Preparing Future Teachers to Manage Classroom Behavior: Evaluation of an Instructional Package Utilizing Mixed Reality Simulation

by

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Abstract

Classroom management has been demonstrated to be a critical variable related to student outcomes; therefore, it should be treated as a core competency in teacher preparation. Evidence indicates there is a gap between how teachers are being prepared to manage classrooms and what they are experiencing once they enter the field as in-service teachers. A mixed method, quasi-experimental study was designed to evaluate the impact of an instructional package including TeachLivE™ on participants’ performance of two general classroom management strategies targeting disruptive student behavior. The study also looked at the feasibility of this type of instruction from a cost-benefit standpoint as well as the social validity of the practices implemented during the study. Participants included graduate and undergraduate students enrolled in a required course which covered topics related to teaching exceptional students in inclusive classrooms. Single subject data analysis demonstrated the impact of instruction across participants, statistical analysis was used to examine pre- and post-instruction measures, and qualitative data coding procedures were used to discover patterns in student responding on a social validity questionnaire and in weekly journal entries. Results indicated participants were able to perform components of two strategies following instruction; however, teacher self-efficacy measured by the TSES demonstrated no change. A brief cost-benefit analysis provided information on the feasibility of the program with respect to time and budgetary expenditures. Last, qualitative analysis indicated that participants view classroom management as critical and believe it is important to have opportunities to practice strategies prior to entering a classroom.

Key words: classroom management, classroom behavior management, disruptive student behavior, teacher preparation, simulated learning, mixed reality, virtual reality, TeachLivE™, differential reinforcement, setting expectations
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Chapter 1

Disruptive behavior in the classroom has the power to derail even the most interesting and carefully planned lesson by causing distractions for other learners and frustration for teachers (Lewis, Romi, Qui, & Katz, 2005). Managing student behavior in the classroom is a critical facet of classroom management. Classroom management encompasses a wide variety of factors including the physical structure of the school and classroom, monitoring student engagement, development of classroom routines and norms, encouraging appropriate behavior, reducing inappropriate behavior, and using data to monitor student behavior and modify processes when necessary (Oliver & Reschly, 2007). Teacher proficiency in classroom behavior management techniques has been shown to result in a variety of benefits including increased confidence and morale, decreased stress and burnout, enhanced student engagement, and increased time on task for students (Dicke, et al., 2014; Gage, Scott, Hirn, & Mac-Suga, 2018; Jennings & Greenberg, 2009). One of the most cited sources of new teacher stress relates to feeling unprepared to deal with disruptive student behavior (Dicke, Elling, Schmeck, & Leutner, 2015; Pas, Cash, O’Brennan, Debnam, & Bradshaw, 2015). Although classroom management is a core component of quality teaching and an educational policy concern, most teacher preparation programs do not require systematic instruction on and practice of classroom management skills before novice teachers enter the field (Marzano & Marzano, 2003; Pankowski & Walker, 2016).

Classroom Management: A Core Competency on the Back Burner

In 1993, Wang, Haertel, and Walberg undertook a large-scale review of research focused on the factors involved in learning. These authors used evidence extracted from 91 meta-analyses, 179 book chapters, and bodies of work from 61 research experts to “identify and
estimate the influence of educational, psychological, and social factors on learning” (Wang, Haertel, & Walbert, 1993, p. 249). Using student learning as the dependent variable, this review produced a detailed and comprehensive synthesis of the factors contributing to positive student outcomes in education. The authors identified several types of critical variables, including psychological aptitudes, instructional factors, and characteristics of the child’s home environment. This review concluded that instructional variables, such as classroom management, instructional techniques, teacher behavior, and teacher/student interactions play key roles in student learning outcomes. Wang, Haertel, and Walberg stated, “Findings on the salience of classroom instructional variables should also inform teachers’ practice. Efficient classroom management enables teachers to spend more time on instruction than addressing discipline problems and bureaucratic tasks” (1993, p. 278). For the purposes of this study, classroom management and behavior management are used interchangeably with the understanding that managing student behavior as well as teacher behavior plays a critical role in overall classroom management and organization.

Identification of classroom management as a critical variable in student learning outcomes positions this domain as a core competency in teacher preparation programs (Dicke, et al., 2014; Gage, et al., 2018; Jennings & Greenberg, 2009; Oliver & Reschly, 2007; Pankowski & Walker, 2016). Little argument against this can be found; however, gaps in skills demonstrated by teachers in applied settings continue to reflect ongoing deficits in teacher preparation programs (Marzano & Marzano, 2003). Perceptions of the quality of teacher preparation in classroom behavior management differ between deans and chairpersons in colleges and universities and school principals supervising teachers in applied settings. Self-
To illustrate, a large-scale research project sponsored by MetLife and conducted by Harris Interactive between 1984 and 2012 examined a wide variety of topics impacting public school teachers in the US. In 2006, this project produced a study that focused on the expectations and experiences of American school teachers (Markow, Moessner, & Harowitz, 2006). Interview data were collected from a nationally representative sample of over one thousand teachers working in kindergarten through 12th grade classrooms. Additionally, to complement the data collected from classroom teachers, five hundred public school principals and two hundred deans and chairpersons from schools of education and education departments across American colleges and universities were interviewed.

Important findings from the Markow, Moessner, and Harowitz (2006) study included notable disagreement between public school principals and deans/chairpersons in colleges and universities. First, principals were more likely to believe that new teacher expectations of the workload, number of students with special needs, prestige, and salary/benefits were “unrealistic” (Markow, Moessner, & Harowitz, 2006, p. 6). Similarly, principals were also more likely to believe that new teachers were unprepared for several key components of their work, specifically, classroom management and discipline. While nearly a quarter of higher education personnel reported believing new teachers were prepared to maintain order in the classroom, a meager 4% of public school principals reported the same thing. Similarly, 20% of responding teachers indicated they were not prepared to maintain discipline in the classroom. The disparities in these findings, specifically in teachers’ perceptions of their level of preparedness
versus the reports from college and university deans and chairpersons, support the need for more research on effectively preparing teachers to manage difficult behaviors in the classroom.

