttest data is collected earlier in the semester.

Research Question Three. Research question three was: What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment? To address this research question, the researcher followed an iterative coding process, employing both deductive and inductive coding (Saldaña, 2010). The researcher applied codes informed by the literature, utilizing Bandura's (1986, 1994, 1997, 2000) four ways to cultivate a strong sense of self-efficacy (master experiences, vicarious

experiences, social encouragement, and emotional arousal) to frame the initial coding. This approach was augmented with inductive codes that emerged from the data as patterns became apparent.

The original codes were grouped into categories and subthemes, which were then organized into three themes. Theme one was *utilizing mindfulness strategies to cope with in-the-moment stressors*, theme two was *using mindfulness as classroom teachers*, and theme three was *simulation experiences influenced teaching self-efficacy beliefs*. These themes were then connected to one another within a single findings statement. Analysis of the qualitative data resulted in the following finding statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers. When interpreting the findings for research question three, the researcher compared these results again current literature and considered implications for educators and suggestions for future research. This information is summarized in Table 5.3.

Table 5.3

Summary of Discussion of Results for Research Question Three

Findings	Related Literature	Implications for Educators	Suggestions for Future Research
Preservice teachers who received a mindfulness-based coaching treatment were able to utilize strategies to cope with in-the-moment stressors associated with mixed-reality simulations and this resulted in mastery experiences which increased their overall sense of teaching self-efficacy.	Olcese, Fulchini, and McKinizie (2016) conducted a study to investigate how participating in a professional learning community (PLC) while receiving professional learning that incorporated mindfulness-based support and mixed-reality simulation learning environments impacted the overall experience of teachers. After participating in this experience, teachers reported a shift in their perspective on mindfulness and its ability to impact teaching and learning, as well as an openness to utilizing mindfulness-based practices in their personal lives. Hudson, Voytecki, and Zhang (2018) conducted a study to evaluate the impact of a mixed-reality learning environment on preservice teachers' perceptions of readiness to manage a classroom. Several themes emerged through the data analysis. Of particular relevance, the mixed-reality experience felt real to the participants. Participants were able to practice new skills and gained confidence. Reflection helped the participants gain a deeper understanding of their own teaching practices thus, becoming aware of important skills that they lacked. Participants felt that they struggled to manage disruptive behavior positively.	Preservice teachers that learned about mindfulness were able to utilize strategies to cope with in-the-moment stressors associated with mixed-reality simulations and they also perceived that they acquired tools, which they could utilize in the future when serving as classroom teacher; therefore developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum in order to increase the occurrence of mastery experience during mixed-reality simulations.	Since learning about mindfulness helped some preservice teachers cope with in-the-moment stressors associated with mixed-reality simulations, future researchers could conduct a similar study with in-service teachers to see if in-service teachers are able to utilize strategies to cope with in-the-moment stressors associated with real classroom environments. Since preservice teachers believe that they acquired tools that they could utilize in the classroom as in-service teachers, future researchers could conduct a follow up study to investigate which practices these teachers utilize in the classroom.

(continued)

Table 5.3

Summary of Discussion of Results for Research Question Three

Findings	Related Literature	Implications for Educators	Suggestions for Future Research
Preservice teachers that received a mindfulness-based coaching treatment believed that they acquired tools, which they could utilize in the future when serving as classroom teachers and this increased their overall sense of teaching self-efficacy. Preservice teachers from the treatment and comparison groups felt that participating in the mixed-reality simulation environment approximated the experience of teaching and this influenced their teaching self-efficacy beliefs.	Dirghangi (2019) implemented a pilot unit that integrated mindfulness-based self-inquiry tailored to the needs to preservice English teachers. Preservice teachers responded positively to the pilot unit, sharing instances of using the practices during their student teaching experiences and also in their personal lives. Preservice teachers also shared about gaining empathy for students at their student teaching placement. They also reflected upon their challenging demands, noting the importance of balance, well-being, and self-care, remarking that self-care was neglected during times of stress. Some preservice teachers were able to apply a gratitude practice with a positive impact when faced with a challenging situation.	Since preservice teachers from both the treatment and comparison groups identified the simulation experiences as being stressful, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum in order to help preservice teachers cope with this stress. Since preservice teachers felt that participating in the mixed-reality simulation environment approximated the experience of teaching and this influenced their teaching self-efficacy beliefs, developers of teacher preparation programs could consider integrating mixed-reality simulations into the program curriculum, if not already doing so. Since some of the preservice teachers struggled with receiving feedback after simulation experiences, developers of teacher preparation programs could consider using feedback scripts aligned with rubrics to scaffold the feedback process that follows each simulation experience.	Since only some of the preservice teachers who received a mindfulness-based coaching treatment were able to utilize strategies to cope with in-the-moment stressors, future researchers could conduct a follow up study that specifically considers the unique characteristics of preservice teachers that embrace mindfulness-based coaching.

Related Literature. Olcese, Fulchini, and McKinizie (2016) conducted a study to investigate how participating in a professional learning community (PLC) while receiving professional learning that incorporated mindfulness-based support and mixed-reality simulation learning environments impacted the overall experience of teachers. After participating in this experience, teachers reported a shift in their perspective on mindfulness and its ability to impact teaching and learning, as well as an openness to utilizing mindfulness-based practices in their personal lives. Results from the study conducted by Olcese et al. (2016) were similar to some of the qualitative findings within the current study. One of subthemes within the current study specifically centered around preservice teaching participants extended mindfulness practices into their personal lives. Furthermore, many of the preservice teacher participants within the current study spoke about intentions to utilized different mindfulness practice within a classroom environment. Hudson, Voytecki, and Zhang conducted a study in 2018 which also yielded results that relate to the findings for research question three of the current study.

Hudson et al. (2018) evaluated the impact of a mixed-reality learning environment on preservice teachers' perceptions of readiness to manage a classroom. Several themes emerged through the data analysis. Of relevance, the mixed-reality experience felt real to the participants. Participants were able to practice new skills and gained confidence. Reflection helped the participants gain a deeper understanding of their own teaching practices thus, becoming aware of important skills that they lacked. Participants felt that they struggled to manage disruptive behavior positively. Within the current study, theme three of the qualitative findings specifically focused on how participating in the mixed-reality simulation learning environment impacted the preservice teachers' overall sense of teaching self-efficacy. As in the case of Hudson et al. (2018), the preservice teacher participants felt that the mixed-reality environment approximated

the experience of teaching. While many of the participants in the current study felt that the simulations increased their overall sense of teaching self-efficacy, some felt that it decreased. Similar to the study conducted by Hudson et al. (2018), preservice teacher participants were also able to identify specific areas for growth or improvement after engaging in the simulation experiences. Dirghangi conducted a study in 2019 which also yielded results that relate to the findings for research question three of the current study.

Dirghangi (2019) implemented a pilot unit that integrated mindfulness-based self-inquiry tailored to the needs to preservice English teachers. Preservice teachers responded positively to the pilot unit, sharing instances of using the practices during their student teaching experiences and in their personal lives. Preservice teachers also shared about gaining empathy for students at their student teaching placement. They also reflected upon their challenging demands, noting the importance of balance, well-being, and self-care, remarking that self-care was neglected during times of stress. Some preservice teachers were able to apply a gratitude practice with a positive impact when faced with a challenging situation. Of note, the findings from Dirghangi's (2019) study relate to one of the subthemes within the current study, which centered around self-care practices. Within the current study, preservice teacher participants that received the mindfulness-based coaching treatment spoke about various self-case practices that they had engaged in.

Implications for Educators. Preservice teachers that learned about mindfulness were able to utilize strategies to cope with in-the-moment stressors associated with mixed-reality simulations and they also perceived that they acquired tools, which they could utilize in the future when serving as classroom teacher; therefore developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum in order to increase

the occurrence of mastery experience during mixed-reality simulations. Especially considering the quantitative findings from research question one and research question two, there is little risk associated with integrating such mindfulness practices; the mindfulness-based coaching treatment did not significantly decease mindfulness or teaching self-efficacy. Furthermore, since preservice teachers from both the treatment and comparison groups identified the simulation experiences as being stressful, developers of teacher preparation programs could consider integrating mindfulness practices into the program curriculum in order to help preservice teachers cope with this stress. Qualitative findings indicate that these practices could benefit the preservice teachers.

Since preservice teachers felt that participating in the mixed-reality simulation environment approximated the experience of teaching and this influenced their teaching self-efficacy beliefs, developers of teacher preparation programs could consider integrating mixed-reality simulations into the program curriculum, if not already doing so. The qualitative findings from the current study suggest that the mixed-reality simulation learning environment helped the preservice teachers better understand the phenomenon of teaching, while being able to identify personal areas of strength as well as opportunities for growth. Other studies (Gundel el al., 2019) indicated that increased exposure time to these types of mixed-reality simulation learning environments results increased teaching self-efficacy. Therefore, teacher preparation programs ought to include these types of experiences if not already doing so. Additionally, since some of the preservice teachers struggled with receiving feedback after simulation experiences, developers of teacher preparation programs could consider using feedback scripts aligned with rubrics (Piro & O'Callaghan, 2017) to scaffold the feedback process that follows each simulation

experience. Findings for research question three led the researcher to develop suggestions for future research.

Suggestions for future research. Since learning about mindfulness helped some preservice teachers cope with in-the-moment stressors associated with mixed-reality simulations, future researchers could conduct a similar study with in-service teachers to see if in-service teachers are able to utilize strategies to cope with in-the-moment stressors associated with real classroom environments. It would be interesting to see if these results translate over to context where teachers are working with real students rather than avatars within a mixed-reality simulation learning environment, wherein the preservice teachers have opportunities for in-the-moment peer coaching and teacher feedback

Since preservice teachers believe that they acquired tools that they could utilize in the classroom as in-service teachers, future researchers could conduct a follow up study to investigate which practices these teachers utilize in the classroom. In the current study, the preservice teachers spoke about intentions to utilize certain practices. It would be interesting to see if this took place and if so, what that might look like.

Lastly, since only some of the preservice teachers who received a mindfulness-based coaching treatment were able to utilize strategies to cope with in-the-moment stressors, future researchers could conduct a follow up study that specifically considers the unique characteristics of preservice teachers that embraced mindfulness-based coaching. By better understanding the characteristics of preservice teachers that do gravitate towards utilizing the mindfulness practices, researchers could then make recommendations about which dispositions ought to be fostered amongst preservice teachers, if the goal were to increase the incidence of utilizing

mindfulness practices. After considering the findings for research question three, the researcher moved onto limitations of the study.

Limitations of the Study

The researcher took steps to control for threats to validity of the quantitative findings.

Internal Threats to Validity

Internal validity of a study relates to the quality the findings from the study (Fraenkel & Wallen, 2012). The researcher took steps to control for various threats to internal validity. Compensatory equalization of treatments refers to situations wherein the comparison group receives compensatory treatment to offset perceived inequity (Fraenkel & Wallen, 2012). The researcher controlled for this threat by isolating the treatment group and the comparison group. The comparison group was not able to perceive any inequity, so there will was no temptation to provide any type of compensatory treatment. Additionally, the researcher communicated with the course professors to ensure that they did not inadvertently provide any type of treatment.

Subject characteristics refers to situations when individuals or groups are different in ways that impact the variables being examined in the study (Fraenkel & Wallen, 2012). The researcher controlled for subject characteristics by randomly assigning the treatment and comparison groups and by including a demographic survey.

Experimental mortality refers to participants leaving the study over the course of time, particularly when the two groups are not alike in their tendency to experience attrition (Fraenkel & Wallen, 2012). The researcher controlled for this threat by randomly assigning the treatment and comparison groups.

History refers to situations wherein events taking place outside of the context of the experiment impact the post-test results (Fraenkel & Wallen, 2012). To control for this threat, the

researcher included a comparison group in the study. Both groups were exposed to similar historical events experiences.