**Implications for Teacher Preparation**

If there is a deficit in preparation for classroom behavior management, as is suggested by research, there are implications for teacher education programs. While most of the extant research focused on this deficit has been conducted retrospectively, several researchers have sought answers closer to the source. To further understand the problem, researchers analyzed content from courses in teacher preparation programs. In 2001, Landau reported the results of a survey of offered coursework for a sample of twenty teacher preparation programs. Landau chose programs from “large and small, public and private, well known and not well known, and located in various part of the United States” (p. 4). While it is unclear whether this sample was representative of teacher education programs across the country, results provided insight into the absence of classroom management coursework. Landau found that only one program out of twenty offered a course with “classroom management” as the title. Other programs mentioned communication and classroom organization strategies in course descriptions, but did not directly refer to “management strategies” (2001, p. 4). Beyond the absence of stand-alone courses and specific mentions of classroom management in course descriptions, Landau also found that existing courses were offered within special education programs rather than general education disciplines. She indicated this finding suggested a bias toward the belief that classroom management responsibilities lie primarily with teachers managing children identified with disabilities and not all teachers.

Stough (2006), following the lead of Landau (2001), highlighted the absence of training in classroom management in teacher preparation programs and took the issue further by
examining changes in educational standards as a potential driver for the disparity. Stough’s findings suggest standards used to determine licensing, certification, and accreditation focus more on content knowledge as opposed to pedagogical knowledge. Stough’s analysis indicated that a gradual shift has been made away from general pedagogical methods toward courses aligned with specific content knowledge. Stough concluded that a lack of course content in classroom management might simply be the natural result of this shift paired with an absence of standards related to classroom management.

Addressing the pervasive lack of explicit coursework in classroom management and national standards related to classroom management practices is well beyond the scope of this study; however, seeking greater understanding of classroom management instruction currently included in teacher preparation programs is of interest. Specifically, it is important to look at how programs may be infusing this content into existing coursework in order to look for opportunities to promote the most efficient and effective methods possible for preparing future teachers to effectively manage classrooms and students.

**Status Quo in Teacher Preparation**

In the absence of stand-alone coursework in classroom management, teacher preparation programs claim to include instruction in this domain within other courses. While this is likely to be true in most cases, the reality may be that content in classroom management is presented from a theoretical standpoint; thus, may lack real-world connections for pre-service teachers (Siebert, 2005). A 2014 National Council on Teacher Quality (NCTQ) report on classroom management examined 122 teacher preparation programs to determine the extent to which teachers were being prepared to utilize research-based classroom management strategies in their future classrooms. Results indicated nearly all programs reviewed could claim they covered classroom management
topics; however, there was no indication this content was chosen based on what was shown through research to be most effective. Surprisingly, some of the more common evidence-based strategies, such as consequences for inappropriate behavior, reinforcement for appropriate behavior, and fostering student engagement, appeared to be “out of favor” with teacher educators (Greenberg, Putman, & Walsh, 2014, p. ii). The authors of this report concluded that classroom management seems to be “everywhere but nowhere” in teacher preparation programs, demonstrating a systemic lack of focus on strategies supported by research and an absence of exposure to coherent, connected techniques with opportunities to practice and receive feedback (Greenberg, Putman, & Walsh, 2014, p. ii).

There may also be an assumption that pre-service teachers are receiving training in classroom management while in K-12 classrooms as student teachers. Greenberg, Putman, and Walsh (2014) explored this possibility as well. They found that even if supervising and cooperating teachers were proficient in classroom management, they were not often involved in the development or delivery of curriculum for pre-service teachers. These authors reported this potentially leads to course content divorced from student teaching experiences, which contributes to the lack of preparation in this domain. Additionally, they concluded that field placements were not guaranteed to provide opportunities for seeing veteran teachers manage hostile or severe disruptive behaviors. Further, researchers have noted there is no evidence that new teachers simply “pick up” classroom management skills on the job. Teachers who lack basic classroom management skills in the beginning may self-select out of the classroom rather than develop skills over time (Baker, 2005).
What is Needed?

Greenberg, Putnam, and Walsh (2014), authors of the 2014 NCTQ report, outlined what they referred to as “The Big Five”, which are five research-based strategies they believe to be essential for every teacher candidate to master (p. 3). The Big Five consist of: establishing rules, teaching routines, providing specific praise, applying consistent consequences for misbehavior, and promoting student engagement. Their report built upon these basic skills and made several recommendations for addressing the absence of instruction on the Big Five in teacher preparation programs. First, the authors suggested coordination between foundational coursework and clinical coursework to ensure classroom management is adequately covered. They also recommended that programs survey their graduates and respective employers to target areas of improvement, utilize videos of actual classrooms being managed by real teachers as part of instruction, use classroom observations as opportunities to identify specific classroom management strategies, adopt simulation technology to allow teacher candidates not yet ready for field placements to practice discrete skills in a low risk environment, align feedback on student teaching with coursework and increase the amount of feedback, modify how supervising teachers are chosen, ensure all performance assessments address teacher candidates’ knowledge of and ability to perform classroom management techniques, adopt state regulations for teacher preparation programs related to the Big Five, and last, incorporate all research-based classroom management strategies into program accreditation standards.

Statement of Problem

With the connection of student learning outcomes to a teacher’s ability to manage difficult behavior in the classroom, teacher preparation related to classroom management is critical (Dicke, et al., 2014; Gage, et al., 2018; Jennings & Greenberg, 2009; Lewis, Romi, Qui,
Numerous researchers have documented the absence of cohesive instruction on classroom management techniques and opportunities to practice strategies with feedback in teacher preparation programs (Baker, 2005; Freeman, Simonsen, Briere, & MacSuga-Gage, 2014; Greenberg, Putnam, & Walsh, 2014; Landau, 2001; Marzano & Marzano, 2003; Pankowski & Walker, 2016; Siebert, 2005; Stough, 2006). Answering this deficit with a general call for more focus on classroom management in teacher education may not be the best answer. It appears that identification and implementation of efficient, effective, high-impact instructional methodologies in teacher preparation are warranted to truly prepare teacher candidates for the challenge of managing classrooms. In particular, harnessing the use of technology as a bridge between theoretical coursework and fieldwork experiences seems a promising place to start. In their 2014 report on the status of classroom management in teacher preparation, Greenberg, Putnam, and Walsh (2014) introduced the concept of instruction through simulation experiences and recommended broader adoption of this technology.

There is a growing body of research on the use of simulations in teacher preparation programs. A 2014 article by Dieker, Rodriguez, Lignugaris/Kraft, Hynes, and Hughes described the status of simulation technology and how it was being used in some teacher preparation programs. The authors indicated there were a variety of simulators being used in this manner. They defined simulations as experiences that “allow individuals to have repeated trials involving high stakes situations without risking the loss of valuable resources” (p. 22). This definition is quite broad and covers a wide range of activities; hence, the technology required to run simulations varies a great deal. Using an early type of teacher education simulation to illustrate, Kersh (1963) explored the use of film slides and printed materials to construct a simulated sixth
grade classroom called “Mr. Land’s Sixth Grade” (pp. 4-5). Mr. Land was the fictitious teacher of twenty-two fictitious sixth grade students. Kersh (1963) created cumulative records for all of the simulated students, designed scenarios with accompanying materials, and developed film slides for scenarios, complete with potential student responses. The work undertaken by Kersh (1963) must have been enormous and the implementation on a large scale nearly impossible. This could explain why there is no evidence to indicate Kersh’s simulation procedures were adopted in teacher preparation programs.

Fast forward to 2018 when simulation technology has expanded at such an enormous rate that virtual reality goggles are available in big box stores for anyone to purchase. Advancements in technology over the last fifteen years have allowed some teacher education programs to adopt a variety of simulation methodologies to provide teacher candidates with repeated opportunities to practice applied skills. Simulations like the Cook School District Simulation and simSchool use web-based platforms to facilitate the practice of specific teaching skills related to decision making and meeting the instructional needs of a wide range of students (Girod & Girod, 2008; McPherson, Tyler-Wood, McEnturff Elison, Peak, 2011). While these platforms allow for repeated practice of critical teaching skills they are missing the immersive qualities of more recent simulation technologies. Research indicates the most effective simulations require a level of “suspension of disbelief” in order to effectively bridge the gap between traditional classroom instruction and fieldwork experiences (Dieker, Rodriguez, Lignugaris/Kraft, Hynes, & Hughes, 2014, p. 22).

Immersive mixed reality simulations have emerged as promising platforms for preparing pre-service teachers thanks to advancements in the fields of healthcare and military training (Dieker, et. al, 2014). According to Hughes, Stapleton, Hughes, and Smith (2005), mixed reality
is defined as an experience in which the participant is interacting in a setting that is either real and contains augmented reality components or is virtual and includes real-world components. *Second Life* and TeachLivE™ (TLE) are two examples of immersive simulations using mixed reality technologies; however, they differ in several important ways. *Second Life* is a massive multi-player online game (MMPOG) with different platforms suitable for a wide variety of entertainment and educational purposes, including teacher education. *Second Life* is described as a “microworld” in which players inhabit an avatar, interact in real-time with other people also being represented by avatars, and control key aspects of the virtual environment (Mahon, Bryant, Brown, & Kim, 2010, p. 123). In the case of *Second Life*, the setting and avatars are virtual, while the interactions between actual participants occur within the game and take place in real-time. One benefit of *Second Life* is that participants are connected remotely and thus, can be in any location with adequate internet connectivity. TLE uses similar virtual avatar technology; however, the setting is virtual and is populated by a set of fully developed avatars with intact backgrounds and personality traits inhabited by trained interactors located off-site. Participants are in the same physical location and interact as themselves rather than avatars. Scenarios are developed to broadly describe avatar behavior and outline potential responses by the virtual students to participant behavior. TLE technology allows the interactors to see and hear participants and subsequently react in real-time with a customizable level of unpredictability. With little reliance on scripts and interactions occurring in real-time, the potential for suspension of disbelief is enhanced through the concept of “telepresence” or presence, for short (Walker & Raimondi, 2016, p. 21). Presence simply means that a multidimensional virtual environment contains objects, people, things, activities, events, sounds, interactions, and experiences that feel
like those found in the physical world and contribute to suspension of disbelief (International Society for Presence Research, 2000).

TLE was originally developed through a Bill and Melinda Gates Foundation grant awarded to the University of Central Florida (UCF) for the purpose of studying the effectiveness of teacher preparation practices using TLE mixed reality simulation technology. When the final grant report was published in the summer of 2016, more than eighty colleges of education had adopted TLE technology for use in preparing K-12 classroom teachers. This grant also specified a time-line for commercialization of the TLE product and expansion of adoption beyond teacher education into more diverse disciplines, such as hospitality, counseling, leadership training, autism research, and employment training (Dieker, Hughes, & Hynes, 2016). A company called, Mursion, joined the project as a commercialization partner and licensing agent for the technology. Commercialization through Mursion expanded licensing opportunities to additional higher education programs and made this technology available across more disciplines. UCF retained rights to continue to develop TLE and engage in research on various uses of the technology with partners across the globe. The project that is the subject of this research took advantage of a pre-existing contract with UCF to conduct this research study on using TLE for teacher preparation in classroom management.

While there is a growing body of research on the efficacy of simulation technology in teacher preparation, in particular TLE, there appears to be a gap in research that examines the feasibility of these options for applied use in teacher preparation. More research is needed on the cost of implementing this technology compared to realized benefits for teacher preparation, and ultimately, student outcomes. For example, with dwindling fiscal resources and cuts across state and federal budgets, colleges and universities may hesitate to adopt expensive technology even if
research suggests it may be an effective instructional tool (Mitchell, Leachman, & Masterson, 2016). Adoption may be even less likely if there are more cost effective methods also supported by research.

**Purpose**

The purpose of this research project was to evaluate an instructional program using the TLE middle school classroom environment to teach two general, research-based classroom management strategies to undergraduate and graduate students enrolled in an introductory course on teaching exceptional learners in general education classrooms. Setting behavioral expectations and differential reinforcement were chosen based on empirical evidence supporting the use of these strategies in classroom management practices and the fit between inherent restraints of the technology and participant ability to perform these techniques. A mixed method design was used to collect information on changes in performance of skills, sense of self-efficacy of classroom behavior management, feasibility of program implementation, and social validity of the technology and procedures.

**Research Questions**

1. What are the effects of an instructional program delivered within a mixed reality environment on the classroom behavior management skills of pre-service teachers?
   
   a. How does the behavioral skill set of pre-service teachers change after participating in this intervention?
   
   b. How feasible is this intervention practice for use in teacher preparation?

2. How prepared do participants feel to implement general behavior management techniques in an actual classroom before and after instruction?
3. What are the participants’ perceptions of the validity of this instructional package for use in teacher preparation?

Definitions of terms

Setting Behavioral Expectations

To set behavioral expectations is to specify explicit rules for student behavior in the classroom or during a particular classroom activity and describe appropriate related behaviors (Greenwood, Hops, Delquadri, & Guild, 1974; Madsen, Becker, & Thomas, 1968).