Maturation refers to changes over time that develop for participants and impact the post-test results (Fraenkel & Wallen, 2012). To control for this threat, the researcher included a comparison group in the study. Both groups were exposed to similar maturation experiences. The researcher also controlled for external threats to validity.

External Threats to Validity

Threats to external validity are any factors within a study that reduce the generalizability of the results (Fraenkel & Wallen, 2012).

Population validity refers to (a) the extent to which one can generalize the findings from the experimental sample to a defined population as well as (b) the extent to which variables interact with treatment effects (Fraenkel & Wallen, 2012). When writing up the findings, the researcher provided rich descriptions of the sample so that it was clear which populations the sample represented. Given similar circumstances, other researchers could implement the same treatment with a different sample to test for similar results.

The Hawthorne effect takes place when participants are aware that they are participants in a study, are aware of the hypothesis being tested, or are aware of receiving special attention (Fraenkel & Wallen, 2012). Given that participants in this study completed instruments relating to mindfulness and self-efficacy, there was a high level of risk for this threat. To mitigate this risk, the researcher asked all professors and individuals involved in the simulation to minimize the concept that a study was taking place.

Trustworthiness

The researcher also took steps to strengthen the trustworthiness of the qualitative findings.

Credibility

Credibility refers to the confidence of the qualitative researcher that findings are truthful and accurate (Lincoln & Guba, 1985). To ensure credibility, the researcher provided a biography indicating her experience as an educator (see to Appendix V). The researcher also participated in prolonged engagement with the participants, spending time observing and developing relationships and rapport (Pandey & Patnaik, 2014). The researcher triangulated data sources and data collection methods to guarantee that the findings were rich, robust, and well-developed (Pandey & Patnaik, 2014). Lastly, the researcher provided thick descriptions to account for the specificity and circumstantiality of the data (Tracy, 2010).

Dependability

Dependability refers to the extent to which the study can be repeated by other researchers and achieve consistent findings (Lincoln & Guba, 1985). To ensure dependability, the researcher utilized an inquiry audit (Lincoln & Guba, 1985) by the dissertation chair to examine the process and product of the study. To allow for this inquiry audit, the researcher kept a detailed record of methods of data collection and analysis.

Transferability

Transferability refers to the degree to which the findings of the study are applicable to other contexts (Lincoln & Guba, 1985). The researcher used thick description (Lincoln & Guba, 1985) to demonstrate applicability and to convey the boundaries of the findings. Through

describing the phenomenon in sufficient detail, others can determine the extent to which findings are transferable to other settings.

Confirmability

Confirmability refers to the degree of neutrality in the findings, i.e. the findings are based upon participants' responses and not any potential bias or personal motivations of the researcher (Lincoln & Guba, 1985). To establish confirmability, the researcher provided an audit trail (Lincoln & Guba, 1985). The researcher saved all the raw data and also maintained detailed process notes.

Conclusion

The study was designed to investigate the impact of a mindfulness-based coaching treatment on preservice teachers' sense of self-efficacy and mindfulness and to understand the perceptions regarding self-efficacy of preservice teachers participating a mixed-reality simulation environment. The researcher employed a mixed-methods concurrent embedded design, which incorporated a quasi-experimental component and multiple case studies. Two ANOVAs were performed to analyze differences in posttest scores for participants in the treatment and comparison groups. Results of the first ANOVA showed no significant difference for the posttest measure of teachers' perceptions of mindfulness between the treatment and comparison groups, $F(1) = .002$, $p = .968$. Results of the second ANOVA showed no significant difference for the posttest measure to teachers' sense of self-efficacy between the treatment and comparison groups, $F(1) = .005$, $p = .942$.

To analyze the qualitative data, the researcher followed an iterative coding process (Saldaña, 2010) and arrived at the following finding statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and

learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers.

In conclusion, this work may contribute to the existing body of knowledge around offering mindfulness practices to preservice teacher and its impact on preservice teacher mindfulness and sense of teaching self-efficacy. By integrating mindfulness practices into teacher preparation programs, developers of those programs may be able to offer preservice teachers tools and strategies that they can use when serving as educators.

References

About CREST/TeachLivE. (2020). Retrieved May 02, 2020, from http://teachlive.org/about/about-teachlive/

Aguilar, J., & Telese, J. (2019, March). Learning productive mathematical talk moves through mix-reality simulation: The case of pre-service elementary teachers in a Hispanic serving institution. Paper presented at The Society for Information Technology & Teacher Education International Conference. Las Vegas, NV.

Akpan, P. L., & Saunders, P. J. (2017). From shame to mindfulness and self-compassion: A teacher's journey to greater self-efficacy. *Journal of the International Society for Teacher Education, 21*(2), 41–49.

Aylesworth, M. A. (2018). *Mindfulness practices: Investigating impacts on prekindergarten teacher perceptions of classroom climate, teacher self-efficacy and student interactions.* (Unpublished doctoral dissertation). Abstracts International Section A: Humanities and Social Sciences. ProQuest Information & Learning.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky inventory of mindfulness skills. *Assessment, 11,* 191-206.

Ball, D. L., & Forzani, F. M. (2010). Teaching skillful teaching. *Educational Leadership*, 68(4), 40.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press. Retrieved from https://www.des.emory.edu/mfp/BanEncy.html

Bandura, A., (1997). *Self-efficacy*. *The exercise of control* (1st ed.). New Jersey: W.H. Freeman.

Bandura, A. (2000) Cultivate self-efficacy for personal and organizational effectiveness. In E.A. Locke (ed.) *The Blackwell Handbook of Principles of Organizational Behavior*. Oxford: Blackwell, 120–36.

Barnes, G., Crowe, E., Schaefer, B. (2007). The cost of teacher turnover in five school districts: A pilot study. *National Commission on Teaching and America's Future.* Washington, DC.

Bautista, N. U., & Boone, W. J. (2015). Exploring the impact of TeachMe™ lab virtual classroom teaching simulation on early childhood education majors self-efficacy beliefs. *Journal of Science Teacher Education, 26,* 237-262.

Bech, P. (1998). *Quality of Life in the Psychiatric Patient*. London: Mosby-Wolfe.

Becht, K., & Delisio, L. (2015). The lived experiences of middle school and high school teachers utilizing TeachLivE as a professional development tool. In Bousfield, T., Hynes, M., Hughes, C., Straub, C., Dieker, L. & Ingrahm, K. (Eds.), *Proceedings of 3rd National TLE TeachLivE™ Conference 2015: Dissecting Education*, Orlando, FL: University of Central Florida, 38-40. Retrieved from http://teachlive.org/wp-content/uploads/2016/09/TLE-Proceedings-2015.pdf

Bedel, E. F. (2016). Exploring academic motivation, academic self-efficacy and attitudes toward teaching in pre-service early childhood education teachers. *Journal of Education and Training Studies, 4(1),* 142–149.

Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., Ogedegbe, G., Orwig, D., Ernst, D., & Czajkowski, S. (2004). Enhancing treatment fidelity in health behavior

change studies: Best practices and recommendations from the NIH behavior change consortium, *Health Psychology, 23*, 443-451.

Bernay, R. S. (2014). Mindfulness and the beginning teacher. *Australian Journal of Teacher Education*, *39*(7), 58-69.

Betoret, F. D. (2006). Stressors, self-efficacy, coping resources, and burnout among secondary school teachers in Spain. *Educational Psychology, 26,* 519-539.

Bodner, T. E., & Langer, E. J. (2001, June). *Individual differences in mindfulness: The Mindfulness/Mindlessness Scale*. Poster presented at the 13th annual American Psychological Society Convention, Toronto, Ontario, Canada.

Brackett, M. A., Rivers, S. E., Shiffman, S., Lerner, N., & Salovey, P. (2006). Relating emotional abilities to social functions: A comparison of self-report and performance measures of emotional intelligence. *Journal of Personality and Social Psychology, 91,* 780-795.

Broderick, P. C. (2013). *Learning to breathe. A mindfulness curriculum for adolescents to cultivate emotional regulation, attention, and performance*. Oakland, CT: New Harbinger Publications.

Broderick, P. C., & Jennings, P. A. (2012). Mindfulness for adolescents: A promising approach to supporting emotion regulation and preventing risky behavior. *New Directions for Youth Development, 2012*(136), 111-126. doi:10.1002/yd.20042.

Brown, R. (2017). The perceived impact of mindfulness instruction on pre-service elementary teachers. *Childhood Education, 93(2),* 136–146.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Brown, E. L., Horner, C. G., Kerr, M. M., & Scanlon, C. L. (2014). United States' teachers' emotional labor and professional identities. *KEDI Journal of Educational Policy, 11,* 205-225.

Brown, K. W. & Ryan, R. M. (2003a). Mindful Attention Awareness Scale [Measurement instrument]. Retrieved from https://ppc.sas.upenn.edu/sites/default/files/mindfulnessscale.pdf

Brown, K. W. & Ryan, R. M. (2003b). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Psychology and Social Psychology*, *84*, 822-848.

Cansoy, R., & Türkoglu, M. E. (2017). Examining the relationship between pre-service teachers' critical thinking disposition, problem solving skills and teacher self-efficacy. *International Education Studies, 10(6),* 23–35.

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: a study at the school level. *Journal of School Psychology, 44*, 473-490.

Chapin, S. H., O'Connor, M. C., & Anderson, N. C. (2009). *Classroom discussions: Using math talk to help students learn, Grades K-6.* Sausalito, CA: Math Solutions.

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of the mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education, 59,* 1054-1064.

Chester, M. D., & Beaudin, B. Q. (1996). Efficacy beliefs of newly hired teachers in urban schools. *American Educational Research Journal, 33(1)*, 233-257.

Cobb, S. V. G. (2007). Virtual environments supporting learning and communication in special needs education. *Topics in Language Disorders, 27*(3), 211.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Healthy and Social Behavior, 24,* 385-396.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health: Claremont symposium on applied social psychology.* Newbury Park, CA: Sage.

Colson, T., Sparks, K., Berridge, G., Frimming, R., & Willis, C. (2017). Pre-service teachers and self-efficacy: A study in contrast. *Discourse & Communication for Sustainable Education, 8(2),* 66–76.

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.

Clarke, L. (2013). Virtual learning environments in teacher education. A journey, a journey. *Technology, Pedagogy and Education, 22,* 121-131.

Crane, R. S., Brewer, J., Feldman, C., Kabat-Zinn, J., Santorelli, S., Williams, J. M. G, & Kuyken, W. (2017). What defines mindfulness-based programs? The warp and the weft. *Psychological Medicine, 47*(6), 990-999.

Creswell, J. W. (2003). *Research design qualitative, quantitative and mixed methods approaches.* (2nd ed.). SAGE Publications.

Creswell, J. W. (2017). *Qualitative inquiry and research design: Choosing among five approaches.* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. Sage: Washington, DC.

Cruz, J. M., Wilson, A. T., & Wang, X. (2019). Connections between pre-service teachers' mathematical dispositions and self-efficacy for teaching mathematics. *International Journal of Research in Education and Science, 5(2),* 400–420.

D'Agostina, R., & Belanger, A. (1990). A Suggestion for Using Powerful and Informative Tests of Normality. *The American Statistician, 44(4)*, 316-321.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Urbanowski, F., Harrington, A., Bonus, K., Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, *65*, 564-570.

Davidson, R. J., & McEwen, B. S. (2012). Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nature Neuroscience, 15*(5), 689-695.

Dede, C. (2009). Immersive interfaces for engagement and learning. *Science, 323,* 66-69.

Delcourt, M. A. B., & McKinnon, J. (2011). Tools for inquiry: Improving questioning in the classroom. *LEARNing Landscapes*, 2(4), 145-159.

DeMauro, A. A., & Jennings, P. A. (2016). Pre-service teachers' efficacy beliefs and emotional states. *Emotional & Behavioral Difficulties, 21(1),* 119–132.

DeSantis, W. (2018). *The effect of data-driven feedback and coaching using a reality simulation in a preservice teacher education program.* (Unpublished doctoral dissertation). Western Connecticut State University.