Differential Reinforcement

Differential reinforcement is the application of reinforcing consequences to only behaviors of a certain class that meet pre-determined criterion while ignoring any other responses (Cooper, Heron, & Heward, 2007; Vollmer & Iwata, 1992).

Disruptive Classroom Behavior

Disruptive classroom behavior covers a broad range of behavioral topographies; therefore, it is best defined by the end result. Disruptive classroom behavior is any behavior that results in distraction of peers and interruption of instructional activities, regardless of what the student or students were doing (Stage & Quiroz, 1997).

Chapter Summary

Preparation for effective use of classroom management strategies is critical for teachers. Lack of preparation to manage the classroom environment and student engagement has been demonstrated to lead to several unfavorable outcomes, including increased teacher attrition and decreased academic progress (Burke, Oats, Ringle, Fichtner, & DelGaudio, 2011). The absence
of explicit instruction and repeated practice of classroom behavior management strategies in teacher preparation has been documented by numerous researchers. Recent technologies such as mixed reality simulation have the potential to bridge the gap from instruction using lecture-based course content and fieldwork in real classrooms. Simulation technology allows for immersive practice of discrete classroom management skills prior to when pre-service teachers enter classroom settings with actual students. This study focuses on the feasibility of implementing simulation-based technologies in teacher preparation programs. The next chapter will connect the research questions presented here with broader theoretical constructs and will summarize major research on preparing teachers to effectively manage student behavior in the classroom.
Fifty years of research on classroom behavior management techniques indicates the focus on addressing and improving behavior in the classroom is not a new endeavor. For example, a study initiated by the US Department of Health, Education and Welfare and executed by Southwestern Cooperative Educational Laboratory in 1967 sought to “pragmatically study and develop classroom management techniques, teaching strategies to increase pupil interest in the learning process and to contribute to pupil gain in desirable behaviors” (p. 1). Despite the long history of research on classroom behavior management, there appears to be a gap between effective practices identified and validated through research and the preparation of teachers to use these techniques in the classroom (Baker, 2005; Levine, 2006; Oliver & Reschly, 2007; Siebert, 2005, Stage & Quiroz, 1997; Sugai & Horner, 2002). The following chapter situates classroom behavior management and implications for teacher preparation within a framework of learning and behavior theories, reviews research on teacher preparation practices in behavior management, and provides background on techniques supported by empirical research used to address problems related to student behavior in the classroom.

Theoretical Framework

Several major learning and behavior theories inform the focus and structure of this exploratory study. These theories describe the processes at work during programmed behavior change, as well as the social and cognitive learning theories applicable to teacher education. Behavior analytic theory will be explored within the context of student and teacher behavior change, while social cognitive theory and the construct of teacher efficacy emphasize the processes by which pedagogical skills are developed, performed, and maintained.
Behavior Analysis

Behavior analysis, or the science of behavior, informs the practice of behavior change, in general, and methods for addressing socially important student behavior in the classroom, in particular. Behavior analysis posits that all behavior serves a function and looks to understand behavior by examining environmental variables, setting events, antecedents preceding behavior, and consequences following behavior (Baer, Wolf, & Risley, 1968; Sidman, 1960; Skinner, 1953). The technology of behavior analysis was developed out of the work of early behaviorists, specifically John Watson and B. F. Skinner (Cooper, Heron, & Heward, 2007).

In 1969, Baer, Wolf, and Risley published a seminal paper outlining seven dimensions of applied behavior analysis, describing the science as: applied, behavioral, analytic, technological, conceptually systematic, effective, and having generality. These dimensions have maintained their relevance over time and remain fundamental tenets of applied behavior analysis. Baer, Wolf, and Risley (1987) published a follow up to their original work reiterating the relevance of the seven dimensions of applied behavior analysis. The word, ‘applied’ continues to mean the science is committed to making socially significant changes that improve peoples’ lives. Applied behavior analysis remains ‘behavioral’ because it focuses on observable and measurable behaviors targeted for change. Being ‘analytic’ still means that a functional relationship between a manipulated variable and a measured behavior has been established. Applied behavior analysis continues to be ‘technological,’ which means procedures are described in enough detail to allow for replication by other researchers and practitioners with the same results. The language used to describe behavior analysis is ‘conceptually systematic’ ensuring that definitions and interpretations endure over time. Applied behavior analytic applications are ‘effective’ and have ‘generality.’ These terms mean that interventions improve the behavior targeted for change and
require behavior change to last over time and across settings and people (Baer, Wolf, & Risley, 1987; Cooper, Heron, & Heward, 2007).

Applied research supports the effective application of theories of behavior analysis in settings such as classrooms, clinics, community environments, and homes (Cooper, Heron, & Heward, 2007). Studies have demonstrated the positive impact of modifying the environment, teacher behavior, antecedent variables, and consequence variables on the problematic classroom behavior of students (Sugai, et al., 2000; Thomas, Becker, & Armstrong, 1968). Therefore, as suggested by the theoretical foundations of behavior analysis, if changes in teacher behavior can promote increases in appropriate classroom behavior in students, then it follows that teachers can be prepared to implement changes through instruction on effective classroom behavior management (Reinke, Lewis-Palmer, & Merrell, 2008; Thomas, Becker, & Armstrong, 1968).

**Social Cognitive Theory**

While a large body of research on applied behavior analysis and modifying student behaviors provides a strong foundation for the specific behavior change strategies chosen for this study, the instructional practices and design of the learning environment was influenced by tenets of Social Cognitive Theory (SCT). SCT was developed around several assumptions about how humans learn and perform behaviors (Bandura, 1971). These assumptions include the existence of a reciprocal relationship between a person’s characteristics, her environment, her behavior, active and observational or vicarious learning, the difference between learning and the ability to perform a specific behavior, and the part in which self-efficacy plays in learning (Schunk, 2012). These assumptions all play a role in teacher preparation and more specifically, preparation to manage difficult student behavior in the classroom.
The triadic reciprocity assumption of SCT posits that the impact of personal and environmental characteristics on behavior is not unidirectional. Bandura, considered the father of SCT, stated, “the environment is only a potentiality, not a fixed property that inevitably impinges upon individuals and to which their behavior eventually adapts” (1971, p. 40). Thus, according to SCT, there are bidirectional relationships between a teacher’s personal characteristics, the classroom environment, and her behavior. Further, if student behavior is considered an environmental factor, then the assertion can be made that a teacher’s behavior is closely related to student behavior and vice versa. This assumption parallels fundamental tenets of applied behavior analytic theory as well.

Active learning, or learning by doing, and observational learning, or learning vicariously by watching others, are concepts addressed by SCT (Schunk, 2012). Of particular interest to social cognitivists, and a deviation from behavior analytic theory, is the assumption that some learning can occur simply by watching others model an action or task. Bandura described observational learning as the type of learning process by which “observers display new patterns of behavior that, prior to exposure to the modeled behavior, have a zero probability of occurrence even when motivation is high” (Schunk, 2016, p. 125). In terms of classroom behavior management skills for pre-service teachers, the assumption that some learning can occur simply by watching others perform a skill is not at odds with what is known about how teachers are prepared to manage their own classrooms. The problem may be more closely related to the gap between learning about a concept versus being able to perform a discrete skill in a real setting.

The distinction between learning a concept and performing a specific learned behavior lies at the intersection between SCT and behavior analytic theory. As described by Schunk
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(2016), the performance of learned behaviors requires “motivation, interest, incentives to perform, perceived need, physical state, social pressures, and type of competing activities” (p. 121). Thus, a mechanism of some sort is required to bridge the divide between learning and performance, particularly if the skill being performed is difficult and the performer new to the task. In a college classroom, performance of learned skills is incentivized by the social expectations as well as course grades; thus, active learning may be the best complement to observational learning for acquisition of specific classroom behavior management strategies.

Another key facet of SCT is the concept of efficacy and how it relates to an individual’s performance of learned behaviors. Efficacy describes a person’s belief in his or her capacity to perform a specific behavior or task (Bandura, 1971; Schunk, 2012). Efficacy plays a key role in the performance of learned behaviors. For example, if an individual feels that he or she is not capable of performing a given task or skill then motivation is low, whereas, when efficacy is higher, motivation to engage in a task is elevated (Schunk, 2016). From a teacher’s perspective, teacher efficacy might be described as a self-judgment of one’s capacity to facilitate desired student learning outcomes (Tschannen-Moran & Hoy, 2001).

**The Construct of Teacher Efficacy**

While the overarching concept of teacher efficacy may be quite simple, measuring it remains difficult (Duffin, French, & Patrick, 2012). The importance of a teacher’s sense of efficacy has been the focus of research for a number of years and results indicate teacher efficacy is closely related to student motivation, learning outcomes, and individual student efficacy (Tschannen-Moran & Hoy, 2001). Given the impactful role of teacher efficacy on student outcomes, it makes sense that researchers would want to be able to measure this construct and design interventions to positively impact teacher efficacy. Work by Tschannen-Moran,
Woolfolk Hoy, and Hoy (1998) compiled the extant research on teacher efficacy and attempts to measure and quantify the concept. They synthesized prior work done by other researchers and conducted correlation analyses on all existing measures of teacher efficacy and non-efficacy. The authors described the results of their analyses as “conceptual confusion” and proposed an integrated model for measuring teacher efficacy (1998, p. 227).

Tschannen-Moran and Hoy (2001) used the results of their earlier research to develop and validate a new omnibus measure of teacher efficacy called the Teacher Sense of Efficacy Scale, available in long-form and short-form. The Teacher Sense of Efficacy Scale (TSES) is the name preferred by the developers; however, it may also be correctly referred to as the Ohio State Teacher Efficacy Scale (OSTES). The TSES consists of three subscales, including Efficacy in Student Engagement, Efficacy in Instructional Strategies, and Efficacy in Classroom Management. Research conducted on the TSES after 2001 further examined the construct validity of teacher efficacy; among these was a study by Klassen, Bong, Usher, Chong, Huan, Wong, and Georgiou (2009) that examined TSES results from 1,212 teachers across five countries, including the US, Canada, Cyprus, Korea, and Singapore. Results from this study yielded evidence of strong internal consistency within and across all five settings with consistent correlations between teacher efficacy and job satisfaction among participants. Overall, research suggests the TSES is a valid tool for measuring teacher efficacy, particularly across student engagement, instructional strategies, and classroom management domains (Fives & Buehl, 2009, Klassen et al., 2009).

**Research on Teacher Preparation in Classroom Management**

While research provides numerous examples of the importance of classroom management and an absence of instruction on requisite skills in teacher education, empirical studies exploring
specific instructional procedures used to prepare teachers to manage classrooms is more difficult to find. In order to provide sufficient background on teacher preparation research in classroom management, the results of a systematic literature search for empirically-investigated instructional practices is presented in this section. A search for research studies focused on preparing pre-service teachers to manage classrooms, including student behavior, was conducted using ERIC and PsycINFO databases. Databases were queried using the Boolean search phrases: ‘teacher education’ or ‘teacher training’ or ‘teacher preparation’ and ‘classroom management’ or ‘behavior management.’ Keyword searches included all text contained in the articles rather than only titles and abstracts and were limited to journal articles published in peer reviewed journals. Journal articles identified through the initial search were screened for inclusion based on these criteria: (a) an empirical study using single subject, quantitative, or qualitative research methodologies was conducted, (b) participants were limited to or at least included pre-service teachers, (c) the independent variable was instruction of some type on classroom management or behavior management, (d) the setting was located within the United States, (e) the journal article was written in English, and (e) the article was published between 1950 and April 2018.

The review included ancestral searches from articles identified using the same criteria. Studies excluded from review were those focused only on in-service teachers. Other exclusions included instructional interventions related to training pre-service teachers in pedagogical skills not directly related to classroom management or behavior management. Additionally, studies conducted on the course content of teacher preparation programs and focused on programs located outside of the United States were excluded. The time interval of 1950 through 2017 was chosen to capture early research on teacher preparation in classroom management and to maximize search results.
Search results yielded a total of 935 articles in ERIC and 573 in PsycINFO. Abstracts were reviewed to determine initial inclusion or exclusion based on set criteria. Twenty-four articles from ERIC met criteria and only one additional article from PsychINFO met criteria. Anecdotally, the vast majority of search results were excluded for not being empirical studies, not including pre-service teachers as participants, or having been conducted in settings outside the United States. Ancestral searches yielded no additional studies that met inclusion criteria.