DeSantis, W., Delcourt, M. A. B., Shore, B. M., & Greenwood, J. C. (2017, October). *The effect of data driven coaching using a mixed reality simulation in a pre-service teacher education program*. Paper presentation at the 48th Annual Meeting of the Northeastern Educational Research Association, Trumbull, CT.

Dever, R., & Clement, S. (2016). Middle school pre-service teachers' sense of self-efficacy in relation to authentic learning experiences. *Electronic Journal of Science Education, 20(5),* 39–52.

Diefendorff, J. M., Croyle, M. H., & Gosserand, R., (2005). The dimensionality and antecednats of emotional labor strategies. *Journal of Vocational Behavior, 66,* 339-357.

Dieker, L. A., Rodriguez, J. A., Lignugaris/Kraft, B., Hynes, M. C., & Hughe, M. C. (2014). The potential of simulated environments in teacher education. *Teacher Education and Special Education: The Journal of Teacher Education Division of the Council for Exceptional Children, 37*(1), 21-33. doi:10.1177/0888406413512683

Dirghangi, C. (2019). Mindful self-inquiry: Preventing burnout in preservice English teachers through a tailored mindfulness-based curriculum. *Virginia English Journal, 69(1),* 72–78.

Doepken, D., Lawsky, E., & Padwa, L. (2004). Modified Fennema-Sherman attitude scale. Retrieved from teacherleaders.wordpress.com/2013/07/modified-fennema-math-attitude.doc

Dorman, J. P. (2014). Classroom psychosocial environment and course experiences in pre-service teacher education courses at an Australian university. *Studies in Higher Education, 39*(1), 34–47.

Driscoll, M. P. (2005). *Psychology of learning for instruction*. New York, NY: Pearson.

Duffin, L., French, B., Patrick, H. (2012). The teachers' sense of efficacy scale: Confirming the factor structure with beginning pre-service teachers. *Teacher and Teacher Education*. doi: 10.1016/j.tate.2012.03.004.

DuFour, R., & Eaker, R. (1998). *Professional learning communities at work: Best practices for enhancing student achievement.* Bloomington, IN: Solution Tree Press.

Enochs, L. G., & Riggs, L. M. (1990). Further development of an elementary science teaching efficacy belief instrument: A preservice elementary scale. *School Science and Mathematics, 90,* 695-706.

Enochs, L. G., Smith, P. L. & Huinker, D. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics, 100(4),* 194-202.

Erkuş, A., Sanli, N., Bagli, M. T., & Guven, K. (2000). Öğretmenliğe ilişkin tutum ölçeği geliştirilmesi. *Eğitim ve Bilim*. *25*(116), 27-32.

Ertmer, P. A., (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53,* 25-39.

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an industrial design perspective. *Performance Improvement Quarterly,* 6(4), 50-72.

Facione, P. A., Facione, N. C., & Giancarlo, C. (1996). The motivation to think in working and learning. In E. Jones (Ed.), *Defining Expectations for Student Learning.* San Francisco, CA: Jossey-Bass Inc., 67-79.

Flook, L., Goldberg, S. B., Pinger, L., & Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology, 51*(1), 44-51.

Forzani, F. (2014). Understanding core practices and practice-based teacher education: Learning from the past. *Journal of Teacher Education, 65*, 1-12.

Fraenkel, J. R., & Wallen, N. E. (2012). *How to design and evaluate research in education* (8th ed.). New York: McGraw-Hill.

Gall, M. D., Gall, J. P., Borg, W. R. (2007). *Educational Research: An Introduction, 8th Edition*. Pearson.

Garner, P. W., Bender, S. L., & Fedor, M. (2018). Mindfulness-based SEL programming to increase preservice teachers' mindfulness and emotional competence. *Psychology in the Schools, 55(4)*, 377–390.

Gast, D. L., & Ledford J. R. (2010). Multiple baseline and multiple probe designs. In D. L. Gast (Ed.), *Single subject research in behavioral sciences* (pp. 276-328). Mahawh, NJ: Routledge.

Gerstenschlager, N. E., & Tassell, J. L. (2017). *Addressing mindfulness, mindset, content knowledge, and anxiety in mathematics for preservice teachers*. Conference Papers -- Psychology of Mathematics & Education of North America, 885-888.

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569-582.

Gold, E., Smith, A., Hopper, I., Herne, D., Tasey, G., & Hulland, C. (2010). Mindfulness-based stress reduction (MBSR) for primary school teachers. *Journal of Child and Family Studies, 19,* 184-189.

Gratz, K. L. & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessments, 26,* 41-54.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35–43.

Gundel, E. (2018). *Understanding the effects of mixed reality simulation on preservice teacher self-efficacy.* (Unpublished doctoral dissertation). Western Connecticut State University.

Gundel, E., Piro, J. S., Straub, C., & Smith, K. (2019). Self-efficacy in mixed reality simulations: Implications for preservice teacher education. *Teacher Educator, 54(3)*, 244–269.

Hampton, N. Z. (1998). Sources of Academic Self-Efficacy Scale: An assessment tool for rehabilitation counselors. *Rehabilitation Counseling Bulletin, 41*(4), 260–277.

Han, I., Shin, W. S., & Ko, Y. (2017). The effect of student teaching experience and teacher beliefs on pre-service teachers' self-efficacy and intention to use technology in teaching. *Teachers and Teaching: Theory and Practice, 23(7),* 829–842.

Hanh, T. N., Weare, K. (2017). *Happy teachers change the world: A guide for cultivating mindfulness in education.* Berkeley, CA: Parallax Press.

Hartigan, B. F. (2017). Mindfulness in teacher education: A constructivist approach to stress reduction for teacher candidates and their students. *Childhood Education, 93(2),* 153–158.

Hawn Foundation. (2011). *The mindup curriculum: Grades prek-2: brain-focused strategies for learning –and living.* New York, NY: Scholastic.

Headden, S. (2014). *Beginners in the classroom: What the changing demographics of teaching means for schools, students, and society*. New York: Carnegie Foundation for The Advancement of Teaching.

Heppner, P. P., & Petersen, C. H. (1982). The development and implications of a personal problem-solving inventory. *Journal of Counseling Psychology, 29(1)*, 66.

Hoy, A. W., Hoy, W. K., & Kurz, N. M. (2008). Teacher's academic optimism: The development and test of a new construct. *Teaching and Teacher Education, 24*, 821-835.

Hsu, P. S. (2013). Examining change of preservice teachers' beliefs about technology integration during student teaching. *Journal of Technology and Teacher Education, 21,* 27-48

Hudson, M., Voytecki, K., & Zhang, G. (2018). Mixed-Reality Teaching Experiences Improve Preservice Special Education Students' Perceptions of their Ability to Manage a Classroom. *Journal for Virtual Worlds Research, 11*(2).

Hue, M., Lau, N. (2015). Promoting well-being and preventing burnout in teacher education: a pilot study of a mindfulness-based program for per-service teachers in Hong Kong. *Teacher Development, 19*(3), 381-401.

HyperRESEARCH. (2019). Version 4.0.2

Jennings, P. A. (2015). *Mindfulness for teachers: Simple skills for peace and productivity in the classroom.* New York, NY: W. W. Norton & Company Ltd.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life.* New York, NY: Hyperion.

Kerr, S. L., Lucas, L. J., DiDomenico, G. E., Mishra, V., Stanton, B. J., Shivde, G., … Terry, G. M. (2017). Is mindfulness training useful for pre-service teachers? An exploratory investigation. *Teaching Education, 28(4),* 349–359.

Klassen R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y. F., et al. (2009). Exploring the validity of teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology, 34,* 67-76.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.) New York: The Guilford Press.

Kloosterman, P. & Stage F. K. (1992). Measuring beliefs about mathematical performance: A meta-analysis. *Psychological Bulletin, 107(2),* 139-155.

Kynaston, K. (2017). *The use of mindfulness to enhance a special educator's self-efficacy: A qualitative case study.* (Unpublished doctoral dissertation). *ProQuest LLC.* ProQuest LLC. Northcentral University.

Kyriacou, C. (2001). Teacher stress. Directions for future research. *Educational Review, 53*(1), 27-35.

Land, R. (2016). Toil and trouble: Threshold concepts as a pedagogy of uncertainty. In R. Land, J. Meyer & M. Flanagan (Eds), *Threshold concepts in practice.* Boston, MA: Sense Publishers.

Land, R., Rattray, J., & Vivian, P. (2014). Learning in the liminal space: a semiotic approach to threshold concepts. *Higher Education, 67*(2), 199-217.

Ledger, S. Ersozlu, Z., Fischetti, J. Preservice teachers' confidence and preferred teaching strategies using TeachLive virtual environment: A two-step cluster analysis. (2019). *EURASIA Journal of Mathematics, Science and Technology Education, 15(3).*

Lichtman, M. (2006). *Qualitative research: A user's guide.* Thousand Oaks, CA: Sage

Limniou, M., Roberts, D., & Papadopoulos, N. (2008). Full immersive virtual environment CAVE™ in chemistry education. *Computers & Education, 51*(2), 584–593.

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Liu, C. Y. (2011). Factors related to pedagogical belief's about using technology in the mathematics classroom. *Journal of Computers in Mathematics and Science Teaching, 27,* 341-360.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. Sydney: Psychology Foundation.

Luberto, C. M., Cotton, S., McLeish, A. C., Mingione, C. J., & O'Bryan, E. M. (2014). Mindfulness skills and emotion regulation: The mediating role of coping self-efficacy. *Mindfulness, 5*(4), 373–380.

Luszczynska, A., Schwarzer, R. (2005). *Social Cognitive Theory*, 127-169. Predicting Health Behaviors: Research and Practice with Social Cognitive Models, (2nd ed). Berkshire, England: Open University Press.

MacKillop, J., Anderson, E. (2007). Further psychometric validation of the Mindful Attention Awareness Scale (MAAS). *Journal of Psychopathology and Behavioral Assessment, 29*(4), 289-293.

McLeod, K. (2001). *Wake up to your life: Discovering the Buddhist path of attention.* New York, NY: HarperCollins.

Memduhoglu, H. B., Kotluk, N., & Yayla, A. (2017). The effect of focus group discussions on pre-service teachers' teaching experiences and practices: A mixed methods study. *International Journal of Instruction, 10(4),* 273–292.

Meyer, J. H., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education, 49*(3), 373-388.

Meyer, J. H., Rattray, J., Vivian, P. (2014). Learning in the liminal space: a semiotic approach to threshold concepts. *Higher Education, 67*, 199-217.

Meyers, L. S., Gamst, G. C., & Guarino, A. J. (2013). *Performing data analysis using IBM SPSS.* Thousand Oak, CA: SAGE Publications, Inc.

Miles, M. B., & Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (Third edition). SAGE Publications, Inc.

Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEICE Transactions on Information and Systems, 77*(12), 1321-1329.

Milgram, P., Takemura, H., Utsumi, A., & Kishino, F. (1994) Augmented reality: A class of displays on the reality-virtuality continuum. *Telemanipulator and Telepresence Technologies, 2351*, 282-292. doi:10.1117/12.197321

Mursion. (2018). *Mursion*. Retrieved from https://mursion.com

Nagendran, N., Pillat, R., Kavanaugh, A., Welch, G., & Hughes, C. (2014). AMITIES: avatar-mediated interactive training and individualized experience system. *Proceedings of the 19th ACM Symposium on Virtual Reality Software and Technology,* 143-152.

NCATE. (2015). *National Council for Accreditation of Teacher Education.* Retrieved from http://ncate.org

National Professional Development Center (NPDC) on Autism Spectrum Disorders. (2010). *Evidence-based practices for children and youth with autism spectrum disorders.*

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2,* 223-250.

Nguyen, Q. D., Fernandez, N., Karsenti, T., & Charlin, B. (2014). What is reflection? A conceptual analysis of major definitions and a proposal of a five-component model. *Medical Education, 48*(12), 1176-1189.

O'Callaghan, K. & Piro, J. (2016). Virtual simulations in a practice-based teacher education. *The Field Experience Journal*. *17*(1). 94-118.