Studies that met criteria were further analyzed and categorized by the modality of instruction on classroom management. This systematic literature review, while limited in results, yielded a range of studies taking place across forty-two years of research on teaching classroom management skills to future teachers. Categories of teaching modalities included: (a) scripted responses, (b) clinical experiences, (c) professional development, (d) feedback and reflection, (e) video/multimedia, and (f) role-playing and simulation.

**Scripted Responses**

A brief summary of the results of this literature review, organized by general teaching modality, provide a backdrop for the methods and procedures chosen in the current study. A single study, by Lentfer and Franks (2015), used scripted responses to provide pre-service teachers a “proactive communication model” to address disruptive student behavior (Lentfer & Franks, 2015, p. 80). This study paired five weeks of didactic instruction with a subsequent field placement; thus, pre-service teachers were expected to employ the scripts in real classrooms with disruptive students after learning the strategy in a classroom management course. Statistical analysis of pre- and post-measures indicated significant gains in knowledge of and self-efficacy in classroom management.
Clinical Experiences

Two studies examined the impact of clinical experiences, including practica, internships, and student teaching placements on developing the classroom behavior management skills of pre-service teachers. A 2008 qualitative study by Gimbert examined the development of classroom management curriculum within a school-university partnership and the experiences of faculty and mentor teachers who self-selected to participate and the teacher candidates enrolled in the course. Next, a quantitative research study by Cushman and Kemp (2012) highlighted the benefits of clinical experiences on pre-service teachers’ classroom management skills and confidence in using what they learned. The purpose of this study was to look at teacher candidates’ confidence in classroom management techniques across two different types of instruction. The first phase of instruction required participants to read a textbook, *Teach Like a Champion* written by Doug Lemov, and then participate in discussion during class sessions. Following this, students participated in a lab experience that required them to spend ninety hours across one month in an elementary lab school that utilized classroom management strategies described by Lemov (2010). Participants indicated a statistically significant difference in overall classroom management confidence levels after completing the lab experience compared to going into it.

Professional Development

Two research teams examined the benefits of using a professional development model of instruction with pre-service teachers to teach classroom management skills (Hsu & Malkin, 2013; Siebert, 2005). Siebert (2005) looked specifically at the use of a Professional Development School (PDS), which was part of an initiative by the American Federation of Teachers to facilitate collaboration between researchers and practitioners for the purpose of
improving teacher practice in research-based methods and enhancing student achievement. The second study, conducted by Hsu and Malkin (2013), used a quantitative design to examine the impact of professional development workshops on student teachers’ self-perception of critical teaching skills. Statistical analysis indicated significant differences in pre and post-instruction survey responses. Specifically, participants in the treatment group reported feeling more knowledgeable regarding effectively managing the behavior of their students.

**Feedback and Reflection**

With regard to feedback and reflection, a qualitative study by Anderson and Radecich (2001) examined the impact of multi-prong feedback from peers, instructors, and supervisors on classroom management and teaching effectiveness of pre-service teachers participating in an early field experience. Participants documented private reflections on feedback and their experiences using a dialogue journal kept between them and their university supervisor. Participants indicated that feedback from peers, instructors, and fieldwork supervisors was valuable; however, they reported the feedback from instructors and supervisors as most valuable. Data analyses did not yield any conclusions about the benefit of feedback and reflection on pre-service teacher’s classroom management skills. Another study, by Yost and Mosca (2003), evaluated the use of a specific model of critical reflection, called E.N.A.C.T., which stands for Examine, Name, Analyze, Critically evaluate, and Treat. Pre-service general education teachers were taught to use this model while enrolled in a class on research methods and behavior management, which coincided with a semester of student teaching in a special education classroom. Participants reported the model helped them to understand the sources of student misbehavior and was effective in giving them tools for addressing problems.
Video and Multimedia

Instructional practices incorporating video and other multimedia platforms comprised the second largest category of empirical studies. The search criteria yielded four empirical studies on the use of video and one examining the impact of Content Acquisition Podcasts on teaching classroom management to pre-service teachers (Ellingson, 1991; Kennedy & Thomas, 2012; Lee & Choi, 2008; Sariscany & Pettigrew, 1997; Tobin and Johnson, 1994). Ellingson (1991) assigned eighty-eight undergraduate art education majors to one of three conditions, generic classroom management, discipline specific classroom management, and control. Instruction on classroom management was facilitated through a video-taped lecture and accompanying self-instructional units. The discipline specific group viewed the same video as the generic group, but completed a self-instructional unit that specifically addressed classroom management in art education. Participants were assessed through a written test and an observation during fieldwork by their student teacher supervisors. Statistical analysis indicated both the generic and discipline specific groups made gains in knowledge of classroom management strategies; however, there was not a statistically significant difference in the applications of strategies in the applied setting.

Two additional studies utilized video; however, they included interactive components that required participants to engage with the material in a variety of ways. Tobin and Johnson (1994) utilized Hypercard technology to create computer-based learning modules on multicultural approaches to classroom management, which included live action videos, writing prompts, sound clips, and allowed for participants to progress through the module in a multi-linear way. The authors hypothesize that users benefited from self-directed interaction with the learning material, which was made possible by the innovative Hypercard technology. The second study by Sariscsany and Pettigrew (1997) also implemented interactive video to develop
participants’ declarative knowledge of classroom management issues and strategies. In this case, the authors used a computer program called the Interactive Video Classroom Management Training Program (IVCMTP), which was created specifically for preparing physical education teachers. The IVCMTP included video-taped scenarios representing models of both effective and ineffective classroom management followed by short quizzes with immediate feedback. Progression through the program required one-hundred percent mastery on quizzes. Results suggested the interactive modules increased pre-service teacher knowledge of physical education classroom management techniques.

A fourth study by Lee and Choi (2008) examined the use of a web-based case instruction platform for guiding undergraduate early childhood education majors through expanding their views of classroom management. The case-based learning environment created by the authors included audio presentations of case-studies and required participants to respond to essay questions at each stage of the program. Participants were prompted through identification of the problem and problem solving activities. Based on analysis of writing samples, the authors suggested participants expanded their conceptualization of classroom management; however, there was no evidence to indicate this would lead to development of skills in implementing classroom management strategies.