Olcese, N., Fulchini, A., McKinizie, C. (2016). Weaving Together Mindfulness and 21st Century Professional Learning: Preparing Teachers to Meet Diverse Student Needs. Paper presented at the Fourth Annual TeachLive™ Conference.

Otter™. (2019) Version 2.1.6-1547. [Mobile application software]. Retrieved from http://play.google.com/store.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66,* 543-578.

Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (5th ed.). McGraw Hill.

Pandey, S. C., Patnaik, S. (2014). Establishing reliability and validity in qualitative inquiry: A critical examination. *Journal of Development and Management Studies, 12*(1), 5743-5753.

Pankowski, J., & Walker, J. T. (2016). Using simulation to support novice teachers' classroom management skills: Comparing traditional and alternative certification groups. *Journal of the National Association for Alternative Certification, 11(1),* 3–20.

Pas, E., Johnson, S., Larson, K. E., Brandenburg, L., Church, R., & Bradshaw, C. (2016). Reducing behavior problems among students with autism spectrum disorder: Coaching teachers in a mixed-reality setting. *Journal of Autism & Developmental Disorders, 46(12),* 3640–3652.

Peker, M. (2006). Matematik ogretmeye yonelik kaygi olceginin gelistirilmesi. *Egitim Bilimleri ve Uygulama*, *9*, 73–92.

Peterson-Ahmad, M. (2018). Enhancing pre-service special educator preparation through combined use of virtual simulation and instructional coaching. *Education Sciences, 8(1).*

Piro. J. & O'Callaghan, C. (2019). Journeying towards the profession: Exploring liminal learning within mixed reality simulations. *Action in Teacher Education*. *(41)1*, 79-95

Piro, J. & O'Callaghan, C. (2016). Simulation Guidelines for ED 206. Unpublished document. Western Connecticut State University, Danbury, CT

Piro J. & O'Callaghan, C. (2017). Undergraduate Instructional Rubric for Simulations. Unpublished document. Western Connecticut State University, Danbury, CT

Raymond, A. M. (1997). Inconsistency between a beginning elementary school teacher's mathematical beliefs and teaching practice. *Journal for research in mathematics education, 28(5), 550-576.*

Reinke, W. M., Stormont, M., Herman, K. C., Puri, R., & Goel, N. (2011). Supporting children's mental health in schools: teacher perceptions of needs, roles, and barriers. *School Psychology Quarterly, 26,* 1-13.

Richards, D., Szilas, N., Kavalki, M., & Dras, M. (2008). Impacts of visualization, interaction and immersion in learning using an agent-based training simulation. *International Transactions on Systems Science and Applications. 4*(1), 43-60.

Rosenthal, N. (2016). Using meditation to help close the achievement gap. Retrieved from http://well.blogs.nytimes.com/2016/06/02/using-meditation-to-help-close-the-achievement-gap.

Rusby, J. C., Taylor, T., & Milchak, C. (2001). *Assessing School Settings: Interactions of Student and Teachers (ASSIST) observation system.* Unpublished manual.

Sadowski, C. J., Taylor, R. C., Woodward, H. R., Peacher, R. K., & Martin, B. J. (1982). The reliability and validity of a Likert-type locus of control scale for teachers. *JSAS Catalog of Selected Documents in Psychology, 12,* 32.

Salas, E., Bowers, C. A., & Rhodenizer, L. (1998). It is not how much you have but how you use it: Toward a rational use of simulation to support aviation training. *The International Journal of Aviation Psychology, 8*(3), 197-208.

Saldaña, J. (2010). An introduction to codes and coding. In *The coding manual for qualitative researchers* (pp. 1-31). Thousand Oaks, CA: Sage Publications.

Saltzman, A., & Goldin, P. (2008). Mindfulness based stress reduction for school-age children. In S. C. Hayes & L. A. Greco (Eds.), *Acceptance and mindfulness interventions for children adolescents and families* (pp. 139 - 161). Oakland, CA: Context Press/New Harbinger.

Schonert-Reichl, K. A. (2017). Social and emotional learning and teachers. *Future of Children, 27*(1), 137–155.

Seidman, I. (2013). *Interviewing as qualitative research: A guide for researchers in education and the social sciences, 4th edition.* New York, NY: Teachers College Press.

Semerci, C. (2007). Öğretmen ve öğretmen adayları için Yansıtıcı Düşünme Eğilimi (YANDE) Ölçeğinin geliştirilmesi. *Kuram ve Uygulamada Eğitim Bilimleri*, *7*, 733-740.

Senler, B. (2016). Pre-service science teachers' self-efficacy: The role of attitude, anxiety and locus of control. *Australian Journal of Education (Sage Publications Ltd.), 60(1),* 26–41.

Singh, N. N., Lancioni, G. E., Winton, A. S. W., Karazsia, B. T., & Singh, J. (2013). Mindfulness training for teachers changes the behavior of their preschool students. *Research in Human Development, 10*(3), 211–233.

Skaalvik, E. M., & Skaalvik S. (2010). Teacher self-efficacy and teacher burnout: a study of the relations. *Teaching and Teacher Education, 26,* 1059-1069.

Smith, S. W., Daunic, A. P., & Taylor, G. G. (2007). Treatment fidelity in applied educational research: Expanding the adoption and application of measures to ensure evidence-based practice. *Education & Treatment of Children, 30*(4), 121–134.

Soysa, C. K., & Wilcomb, C. J. (2013). Mindfulness, self-compassion, self-efficacy, and gender as predictors of depression, anxiety, stress, and well-being. *Mindfulness, 6*(2), 217-226.

Srinivasan, M. (2014). *Teach Breathe Learn*. Berkeley, CA: Parallax Press

Statistical Package for the Social Sciences. (2013). *SPSS*, Version 25.0. Armonk, NY: IBM Corp.

Thompson, C. L., & Shrigley, R. L. (1986). What research says: Revisiting the Science Attitude Scale. *School Science and Mathematics, 86,* 331-334.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783-805.

Tschannen-Moran, M., & Woolfolk-Hoy, A. (2001). Teacher efficacy. Capturing an elusive construct. *Teaching and Teacher Education, 17(7),* 783-805.

Uluçinar Sagir, S., Aslan, O., Bertiz, H., & Öner Armagan, F. (2016). Investigation of the relationship between pre-service science teachers' perceived self-efficacy in science teaching and disposition toward reflective thinking. *European Journal of Science and Mathematics Education, 4(3),* 331–344.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The Academic Motivation Scale: A Measure of Intrinsic, Extrinsic, and

Amotivation in Education. *Educational and Psychological Measurement*, *52*(4), 1003–1017.

Vince-Garland, K., Holden, K., & Garland, D. P. (2016). Individualized clinical coaching in the TLE TeachLivE lab: Enhancing fidelity of implementation of system of least prompts among novice teachers of students with autism. *Teacher Education and Special Education, 39(1),* 47–59.

Walach, H., Buchheld, N., Buttenmuller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*, 1543-1555.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1070.

Western Facts & Figures. (2018, October). Retrieved from http://www.wcsu.edu/president/facts-figures/

Wong, P. A. (2017). Mindfulness to engage in self-care: A pre-requisite for teacher advocacy. *Kentucky English Bulletin, 66*(2), 32–37.

Woolfolk Hoy, A., & Davis, H. A. (2006). Teacher self-efficacy and its influence on the achievement of adolescents. In F. Pajares, & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 117-137). Greenwich, CT: Information Age.

Woolley, S. L., Benjamin, W. J. J., & Woolley, A. W. (2004). Construct validity of a self-report measure of teacher beliefs related to constructivist and and traditional approaches to teaching and learning. *Educational and Psychological Measurement, 64,* 319-331.

Zvolensky, M. J., Solomon, S. E., McLeish, A. C., Cassidy, D., Bernstein, A., Bowman, C. J., et al. (2006). Incremental validity of mindfulness-based attention in relation to concurrent prediction of anxiety and depressive symptomatology and perceptions of health. *Cognitive and Behaviour Therapy 35,* 148-158.

Appendix A: Mixed-Reality Simulation Scenarios for ED 206

Simulation Classroom: Middle School
Level: Initial, Preservice
Certification Level: All
Content Area: All
High-Leverage Practice (HLP): *Building Classroom Rapport and Forming Rules*
Number of Simulations: 3 per semester
Lesson Planning: Follow professor guidelines

Background: You are a recent college graduate, and while you are strong in your content area, you have never taught a group of middle school students. Your objective is to establish rapport, set procedures and/or routines, and establish classroom rules. Please prepare a lesson plan prior to each of the three simulation lessons following your professor's guidelines.

Simulation #1

Task: Discover information regarding your students to build rapport through a discussion
Pedagogy: Teacher directed, whole class discussion, individual student questioning

Simulations #2 and #3

Task #1: Guide a discussion on classroom procedures and routines
Pedagogy: Teacher directed, whole class discussions, individual student questioning

Task #2: Guide a discussion on classroom rules
Pedagogy: Teacher directed, whole class discussion, individual student questioning

Note - Half of you will complete Task 1 in the second simulation and half of you will complete Task 2 in the second simulation. Then, you will switch the tasks for Simulation #3. Your professor will schedule you.

Permission granted from: Piro & O'Callaghan (2016) and Mursion™ (2018)

Appendix B: Researcher-adapted Semi-structured Interview Protocol (Treatment Group)

Participant Pseudonym:
Course:
Date:
Meeting Location:
Time:

1. Rapport building

2. Define self-efficacy.
    a. Self-efficacy refers to an individual's "…beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 2). [Researcher note: In other words, your personal belief in your ability to succeed or accomplish a task.]

3. What is the high leverage teaching practice for your class? [Researcher note: Provide preservice teacher with course description (Piro & O'Callaghan, 2016) if clarification is needed]

4. Do you feel that your participation in the mixed-reality simulations have made you more comfortable with your teaching ability?
    a. Can you give me an example?
    b. What was it like to receive feedback from peers?

5. How did the "fish bowl" aspect [watching your peers (PLC) participate] of the mixed-reality simulation experiences impact your feeling about your teaching abilities?
    a. In what ways did observing your peers in the mixed-reality simulations alter teaching behaviors for you in your simulation experiences?

6. In what ways did the coaching experiences impact your perceived self-efficacy in terms of your personal strengths and/or weaknesses as a teacher?
    a. Did you subsequently modify your own behavior?

7. After your experiences with mixed-reality simulation, did you discuss your individual self-efficacy with any of your peers, either in or outside of class?
    a. Did you find that these discussions were encouraging or helpful?
        i. How so?
        ii. Did they help you identify areas to improve?

8. Did you ever feel overwhelmed by one of the scenarios?
    a. What did you do with that feeling?

9. Define mindfulness.

10. What are your thoughts on the mindfulness-based coaching sessions offered after each Mursion™ session?
    a. Was it helpful?
    b. Did the coaching effect your thoughts or behaviors during the Mursion™ lessons?
        i. If so, how?
    c. What about in your life outside of this simulation environment?

11. In what ways did you implement strategies, tools, or feedback from the mindfulness-based coaching sessions?

12. In what ways do you think the mindfulness practices impacted or shaped your teaching self-efficacy?

13. How did you feel about the reflective writing prompts?
    a. Was it helpful?

14. What are your thoughts on the text message reminders to practice mindfulness prior to each Mursion™ session?
    a. Did you notice them?
    b. Did the reminder come to mind during your simulation experience?

Adapted with permission from Gundel (2018).

Appendix C: Researcher-adapted Semi-structured Interview Protocol (Comparison Group)

Participant Pseudonym:
Course:
Date:
Meeting Location:
Time:

1. Rapport building

2. Do you feel that your participation in the mixed-reality simulations impacted your beliefs about your teaching abilities or your confidence in yourself?
    a. Can you give me an example?

3. What was it like to receive feedback from peers?

4. How did the "fish bowl" aspect of the mixed-reality simulation experiences impact your feeling about your teaching abilities?
    a. In what ways did observing your peers in the mixed-reality simulations alter teaching behaviors for you in your simulation experiences?

5. Did you ever find yourself discussing your beliefs about your teaching abilities with any of your peers, either in or outside of class?
    a. Did you find that these discussions were encouraging or helpful?
        i. How so?
        ii. Did they help you identify areas to improve?

6. Did you ever feel overwhelmed by one of the scenarios?
    a. What did you do with that feeling?

Adapted with permission from Gundel (2018).

Appendix D: University Dean Permission Letter

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 23, 2019

Dear Dr. Joan Palladino,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf to conduct research at Western Connecticut State University during the spring semester of 2019.

Throughout the semester, the researcher will meet with preservice teacher candidate participants on four occasions to provide a one-to-one mindfulness coaching treatment. The purpose of the research study is to explore the impact of mindfulness coaching on preservice teachers' sense of self-efficacy for teaching and mindfulness while using a mixed-reality simulation environment such as Mursion™. The study will also investigate the perceptions of preservice teachers that received a mindfulness coaching treatment and those that did not receive a mindfulness coaching treatment.

The study will triangulate both qualitative and quantitative data collected via multiple sources to explore the research questions. Initial data will be collected via the Teachers' Sense of Efficacy Scale (TSES) and the Mindful Attention Awareness Scale (MAAS) as administered to the preservice teacher candidate participants enrolled in ED 206. The TSES and MAAS will be given at the beginning of the semester and again following the completion of the three 10-minute sessions of mixed-reality simulation experiences. A demographic survey will also be completed by preservice teacher candidate participants during the first class meeting at the start of the semester. In addition, the grade point averages of all preservice teachers will be obtained from university records.

Quantitative data collected from the TSES and MAAS will inform the qualitative study, which will feature participant interviews with all of the preservice teacher candidate participants in the study as well as reflections written by the preservice teacher candidate participants. Interviews will focus on the experiences of preservice teachers within mixed reality simulation experiences and how this relates to a sense of self-efficacy.

Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and

loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect the identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness coaching on preservice teachers' experiences with mixed-reality simulations. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

If you grant permission for this research study, please sign the attached statement and return it to me by January 23, 2019. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am the Dean at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant permission for in this research study to take place at Western Connecticut State University.

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Appendix E: Education Department Chair Permission Letter

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 23, 2019

Dear Dr. Catherine O'Callaghan,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf to conduct research at Western Connecticut State University during the spring semester of 2019.

Throughout the semester, the researcher will meet with preservice teacher candidate participants on four occasions to provide a one-to-one mindfulness coaching treatment. The purpose of the research study is to explore the impact of mindfulness coaching on preservice teachers' sense of self-efficacy for teaching and mindfulness while using a mixed-reality simulation environment such as Mursion™. The study will also investigate the perceptions of preservice teachers that received a mindfulness coaching treatment and those that did not receive a mindfulness coaching treatment.

The study will triangulate both qualitative and quantitative data collected via multiple sources to explore the research questions. Initial data will be collected via the Teachers' Sense of Efficacy Scale (TSES) and the Mindful Attention Awareness Scale (MAAS) as administered to the preservice teachers enrolled in ED 206. The TSES and MAAS will be given at the beginning of the semester and again following the completion of the three 10-minute sessions of mixed-reality simulation experiences. Preservice teacher candidate participants will also complete a demographic survey during the first class meeting at the start of the semester. In addition, the grade point averages of all preservice teachers will be obtained from university records.

Quantitative data collected from the TSES and MAAS will inform the qualitative study, which will feature participant interviews with all of the preservice teacher candidate participants in the study as well as reflections written by the preservice teacher candidate participants. Interviews will focus on the experiences of preservice teachers within mixed reality simulation experiences and how this relates to a sense of self-efficacy.

Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures

will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect the identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The Western Connecticut State University Institutional Review Board has approved the aforementioned research study; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness coaching on preservice teachers' experiences with mixed-reality simulations. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

If you grant permission for this research study, please sign the attached statement and return it to me by January 23, 2019. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am the Chair at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant permission for in this research study to take place at Western Connecticut State University.

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Appendix F: Course Instructor Permission Letter

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 23, 2019

Dear Dr. Anna Rocco,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf for your students in ED 206 Introduction to Education to participate in this research study that will commence during the spring 2019 semester.

Throughout the semester, the researcher will meet with each preservice teacher candidate participant on four occasions to provide a one-to-one mindfulness coaching treatment. The purpose of the research study is to explore the impact of mindfulness coaching on preservice teachers' sense of self-efficacy for teaching and mindfulness while using a mixed-reality simulation environment such as Mursion™. The study will also investigate the perceptions of preservice teachers that received a mindfulness coaching treatment and those that did not receive a mindfulness coaching treatment.

The study will triangulate both qualitative and quantitative data collected via multiple sources to explore the research questions. Initial data will be collected via the Teachers' Sense of Efficacy Scale (TSES) and the Mindful Attention Awareness Scale (MAAS) as administered to the preservice teachers enrolled in ED 206. The TSES and MAAS will be given at the beginning of the semester and again following the completion of the three 10-minute sessions of mixed-reality simulation experiences. A demographic survey will also be completed by preservice teacher candidate participants during the first class meeting at the start of the semester. In addition, the grade point averages of all preservice teachers will be obtained from Western Connecticut State University records.

Quantitative data collected from the TSES and MAAS will inform the qualitative study, which will feature participant interviews with all of the preservice teacher candidate participants in the study as well as reflections written by the preservice teacher candidate participants in the treatment group. Interviews will focus on the experiences of preservice teachers within mixed reality simulation experiences in conjunction with a sense of self-efficacy.

Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and

loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect the identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

Adapted with permission from Gundel (2018).

If you grant permission for class-wide participation in this research study, please sign the attached statement and return it to me by January 23, 2019. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am the course instructor for ED 206 Introduction to Education at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission for this research study to take place at Western Connecticut State University.

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 23, 2019

Dear Dr. Helena Nitowski,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf for your students in ED 206 Introduction to Education to participate in this research study that will commence during the spring 2019 semester.

Throughout the semester, the researcher will meet with each preservice teacher candidate participant on four occasions to provide a one-to-one mindfulness coaching treatment. The purpose of the research study is to explore the impact of mindfulness coaching on preservice teachers' sense of self-efficacy for teaching and mindfulness while using a mixed-reality simulation environment such as Mursion™. The study will also investigate the perceptions of preservice teachers that received a mindfulness coaching treatment and those that did not receive a mindfulness coaching treatment.

The study will triangulate both qualitative and quantitative data collected via multiple sources to explore the research questions. Initial data will be collected via the Teachers' Sense of Efficacy Scale (TSES) and the Mindful Attention Awareness Scale (MAAS) as administered to the preservice teachers enrolled in ED 206. The TSES and MAAS will be given at the beginning of the semester and again following the completion of the three 10-minute sessions of mixed-reality simulation experiences. A demographic survey will also be completed by preservice teacher candidate participants during the first class meeting at the start of the semester. In addition, the grade point averages of all preservice teachers will be obtained from Western Connecticut State University records.

Quantitative data collected from the TSES and MAAS will inform the qualitative study, which will feature participant interviews with all of the preservice teacher candidate participants in the study as well as reflections written by the preservice teacher candidate participants in the treatment group. Interviews will focus on the experiences of preservice teachers within mixed reality simulation experiences in conjunction with a sense of self-efficacy.

Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all

participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect the identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

Adapted with permission from Gundel (2018).

If you grant permission for class-wide participation in this research study, please sign the attached statement and return it to me by January 23, 2019. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am the course instructor for ED 206 Introduction to Education at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission for this research study to take place at Western Connecticut State University.

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Appendix G: Treatment Group Participant Letter of Consent

Hello!

My name is Parvin Taraz and I am a doctoral student at Western Connecticut State University studying mixed-reality simulation learning environments this semester.

I will be asking for your consent to participate in my study in two phases:

Phase 1: Complete a demographic survey, the Teachers' Sense of Efficacy Scale (TSES), and the Mindful Attention Awareness Scale (MAAS), which are all within this folder. Throughout the semester, the researcher will meet with you on four different occasions for up to 30 minutes to provide one-to-one mindfulness coaching to help you work through the mixed-reality simulations. You will then retake the TSES and MAAS again following the completion of your third and final mixed-reality simulation session this semester.

Phase 2: You will be asked to participate in a 15-minute interview in late April or early May, as well as allow me to view previously recorded mixed-reality simulation sessions and to view your reflective journals (both completed as part of your course requirements).

Note: I am **not** evaluating you as a potential teacher in any way, shape, or form. Also, participating in my study will **not** affect your grade in your course.

If you agree to be a part of the study, please complete the packet found within this folder on the right side by signing in the two places marked, completing the demographic form, the TSES form, and the MAAS form. Take the packet on the left side for your records.

Thanks so much, I really appreciate your help!

Parvin Taraz
parvin.taraz@woosterschool.org
203-246-8068

Adapted with permission from Gundel (2018).

QUALITATIVE PHASE CONSENT LETTER

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 28, 2019

Dear Preservice Teacher Candidate Participant,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf, for your participation in this research, which will be conducted during the spring semester of 2019.

The purpose of the research study is to explore the perceptions of preservice teachers who are experiencing an enhanced curriculum via mixed reality simulation, such as Mursion™.

Quantitative data collected during phase one of the study will inform the qualitative study (phase two), which will feature participant interviews. Interviews will be conducted either in-person at a mutually agreed upon location or via Skype, for no more than 15-20 minutes per sitting. As part of your regular course assignments, you will be videotaped conducting three Mursion™ sessions and the coaching sessions with your professor that will follow immediately afterward. In addition, you will also be writing a reflective journal entry following each Mursion™ session. The researcher will be viewing these observations and reflective journal entries. Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect to identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness

coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

QUALITATIVE PHASE CONSENT FORM

If you agree to participate in the QUALITATIVE PHASE of the research study, please sign the attached statement and return it to me in class this evening. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am a preservice teacher candidate at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission to participate in this research study.

Preferred e-mail address *(Please print clearly)*: _____

University e-mail, if different *(Please print clearly)*: _____

Cell phone number *(Please print clearly)*: _____

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

QUANTITATIVE PHASE CONSENT LETTER

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

January 28, 2019

Dear Preservice Teacher Candidate Participant,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf, for your participation in this research, which will be conducted during the spring semester of 2019.

The purpose of the research study is to explore the perceptions of preservice teachers who are experiencing an enhanced curriculum via mixed reality simulation, such as Mursion.

Phase one of this study will gather initial data by way of a demographic survey, the Teachers' Sense of Efficacy Scale (TSES), and the Mindful Attention Awareness Scale (MAAS) as administered to all preservice teachers enrolled in this course. In addition, the researcher will be obtaining your grade point average from Western Connecticut State University records.

Throughout the semester, the researcher will meet with you on four different occasions for about 30 minutes to provide one-to-one mindfulness coaching to help you work through the mixed-reality simulations. You will then retake the TSES and MAAS again following the completion of your third and final mixed-reality simulation session this semester. This data will be used to inform the qualitative study (phase two). Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect to identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research

will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

Adapted with permission from Gundel (2018).

QUANTITATIVE PHASE CONSENT FORM

If you agree to participate in the QUANTITATIVE PHASE of the research study, please sign the attached statement and return it to me in class this evening. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am a preservice teacher candidate at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission to participate in this research study.

Preferred e-mail address *(Please print clearly)*: _____

University e-mail, if different *(Please print clearly)*: _____

Cell phone number *(Please print clearly)*: _____

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Appendix H: Comparison Group Participant Letter of Consent

Hello!

My name is Parvin Taraz and I am a doctoral student at Western Connecticut State University studying mixed-reality simulation learning environments this semester.

I will be asking for your consent to participate in my study in two phases:

Phase 1: Complete a demographic survey, the Teachers' Sense of Efficacy Scale (TSES), and the Mindful Attention Awareness Scale (MAAS), which are all within this folder. You will then retake the TSES and MAAS again following the completion of your third and final mixed-reality simulation session this semester.