Last, Kennedy and Thomas (2012) explored podcasting as a means to instruct pre-service teachers on positive behavior supports in the classroom. The authors defined podcasts as a collection of digital media files, including audio, and in some cases, video, that is not streamed through the web, but instead downloaded and listened to or viewed on a variety of media platforms. Kennedy and Thomas (2012) created carefully structured, standardized podcasts, which included still pictures, text, and synced audio, called Content Acquisition Podcasts or
CAPs. Their study examined the differential impact of CAPs versus textbook reading on knowledge acquisition of Schoolwide Positive Behavioral Interventions and Supports (SW-PBIS) by 164 undergraduate teacher candidates. Based on statistical analysis of pre, post, and maintenance measures, the students in the CAPs instruction group significantly outperformed the text-only group at posttest with a large effect size ($d=.98$).

**Role-playing and Simulation**

The largest number of identified studies utilized role-playing or simulation type instruction to teach classroom management to pre-service teachers. Clapper (2010) defines simulation as participation in a learning experience that is enhanced through replications of real-life interactions. Empirical studies identified through the literature review span forty years of research on simulation and role-playing for instructing teacher candidates on classroom management. Implementation of simulation practices ranged from no-tech role-playing to interactions with high-tech virtual classrooms. The oldest study meeting the literature review criteria was written by Fink and Brownsmith and published in 1975. The authors examined the use of role-playing common scenarios in a college course on managing individuals with behavioral disorders (Fink & Brownsmith, 1975). Only one other article was identified that included role-play as the independent variable. A study by Rudolph (2008) used a survey to measure the attitudes of pre-service teachers toward classroom management before and after writing case-studies based on their experiences with discipline issues during fieldwork, role-playing the scenarios, and problem-solving with peers in class. Results demonstrated statistically significant differences in attitudes toward classroom management after participants engaged in role-playing and problem-solving real-life situations.
The largest number of studies used computer-based simulation technology to present instructional content on classroom management practices to pre-service teachers. A 1980 study by Reynolds and Simpson, compared the impact of three instructional conditions: discussion, role-playing, and computer-based simulation, on students’ perception of competence in classroom management. Results were undifferentiated across learning modalities; however, the authors suggested the simulations were more efficient and took less class time to implement.

Similarly, a group of researchers at the Curry School of Education of the University of Virginia in the late 1980s published several studies exploring the use of microcomputer simulations to train pre-service teachers to implement behavior management techniques. Strang, Murphy, Kauffman, Badt, and Loper (1986) used a microcomputer simulated classroom with four students along with a human operator who provided the voice for each student to present undergraduate education students an opportunity to practice addressing verbal interruptions. Participants saw graphical and textual prompts on their computer screen guiding them toward an appropriate response to disruptive student behavior. Results indicated that the instructional package, subsequently referred to as The Curry Simulation, led to decreases in inappropriate teacher responses and increases in appropriate responses to talkouts. Three additional empirical studies utilizing The Curry Simulation demonstrated promising results for teaching preservice teachers to appropriately address disruptive student verbal behavior (Murphy, Kauffman, & Strang, 1987; Strang, Badt, Kauffman, 1987; Strang, Kauffman, Badt, Murphy, & Loper, 1987; Strang, Murphy, Kauffman, Badt, & Loper, 1986). Research by Gorrell and Downing (1989) explored the use of computer-based simulation in an educational psychology course to “bridge the gap between knowledge and practice” of classroom management applications (p. 336). This study looked at the feasibility of using computer simulations for training application of principles
of behavior analysis to address classroom issues. Participants were sixty-four undergraduate education students enrolled in an educational psychology course. A multiple-choice test measured declarative knowledge of classroom management strategies, while an essay-based test gathered data on applied knowledge of concepts. Participants also completed a measure of self-efficacy in handling school-related issues. Results indicated there were statistically significant differences in applied knowledge of problem solving difficult situations with a large effect size ($d=1.01$); however, there was no difference in demonstrations of declarative knowledge of behavior analysis or reported self-efficacy beliefs among participants. The authors indicated that the large effect size related to applied problem solving justified the cost of developing and implementing this type of computer-based simulation in a college course.

Another researcher in the area of instructional computing, Richard Overbaugh, applied the use of an interactive video simulation with HyperCard to developing knowledge of principles of classroom management to first-year and final-year undergraduate education majors. The Classroom Management Simulation presented content, required assessment of the scenario, prompted decision making, and queried personal reflection on how choices might have impacted students. Multiple empirical studies support the use of the Classroom Management Simulation to develop decision making skills in pre-services teachers (Overbaugh, 1994; Overbaugh, 1995).

The three most recent empirical studies identified in this search focus on mixed virtual reality and demonstrate much more sophisticated simulation technology. A 2010 research study by Mahon, Bryant, Brown, and Kim examined the application of Second Life to provide instruction to pre-service teachers on classroom management. The researchers constructed a three dimensional model that included multiple environments commonly found in a school. The model was populated with thirty middle school students. Participants had access to three years
of simulated academic history and test results on each student as well as family and demographic information. Virtual students were controlled either by another pre-service teacher (avatar) or by the computer software (bots). The virtual environment used in this study was a simulated high-stakes testing scenario. Teacher candidates were expected to know the background of the students and prepare for potential issues as well as respond to disruptive behavior as it happened. Sixteen pre-service teacher participants completed a questionnaire following their experience in the simulation. Results indicated that participants found the technology to be unrealistic and chaotic although several did report they felt they learned something about classroom management from the simulation. The last two studies identified through the systematic literature review utilized TLE technology and will be described in more detail in the next section (Judge, Bobzien, Maydosz, Gear, & Katsioloudis, 2013; Pankowski & Walker, 2016).

**TLE and Classroom Behavior Management**

There is a growing body of research on the ways TLE has been used in teacher preparation programs; however, there have been very few empirical studies published in peer-reviewed journals examining ways in which TLE has been used to teach classroom management strategies specifically. Judge, Bobzien, Maydosz, Gear, and Katsioloudis (2013) designed a study with the purpose of comparing the impact of three different instruction conditions on the ability of pre-service teachers to implement differential reinforcement of incompatible behavior (DRI) with the TLE virtual students. In this study, TLE served as a means by which to assess skills and provide corrective feedback as opposed to being part of the targeted instruction on DRI. The authors found gains in components of DRI across all conditions; however, generalizability of results was limited by a sample size of six.
A 2016 study by Pankowski and Walker used TLE to provide novice teachers with multiple opportunities to practice two critical classroom management skills: motivating students to participate and responding to student noncompliance. The authors were specifically looking at the differences across two groups of graduate students, traditional certification and alternative certification, and how they viewed classroom management. A total of twenty-six participants completed pre-post measures gathering information on their conceptualization of classroom management. Between administration of the measures, participants interacted with the TLE simulation three times as they practiced motivating the virtual students to engage in learning activities and addressing noncompliance when it occurred. Participants reported a perceived improvement in their teaching practices across the simulation activities. There were slight differences between the traditional and alternative certification groups with alternative certification candidates reporting stronger performances in response to student noncompliance. The traditional certification group, more so than the alternative group, reported they found the experience to be realistic and valuable. The authors hypothesized that “For many traditional certification teachers, the simulations represented their first opportunities to establish expectations and deal with those expectations being violated” (Pankowski & Walker, 2016, p. 15). In all, very little research on TLE as an instructional tool for providing pre-service teachers with practice using classroom management techniques has been published in peer reviewed journals. Despite this, the two studies identified indicate TLE provides valuable simulated classroom experiences for pre-service teachers and exposes them to issues of classroom management in a safe, low-risk way.