Phase 2: You will be asked to participate in a 15-minute interview in late November or early December, as well as allow me to view previously recorded mixed-reality simulation sessions and to view your reflective journals (both completed as part of your course requirements).

Note: I am **not** evaluating you as a potential teacher in any way, shape, or form. Also, participating in my study will **not** affect your grade in your course.

If you agree to be a part of the study, please complete the packet found within this folder on the right side by signing in the two places marked, completing the demographic form, the TSES form, and the MAAS form. Take the packet on the left side for your records.

Thanks so much, I really appreciate your help!

Parvin Taraz
parvin.taraz@woosterschool.org
203-246-8068

Adapted with permission from Gundel (2018).

QUALITATIVE PHASE CONSENT LETTER

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

September 16, 2019

Dear Preservice Teacher Candidate Participant,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf, for your participation in this research, which will be conducted during the spring semester of 2019.

The purpose of the research study is to explore the perceptions of preservice teachers who are experiencing an enhanced curriculum via mixed reality simulation, such as Mursion™.

Quantitative data collected during phase one of the study will inform the qualitative study (phase two), which will feature participant interviews. Interviews will be conducted either in-person at a mutually agreed upon location or via Skype, for no more than 15-20 minutes per sitting. As part of your regular course assignments, you will be videotaped conducting three Mursion™ sessions and the coaching sessions with your professor that will follow immediately afterward. In addition, you will also be writing a reflective journal entry following each Mursion™ session. The researcher will be viewing these observations and reflective journal entries. Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect to identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness

coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

QUALITATIVE PHASE CONSENT FORM

If you agree to participate in the QUALITATIVE PHASE of the research study, please sign the attached statement and return it to me in class this evening. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am a preservice teacher candidate at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission to participate in this research study.

Preferred e-mail address *(Please print clearly)*: _____

University e-mail, if different *(Please print clearly)*: _____

Cell phone number *(Please print clearly)*: _____

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

QUANTITATIVE PHASE CONSENT LETTER

Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

September 16, 2019

Dear Preservice Teacher Candidate Participant,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. The program asks doctoral candidates to design and implement a research study as part of the dissertation requirement. Please accept this letter as a formal request on my behalf, for your participation in this research, which will be conducted during the spring semester of 2019.

The purpose of the research study is to explore the perceptions of preservice teachers who are experiencing an enhanced curriculum via mixed reality simulation, such as Mursion.

Phase one of this study will gather initial data by way of a demographic survey, the Teachers' Sense of Efficacy Scale (TSES), and the Mindful Attention Awareness Scale (MAAS) as administered to all preservice teachers enrolled in this course. In addition, the researcher will be obtaining your grade point average from Western Connecticut State University records.

You will then retake the TSES and MAAS again following the completion of your third and final mixed-reality simulation session this semester. This data will be used to inform the qualitative study (phase two). Any and all data collected may be used in future research reports or conferences the researcher may participate in while presenting the findings of this research or suggesting areas of concentration for future studies.

There is no deception in this study. There is little risk, beyond everyday risk, from participating in this study. Possible risks include loss of confidentiality in internet transactions, coercion, and loss of time. Though minimal, the greatest potential risk is confidentiality; however, measures will be undertaken by the researcher to assure that confidentiality is maintained for all participants. Coercion and loss of time are limited risks as participation is entirely voluntary and may be withdrawn at any time throughout the process, without any threat of penalty. Participant identities will be maintained in a secure location to protect confidentiality, with all participant names receiving a pseudonym for privacy within the written study. Results of the study will be reported in such a way as to protect to identity of the individual participants. The researcher has no supervisory relationship with any of the adult participants.

The aforementioned research study has been approved by the Western Connecticut State University Institutional Review Board; protocol number 1819-96. My hope is that this research will contribute to our communal understanding of the benefits of mixed-reality simulations for preservice teachers as well as knowledge of the impact of coaching and specifically mindfulness

coaching on preservice teachers' experiences with mixed-reality simulations. I wish to thank you in advance for considering yourself and your class for participation in this study. If you would like to discuss the study with me, or have any additional questions, please do not hesitate to contact me via phone [(203) 246-8068] or e-mail [taraz001@connect.wcsu.edu].

Sincerely,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
taraz001@connect.wscu.edu
(203) 246-6068 - Cell

Catherine O'Callaghan, Ph.D.
Chair of E & EPY Department
ocallaghanc@wcsu.edu
(203) 837-3267 - Office

Adapted with permission from Gundel (2018).

QUANTITATIVE PHASE CONSENT FORM

If you agree to participate in the QUANTITATIVE PHASE of the research study, please sign the attached statement and return it to me in class this evening. Please keep a copy for your records.

Thank you,

Parvin K. Taraz, Ed.D. Candidate
Instructional Leadership
Western Connecticut State University

I, _____, am a preservice teacher candidate at Western Connecticut State University. I acknowledge that Parvin K. Taraz has made clear to me the purpose of this research study, identified all potential risks involved, and offered to answer any questions. I voluntarily grant my permission to participate in this research study.

Preferred e-mail address *(Please print clearly)*: _____

University e-mail, if different *(Please print clearly)*: _____

Cell phone number *(Please print clearly)*: _____

Printed Name *(Please print clearly)*: _____

Signature: _____ Date: _____

Adapted with permission from Gundel (2018).

Appendix I: Researcher-adapted Mixed-Reality Simulation Observation Protocol

Description: The researcher will utilize this observation protocol when observing mixed-reality simulations during this study. The researcher will record notes, in a consistent manner, on this document to contribute to the data collection audit trail (Lincoln & Guba, 1985).

Participant Pseudonym:
Session Number:
Session Date:

<table>
<tr><td colspan="3">General Observations:</td></tr>
<tr><td>Did the student step out of the simulation?</td><td>What feedback did the student get while out?</td><td>Did the student step back in? Did behavior change?</td></tr>
<tr><td>Coaching: Teacher Suggestions</td><td colspan="2">Coaching: Peer Suggestions</td><td>Coaching: Researcher Thoughts</td></tr>
<tr><td colspan="2">Notes on mindfulness:</td><td colspan="2">Did the student appear to utilize the suggested mindfulness strategy?

YES / NO

Note:</td></tr>
</table>

Adapted with permission from Gundel (2018).

Appendix J: Treatment Group Reflection Prompt

Directions: Use the prompting questions below to write a short reflection on your Mursion™ simulation experience tonight. Answer some or all of the questions.

How do you feel about your Mursion™ simulation experience tonight? What went well? Where is there room for growth?

How would you describe your emotional response to this experience?

Did you use any mindfulness strategies? If so, which ones? How did you use the strategy? Did you find it to be helpful?

In what ways, if any, have you found yourself applying strategies from your mindfulness coaching to other aspects of your life?

What else comes to mind?

Appendix K: Comparison Group Reflection Prompt

Directions: Use the prompting questions below to write a short reflection on your Mursion™ simulation experience tonight. Answer some or all of the questions.

How do you feel about your Mursion™ simulation experience tonight? What went well? Where is there room for growth?

How would you describe your emotional response to this experience?

What else comes to mind?

Appendix L: Researcher-developed Mindfulness Coaching Session Note-catcher Document

Description: This note-catcher document will be utilized by the researcher during the one-to-one mindfulness coaching sessions in this study. In addition to audio recording and transcribing the sessions, the researcher will record notes, in a consistent manner, in this document to contribute to the data collection audit trail (Lincoln & Guba, 1985).

Participant Pseudonym:
Session Number:
Session Date:

Preservice Teacher Perceptions of Simulation	Observer (researcher) Feedback Offered
Mindfulness Strategy Discussed	
Mindfulness Goal for Next Simulation	
General Notes/Comments:	

Appendix M: Researcher-adapted Semi-structured Mindfulness-based Coaching Protocol
[Coaching Sessions #2, 3, 4 only]

Description: This coaching protocol will guide the one-to-one coaching sessions that the researcher will administer to each preservice teacher participant in the treatment group. The aim of this protocol is to ensure consistency and fidelity across all of the coaching sessions.

Note: Contact will be made with participants in the treatment group through in-person meetings on-site at the university. It is planned that each session should not exceed 30 minutes.

1. *Refer to the demographic form to build rapport.*
    a. I see that you are in the elementary education program/secondary education program.
    b. What topics do you look forward to teaching when you complete the program?
    c. How do you think the Mursion™ experience is preparing you for student teaching?
2. In your most recent Mursion™ session, how do you think you did?
    a. What felt easy to do?
    b. What felt difficult to do?
3. How would you describe your emotions during the simulation experience?
4. *Prompt on the meaning of mindfulness.*
5. Talk a little bit about your level of mindfulness during the Mursion™ session.
    a. Did you feel present?
    b. Did you notice your mind wandering at times?
        i. If yes, what did you do to re-focus/re-center yourself?
6. Report the observation notes/findings.
    a. Refer to observation protocol information.
    b. Identify an instant when the preservice teacher did or did not appear mindful.
    c. Follow up on established personalized mindfulness goal.
7. Provide a definition of mindfulness (Srinivasan, 2014; Jennings, 2015; Hanh &Weare, 2017).
8. Offer one mindfulness strategy that the preservice teacher can practice during teaching experiences (see Appendix I: Mindfulness Coaching Curriculum).
9. Formulate and agree upon a mindfulness goal for the next Mursion™ session.
10. The meeting will end with closing rapport.

Adapted with permission from DeSantis (2018).

Appendix N: Researcher-created Mindfulness-based Coaching Curriculum

Description: This mindfulness coaching curriculum was developed by the researcher, following best practices as defined by Crane et al. (2017). The purpose of this curriculum is to ensure treatment fidelity and to increase the overall trustworthiness of the study. Through utilizing this same curriculum, other researchers will be able to recreate this treatment in other contexts.

This document contains the following resources:

- Content Knowledge for the Mindfulness Coach
    - Definitions of Mindfulness
    - Neurological Basis for Mindfulness
    - Impact of Mindfulness on Teachers and Classroom Settings
    - Mindfulness Strategies to Practice While Teachings
- Mindfulness Coaching Session #1 Plan
- Mindfulness Coaching Session #2 Plan
- Mindfulness Coaching Session #3 Plan
- Mindfulness Coaching Session #4 Plan

CONTENT KNOWLEDGE FOR MINDFULNESS COACH:

Definitions of Mindfulness:

- "Mindfulness is energy we cultivate through kind, present-moment awareness. It involves the practice of coming back to the peaceful, compassionate space we all have inside ourselves with curiosity and without judgment," (Srinivasan, 2014).
- Saltzman & Goldin (2008) define mindfulness as paying attention with kindness and curiosity to what is happening inside and around oneself, such as being present and compassionate with oneself and others.
- "A receptive state of mind in which attention, informed by a sensitive awareness of what is occurring in the present, simply observes what is taking place," (Brown & Ryan, 2003b, p. 824).

Neurological Basis for Mindfulness

- Experiential factors such as childhood trauma or interventions designed to promote prosocial behaviors shape neural pathways that underlie social and emotional behavior (Davidson & McEwen, 2012).
- Neuroplasticity is the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience or following injury.
- Due to neuroplasticity, moderate to severe stress is shown to increase growth in the amygdala and decrease growth in the hippocampus and prefrontal cortex (Davidson & McEwen, 2012).
- Practicing mindfulness has been linked to increased activity in regions of the brain that are responsible for attention regulation and prosocial emotions such as empathy (Davidson et al., 2003).
- Structural and functional changes that take place in the brain suggest that well-being and prosocial behaviors can be enhanced through training (Davidson & McEwen, 2012).

Impact of Mindfulness on Teachers and Classroom Settings:

- Benefits for students:
    - Studies show that mindfulness has many positive benefits for students. This includes: improvements in working memory, attention, academic skills, social skills, emotional regulation, and self-esteem, as well as self-reported improvements in mood and decreases in anxiety, stress, and fatigue, (Jennings, 2015; Srinivasan, 2014).
    - Improves emotional self-regulation, (Jennings, 2015; Hanh & Weare, 2017; Srinivasan, 2014).
- Benefits for teachers:
    - Mindfulness can increase teacher well-being and teaching self-efficacy, improve classroom management behaviors, develop supportive relationships with students, (Gold et al., 2010; Hanh & Weare, 2017; Hue & Lau, 2015; Singh et al., 2013; Srinivasan, 2014).
    - Mindfulness helps teachers connect with themselves, which then enables them to authentically connect with others (students) (Hanh & Weare, 2017; McLeod, 2001; Srinivasan, 2014).
    - Helps us become more responsive and less reactive (Hanh & Weare, 2017; Srinivasan, 2014).
    - Improves emotional self-regulation (Gold et al., 2010; Hanh & Weare, 2017; Srinivasan, 2014).
    - Strengthens teacher resiliency (Bernay, 2014)
    - Can help in managing work fatigue (Gold et al., 2010; Hanh & Weare, 2017; Srinivasan, 2014).

Mindfulness Strategies to Practice While Teachings:

- *Mindful Breathing* (Hanh & Weare, 2017): The practice of focusing one's attention on breath, inhaling and exhaling.
    - Triggers parasympathetic nervous system and creates a more relaxed state of body and mind.
    - BCOOL:
        - **B**reath,
        - **C**alm yourself down,
        - know that the situation is **O**kay
        - **O**bserve what's happening inside
        - and hold it with **L**ove.
- *Noting* (Hanh & Weare, 2017; Srnivasan, 2014): The practice of using a simple "note" or label to calmly name, like a whisper in the mind – what we are experiencing.
- *Mindful Walking*: A way to practice mindfulness when there is no time to sit. Thich Nhat Hanh says, "kiss the Earth."
- Share mindfulness with students.
    - Helps students learn how to self-soothe.
    - *Mindfulness Bell* or use an app such as Insight Timer™

COACHING SESSION PLANS:

Mindfulness Coaching Session #1 Plan

When:

- Week 3 of the spring semester of 2019, prior to Simulation Experience #1

Approximate Time:

- 30 minutes

Materials Needed:

- Coaching Session Note-catcher Document
- Pen or pencil

Objectives:

- Establish rapport between the coach and preservice teacher. Discuss the purpose of and goals for the mindfulness-based coaching sessions.
- Develop a shared understanding of the term *mindfulness*.
- Learn about the neurological basis for mindfulness.
- Acquire *Mindful Breathing* as a mindfulness practice.
- Share the BCOOL acronym.

Plan:

- The coach will introduce him or herself to the preservice teacher.
- The coach will explain the purpose of and goals for the mindfulness coaching sessions.
- The coach will invite the preservice teacher to ask any questions that they have about the coaching.
- The coach will share a definition for mindfulness.
- The coach and preservice teacher will discuss the neurological basis for mindfulness.
- The coach will offer *Mindful Breathing* to the preservice teacher as a mindfulness practice.
- The coach will share the BCOOL acronym as a mindfulness reminder and practice.
- The coach and preservice teacher will establish a personalized mindfulness goal for the preservice teacher during the upcoming mixed-reality simulation environment experience.
- Closure.

Mindfulness Coaching Session #2 Plan

Materials Needed:

- Coaching Session Note-catcher Document
- Pen or pencil
- Researcher notes from the Researcher-adapted Mixed-reality Simulation Observation Protocol for Simulation Experience #1.

When:

- Within 72 hours of Simulation Experience #1.

Approximate Time:

- 30 minutes

Objectives:

- Debrief on Simulation Experience #1
- Acquire *Noting* as a mindfulness practice.

Plan:

- The coach will establish rapport with the preservice teacher. [Mindfulness Coaching Protocol item #1]
- The coach will invite the preservice teacher to share their thought on Simulation Experience #1. [Mindfulness Coaching Protocol items #2, 3, 4, 5]
- The coach will share the recorded observations from the Researcher-adapted Mixed-reality Simulation Observation Protocol [Mindfulness Coaching Protocol item #6]
- The coach and preservice teacher will revisit the definition of mindfulness. [Mindfulness Coaching Protocol item #7]
- The coach will share *Noting* with the preservice teacher as a mindfulness practice. [Mindfulness Coaching Protocol item #8]
- The coach and preservice teacher will establish a personalized mindfulness goal for the preservice teacher during the upcoming mixed-reality simulation environment experience. [Mindfulness Coaching Protocol item #9]
- Closure. [Mindfulness Coaching Protocol item #10]

Mindfulness Coaching Session #3 Plan

When:

- Within 72 hours of Simulation Experience #2.

Approximate Time:

- 30 minutes

Materials Needed:

- Coaching Session Note-catcher Document
- Pen or pencil
- Researcher notes from the Researcher-adapted Mixed-reality Simulation Observation Protocol for Simulation Experience #2.

Objectives:

- Debrief on Simulation Experience #2
- Consider the difference between responding and reacting.
- Acquire *Mindful Walking* as a mindfulness practice.

Plan:

- The coach will establish rapport with the preservice teacher. [Mindfulness Coaching Protocol item #1]
- The coach will invite the preservice teacher to share their thought on Simulation Experience #2. [Mindfulness Coaching Protocol items #2, 3, 4, 5]
- The coach will share the recorded observations from the Researcher-adapted Mixed-reality Simulation Observation Protocol. [Mindfulness Coaching Protocol item #6]
- The coach and preservice teacher will revisit the definition of mindfulness. [Mindfulness Coaching Protocol item #7]
- The coach and preservice teacher will discuss the following quote from Meena Srinivasan's book, *Teach Breath Learn*: *"Mindfulness enables us to be more responsive and less reactive."* [Mindfulness Coaching Protocol item #7]
- The coach will share *Mindful Walking* with the preservice teacher as a mindfulness practice. [Mindfulness Coaching Protocol item #8]
- The coach and preservice teacher will establish a personalized mindfulness goal for the preservice teacher during the upcoming mixed-reality simulation environment experience. [Mindfulness Coaching Protocol item #9]
- Closure. [Mindfulness Coaching Protocol item #10]

Mindfulness Coaching Session #4 Plan

When:

- Within 72 hours of Simulation Experience #3.

Approximate Time:

- 30 minutes

Materials Needed:

- Coaching Session Note-catcher Document
- Pen or pencil
- Researcher notes from the Researcher-adapted Mixed-reality Simulation Observation Protocol for Simulation Experience #3.

Objectives:

- Debrief on Simulation Experience #3
- Discuss ways to share mindfulness with students.

Plan:

- The coach will establish rapport with the preservice teacher. [Mindfulness Coaching Protocol item #1]
- The coach will invite the preservice teacher to share their thought on Simulation Experience #3. [Mindfulness Coaching Protocol items #2, 3, 4, 5]
- The coach will share the recorded observations from the Researcher-adapted Mixed-reality Simulation Observation Protocol. [Mindfulness Coaching Protocol item #6]

- The coach and preservice teacher will revisit the definition of mindfulness. [Mindfulness Coaching Protocol item #7]
- The coach and preservice teacher will discuss ways to share mindfulness with students. [Mindfulness Coaching Protocol item #8]
- Closure [Mindfulness Coaching Protocol item #10]

Appendix O: The Essential (Warp) and the Flexible (Weft) Ingredients of Mindfulness-based Programs

Description: Table 1 below describes researched-backed best practices (Crane, et al., 2017) that are essential when developing or administering mindfulness-based program interventions. This table seeks to operationalize the key components of such programs, aiming to increase mindfulness-based program fidelity when utilized for research. The researcher followed these guidelines when developing the mindfulness-based coaching protocol (see Appendix M) and coaching curriculum (see Appendix N) for this study.

Table 1

The Essential (Warp)and the Flexible (Weft) Ingredients of Mindfulness-based Programs

Essential (Warp)	Flexible (Weft)
<u>Mindfulness-based Programs</u>	
Is informed by theories and practices that draw from a confluence of contemplative traditions, science, and the major disciplines of medicine, psychology, and education	The core essential curriculum elements are integrated with adapted curriculum elements, and tailored to specific contexts and populations
Is underpinned by a model of human experience which addresses the causes of human distress and the pathways to relieve it	Variations in program structure, length, and delivery are formatted to fit the population and context
Develops a new relationship with experience characterized by present moment focus, decentering, and an approach to orientation	
Supports the development of greater attentional, emotional, and behavioral self-regulation, as well as positive qualities such as compassion, wisdom, and equanimity.	
Engages the participant in a sustained intensive training in mindfulness meditation practice, in an experiential inquiry-based learning process and in exercises to develop insight and understanding.	
<u>Mindfulness-based Program Teacher</u>	
Has particular competencies which enable the effective delivery of the MBP	Has knowledge, experience, and professional training related to the specialist populations that the mindfulness-based course will be delivered to.

Has the capacity to embody the qualities and attitudes of mindfulness within the process of the teaching. Has engaged in appropriate training and commits to ongoing good practice. Is part of a participatory learning process with their students, clients, or patients.	Has knowledge of relevant underlying theoretical processes which underpin the teaching for particular contexts or populations.

Crane, Brewer, Feldman, Kabat-Zinn, Santorelli, Williams, and Kuyken (2017, p. 993)

Appendix P: Treatment Group Text Message Reminders

Text Message Reminders Sent to Treatment Group Participants Prior to each Simulation

Text Message for Simulation #1	**"**Hi <participant name>. This is <researcher name>. It was great meeting you last week. As you mentally prepare for your Mursion™ simulation tonight, remember to breathe and try your best to stay present in the moment tonight. You will do great – BCOOL!"
Text Message for Simulation #2	**"**Hi <participant name>. I hope you are having a good day. Looking forward to seeing you tonight. As you ready yourself for the Mursion™ simulation, think about the mindfulness practice of Noting that we spoke out during our last meeting. Also, don't forget to breathe!"
Text Message for Simulation #3	"<participant name>! Congrats on almost being done with your Mursion™ simulations. During your final simulation tonight, I hope you will be able to apply all of the mindfulness knowledge and practices that we worked through during our coaching sessions together. Remember to breath, BCOOL, and check in with yourself as needed. You will be great!"

Appendix Q: Mindfulness-based Coaching One-page Documents for Treatment Group Participants

Definitions of Mindfulness

"Mindfulness is energy we cultivate through kind, present-moment awareness. It involves the practice of coming back to the peaceful, compassionate space we all have inside ourselves with curiosity and without judgment," (Srinivasan, 2014).

Saltzman & Goldin (2008) define mindfulness as paying attention with kindness and curiosity to what is happening inside and around oneself, such as being present and compassionate with oneself and others.

"A receptive state of mind in which attention, informed by a sensitive awareness of what is occurring in the present, simply observes what is taking place," (Brown & Ryan, 2003b, p. 824)

Neurological Basis for Mindfulness

Experiential factors such as childhood trauma or interventions designed to promote prosocial behaviors shape neural pathways that underlie social and emotional behavior.

↓

Neuroplasticity is the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience or following injury.

↓

Due to neuroplasticity, moderate to severe stress is shown to increase growth in the amygdala (controls fear response) and decrease growth in the hippocampus (controls memory and emotional responses) and prefrontal cortex (controls executive functions, attention, and memory).

↓

Practicing mindfulness has been linked to increased activity in regions of the brain that are responsible for attention regulation and prosocial emotions such as empathy.

↓

Structural and functional changes that take place in the brain suggest that well-being and prosocial behaviors can be enhanced through training.

Benefits for Students	Benefits for Teachers
• Improvements in working memory, attention, academic skills, social skills, emotional regulation, and self-esteem. • Self-reported improvements in mood and decreases in anxiety, stress, and fatigue.	• Increases teacher well-being and teaching self-efficacy, improve classroom management behaviors. • Helps teachers connect with themselves, which then enables them to authentically connect with others (students). • Helps teachers become more responsive and less reactive. • Improves emotional self-regulation. • Strengthens teacher resiliency. • Can aid in managing work fatigue.

Mindfulness Strategy #1: MINDFUL BREATHING

Focus your attention on your breath as you inhale and exhale.

b cool

b**r**eath. c**a**lm yourself down. know that the situation is **o**kay.
observe what's happening. hold it with **l**ove.

Reminders from Coaching Session #1

"Mindfulness is energy we cultivate through kind, present-moment awareness. It involves the practice of coming back to the peaceful, compassionate space we all have inside ourselves with curiosity and without judgment," (Srinivasan, 2014).

NEUROPLASTICITY

Mindfulness is good for your brain.

Stress is bad for your brain.

Mindfulness Strategy #1: MINDFUL BREATHING

Focus your attention on your breath as you inhale and exhale.

b cool

breath. calm yourself down. know that the situation is okay.
observe what's happening. hold it with love.

Feedback from Coach	Goals for Next Simulation

Mindfulness Strategy #2: NOTING

Use a "note" to calmly name (*like a whisper in the mind*) what you are experiencing.
Label your thoughts.

EXAMPLES:

Experience I am sitting in class and…	Note
I hear a sound in the hallway.	SOUND
I have a thought about a conversation from yesterday that made me angry.	FEELING
I notice that the chair feels uncomfortable against my back.	SENSATION
I find myself wondering about the weather tomorrow.	THOUGHT

Coaching Sessions #1 & #2

DEFINITION OF MINDFULNESS

"Mindfulness is energy we cultivate through kind, present-moment awareness. It involves the practice of coming back to the peaceful, compassionate space we all have inside ourselves with curiosity and without judgment," (Srinivasan, 2014).

~~~~~~

NEUROPLASTICITY

Mindfulness is good for your brain.

Stress is bad for your brain.

~~~~~~

Mindfulness Strategy #1: MINDFUL BREATHING

Focus your attention on your breath as you inhale and exhale.

~~~~~~

Mindfulness Strategy #2: NOTING

Use a "note" to calmly name (*like a whisper in the mind*) what you are experiencing. Label your thoughts.

Coaching Session #3

Feedback/Notes	Goals for Next Simulation

Mindfulness Strategy #3: MINDFUL WALKING

Focus your attention on feelings and sensations as you walk. Be aware of each step and your breath. When your attention drifts away from the sensation of walking and breathing, take notice of these thoughts, moods, or emotions without judgment and gently guide your awareness back to the present moment, back to the walking.

"If we take steps without anxiety, in peace and joy, then we will cause a flower to bloom on earth with every step."
-Thich Nhat Hanh
~~~~~~

Coaching Sessions 1, 2, & 3

DEFINITION OF MINDFULNESS

"Mindfulness is energy we cultivate through kind, present-moment awareness. It involves the practice of coming back to the peaceful, compassionate space we all have inside ourselves with curiosity and without judgment," (Srinivasan, 2014).

~~~~~~

NEUROPLASTICITY

Mindfulness is good for your brain.

Stress is bad for your brain.

~~~~~~

Mindfulness Strategy #1: MINDFUL BREATHING

Focus your attention on your breath as you inhale and exhale.

~~~~~~

Mindfulness Strategy #2: NOTING

Use a "note" to calmly name (*like a whisper in the mind*) what you are experiencing.
Label your thoughts.

~~~~~~

Mindfulness Strategy #3: MINDFUL WALKING

Focus your attention on feelings and sensations as you walk. Be aware of each step and your breath. When your attention drifts away from the sensation of walking and breathing, take notice of these thoughts, moods, or emotions without judgment and gently guide your awareness back to the present moment, back to the walking.

Coaching Session 4

Website Resources
https://www.mindfulschools.org
https://www.edutopia.org/article/mindfulness-resources

Mindfulness Apps
Headspace
Calm
Insight Timer
Buddhify
Smiling Mind (good for kids)

Mindfulness Practices for Students
Gathas
Mindful Coloring
Mindful Breathing
Mindful Walking
Mindful Writing
Guided Meditation
Mindfulness Bell

Book Resources

"Mindfulness for Teachers: Simple Skills for Peace and Productivity in the Classroom" by *Patricia Jennings*

"Teach Breathe Learn: Mindfulness In and Out of the Classroom" by *Meena Srinivasan*

"Happy Teachers Change the World: A Guide for Cultivating Mindfulness in Education" by *Thich Nhat Hanh and Katherine Weare*

"The Blooming of a Lotus: Guided Meditation for Achieving the Miracle of Mindfulness" by *Thick Nhat Hanh*

Appendix R: Researcher-adapted Demographic Survey

Directions: Please check the box that best describes you and provide any additional information.

1. **Gender Identity:**

- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Prefer not to say
- ☐ Prefer to self-describe: _____

2. **Ethnicity:**

- ☐ African-American
- ☐ Asian-American/Pacific Islander
- ☐ Caucasian-American
- ☐ Hispanic-American
- ☐ Native-American
- ☐ Other (please specify): _____

3. **Anticipated Graduation Year:**

- ☐ 2019
- ☐ 2020
- ☐ 2021
- ☐ 2022
- ☐ Other (please specify): _____

4. **Anticipated Teaching Level:**

   - ☐ Early Childhood
   - ☐ Elementary
   - ☐ Secondary
   - ☐ Other (please specify): _____

5. **Content Area:**

   - ☐ Not Applicable
   - ☐ English
   - ☐ Mathematics
   - ☐ Science
   - ☐ Social Studies
   - ☐ World Language
   - ☐ Other (please specify): _____

6. **GPA:** _____

7. **Age:** _____

8. **Career Prior to Education (if applicable):** _____

Adapted with permission from Gundel (2018).

Appendix S: Themes Chart

Research Question: What are the perceptions regarding self-efficacy of preservice teachers that participated in a mixed-reality simulation environment and received a mindfulness-based coaching treatment and those that did not receive a mindfulness-based coaching treatment?

Findings Statement: Participating in a mixed-reality simulation environment influenced the teaching self-efficacy beliefs of preservice teachers and learning about mindfulness strategies while engaging in that process enabled preservice teachers to cope with in-the-moment stressors and consider ways to utilize mindfulness as classroom teachers.

Theme: Preservice teachers that received a mindfulness-based coaching treatment believed that they acquired tools, which they could utilize in the future when serving as classroom teachers and this increased their overall sense of teaching self-efficacy.				**Theme**: In certain instances, preservice teachers that received a mindfulness-based coaching treatment were able to utilize mindfulness strategies to cope with in-the-moment stressors associated with mixed-reality simulations and this resulted in mastery experiences which increased their overall sense of teaching self-efficacy.				**Theme**: Preservice teachers from the treatment and comparison groups felt that participating in the mixed-reality simulation environment approximated the experience of teaching and this influenced their teaching self-efficacy beliefs.			
Subtheme: Preservice teachers can use mindfulness for themselves to cope with the challenges of teaching.		**Subtheme**: Preservice teachers could use mindfulness with students to cultivate a healthy classroom culture.		**Subtheme**: Many preservice teachers that embraced the mindfulness-based coaching successfully employed mindfulness strategies during simulation experiences.		**Subtheme**: Preservice teachers that embraced the mindfulness-based coaching felt empowered by having mindfulness strategies in their "toolbox."		**Subtheme**: In certain instances, participating in the mixed-reality simulation environment increased teaching self-efficacy beliefs.		**Subtheme**: In certain instances, participating in the mixed-reality simulation environment decreased teaching self-efficacy beliefs.	
Code Category: Self-care Practices	**Code Category**: Extending Mindfulness to other Aspects of Life	**Code Category**: Using Mindfulness with Students	**Code Category**: Cultivating Positive Relationships with Students	**Code Category**: Embracing Coaching	**Code Category**: Not Embracing Coaching	**Code Category**: Mindfulness Strategies	**Code Category**: Understanding Mindfulness	**Code Category**: Mastery Experiences	**Code Category**: Learning From Peers	**Code Category**: Frustrating Experiences	**Code Category**: Challenging Feedback
Codes: Breathing Exercise Decompress Psychological Health Stress Relief Stress Relief Strategy Support Network Talking Helps Essential Oils	**Codes**: Extending Mindfulness Connection to Prior Experience	**Codes**: Mindfulness w/ Students Practicum Experience	**Codes**: Teacher Philosophy Relationships with Students Classroom Culture	**Codes**:" Calmness During Simulation Cognitive Flexibility Emotion-based Goal Mindfulness Impacting Self-efficacy -- positive Mindfulness-based Goal Positive Response to Coaching Teacher as Learner Disposition	**Codes**: Lack of Awareness Lack of Motivation Lack of Preparation Low Stress Person Mindfulness Impacting Self-efficacy -- neutral Misunderstanding of Mindfulness Not Embracing Mindfulness	**Codes**: BCOOL Being Present Managing Nervousness Mindful Walking Mindful Writing Mindfulness Practice Mindfulness Strategy Noting	**Codes**: Clarifying Understanding Gratitude Meaning of Mindfulness Metacognition Metacognitive Strategy No Self-judgment Positive Self-talk Responding vs. Reacting Self-awareness Tolerant w/ Ambiguity Vocabulary of Mindfulness Understanding of Neuroplasticity	**Codes**: Applying Simulation to Practice Fake It Mastery Experiences Planning and Preparation Simulation Impacting Self-efficacy -- positive Teaching Self-efficacy -- high	**Codes**: Emotional Arousal Feedback Positive Impact Learning from Peers Social Encouragement Vicarious Experiences	**Codes**: Fear of Unknown Feeling Overwhelmed Feeling Scared Forgetfulness in Simulation Observation Stress Out of Body Experience Simulation Impacting Self-efficacy -- negative Simulation Impacting Self-efficacy -- neutral Teaching Self-efficacy -- low	**Codes**: Feedback Negative Impact Feedback Neutral Impact Peer Interaction Negative Vicarious Experiences -- opposite Perfectionism Self-doubt

Appendix T: Researcher Biography

Parvin Taraz is a doctoral student in the Instructional Leadership program at Western Connecticut State University. Parvin is an Upper School Math Teacher and the Director of Curriculum at Wooster School in Danbury, CT. Parvin was inspired to pursue a career in education after working with youth at a New York City-based outreach program as an academic tutor and rowing coach. It is the joy of working with children that fuels Parvin's passion and excitement as an instructional leader and classroom teacher.

Areas of interest for Parvin include: progressive math instruction, gender equity and education, mindfulness in the classroom, and gratitude. Parvin co-presented at the New England Association of Teachers of English (NEATE) conference in October of 2017 on mindful writing in the classroom. She then worked with colleagues to conduct collaborative autoethnographic research around experiences of educators interested in influencing education through the lens of mindfulness and gratitude. Parvin co-presented this paper at the New England Educational Research Organization (NEERO) conference in May of 2018. For her dissertation, Parvin studied mindfulness coaching and its impact on preservice teachers' self-ratings of mindfulness and teacher self-efficacy in a mixed-reality simulation environment.

EdD in Instructional Leadership
Department of Education and Educational Psychology
Dissertation Registration Form

Student: Parvin K. Taraz Date: May 7, 2020

Dissertation Title: THE EFFECT OF MINDFULNESS COACHING ON PRESERVICE TEACHERS' SELF-EFFICACY AND MINDFULNESS UTILIZING A MIXED-REALITY SIMULATION ENVIRONMENT

Dissertation Committee Members: See attached Dissertation Approval Page

For Office Use Only.

Catherine M. O'Callaghan, Ph.D.	*Catherine M. O'Callaghan*	May 7, 2020
Primary Advisor	Signature	Date
Jody S. Piro, Ed.D.	*Jody S. Piro*	May 10, 2020
Interim Program Coordinator	Signature	Date
Joan S. Palladino, Ed.D.	*Joan S. Palladino*	May 10, 2020
Interim Dean, School of Professional Studies	Signature	Date
Christopher Shankle, Ed.D.	*Christopher Shankle*	May 10, 2020
Associate Director, Division of Graduate Studies	Signature	Date