An unpublished pilot study that subsequently informed the current research project was conducted by Walker and Raimondi (2018) and yielded positive results with regard to using TLE
to prepare pre-service teachers to implement general classroom management strategies including, setting expectations, differential reinforcement, and redirection. Statistical analysis of raw scores indicated all participants increased their performance of at least one of the three targeted strategies. Additionally, all participants indicated that they enjoyed the experience, found it to be a valid method to teach classroom management, and would recommend it to friends and colleagues.

**Evidence-based Interventions for Disruptive Classroom Behavior**

General disruptive behavior in the classroom can be a significant barrier to instruction and can present a source of stress and frustration to teachers (Pas, Cash, O’Brennan, Debnam, & Bradshaw, 2015). Disruptive behavior is a general umbrella term and includes behavioral typographies such as calling out, shouting at others, talking to peers without teacher permission, being out of one’s seat without teacher permission, not following instructions or rules, playing with objects not related to academic tasks, touching others, taking things from others, and minor aggression. Because of the wide range of typographies, disruptive behavior may be best defined by the end-result of the behavior, which is distraction of peers and the teacher away from instructional activities (Thomas, Becker, & Armstrong, 1968).

The scope of this current research study is focused on addressing general disruptive behavior within a classroom system; thus, strategies that can be applied to single students as well as entire classrooms will be discussed. A 2017 article by Cooper and Scott urged teacher educators to focus on teaching prospective teachers to use classroom management practices that are the most efficient, effective, meaningful, and sustainable. The authors identified the teaching practices they considered to meet this standard as high probability practices (HPPs). Cooper and Scott (2017) separated HPPs into two broad categories: the teaching environment and
instructional practices. They suggested that HPPs addressing the teaching environment included management of the “physical attributes of the classroom,” such as how the room is arranged, where the teacher is in relation to the students, presence of active supervision, physical comfort (temperature, noise level, visual stimuli), and the routines and expectations of a classroom (Cooper & Scott, 2017, p. 104). The authors indicated that consistency with regard to classroom rules, routines, and expectations was a critical high probability practice. High probability instructional practices highlighted by the authors included direct and explicit instruction, engagement, and feedback. Frequent opportunities to respond (OTRs) were identified as a key HPP instructional practice related to student engagement and learning. Additionally, they described feedback on student performance and behavior, including verbal and gestural feedback, as one of the most efficient and effective HPPs. According to Cooper and Scott (2017), when feedback is positive and focused on behaviors that the teacher wants to see more of, potential improvements in student learning and social behavior with corresponding reductions in problematic behavior are possible.

An earlier study by Simonsen, Fairbanks, Briesch, and Myers (2008) sought to review empirical research on classroom management and identify practices considered evidence-based. They described evidence-based practices as those that had been evaluated using sound research designs, shown to be effective, and used as the independent variable in three or more empirical studies published in peer-reviewed journals. Review of the literature resulted in identification of twenty general evidence-based classroom management practices. Simonsen, et al (2008) categorized the results into five critical areas of classroom management. These included, “(a) maximize structure; (b) post, teach, review, monitor, and reinforce expectations; (c) actively engage students in observable ways; (d) use a continuum of strategies for responding to
appropriate behaviors; and (e) use a continuum of strategies to respond to inappropriate behaviors” (Simonsen et al., 2008, p. 353). The work by Simonsen et al. resulted in a menu of evidence-based practices in classroom management, complete with cited research, that pre-service teachers should be learning in teacher preparation programs prior to graduating and entering their own classrooms. Both of these studies inform the strategies targeted for instruction in the current research project, including setting expectations, differential reinforcement, and redirection.

**Setting Behavioral Expectations**

Establishing behavioral expectations for the general classroom environment and for specific learning scenarios is a general antecedent strategy teachers can use to signal the behaviors they are looking for as well as those that are not acceptable (Madsen, Becker, & Thomas, 1968; Marzano & Marzano, 2003). Not only has setting clear expectations been demonstrated as an effective classroom management component, but it is a simple, easy to learn, high probability management practice (Cooper & Scott, 2017).

**Differential Reinforcement**

Differential reinforcement consists of applying reinforcing contingencies only to wanted behaviors of a certain type while disregarding responses that are unwanted or do not meet predetermined criteria (Cooper, Heron, & Heward, 2007; Vollmer & Iwata, 1992). Setting behavioral expectations used as an antecedent management strategy pairs well with differential reinforcement of appropriate student behaviors that meet those expectations. Four empirical studies on the use of differential reinforcement as an effective evidence-based strategy for managing problematic student behavior were identified in the review conducted by Simonsen, Fairbanks, Briesch, and Meyers (2008). Differential reinforcement provides teachers a means to
reinforce appropriate student behavior while discouraging inappropriate student behavior in a systematic and effective way (Madsen, Becker, & Thomas, 1969; Thomas, Becker, & Armstrong, 1968).

**Chapter Summary**

Theoretical conceptualization of classroom management and strategies aimed at promoting appropriate and discouraging inappropriate student behavior have grown from the traditions of applied behavior analysis (Baer, Wolf, & Risley, 1968; Sidman, 1960; Skinner, 1953) and social cognitive theory (Bandura, 1971; Schunk, 2012). Both seminal theories provide context for the importance of teacher behavior and support the notion that teachers can be taught to change their behavior to positively impact student behavior and engagement. A systematic literature review of the extant research on instructional strategies and technologies used to prepare pre-service teachers to manage classrooms yielded a wide range of techniques and strategies that support some of the instructional components and target classroom management strategies chosen for the current study, particularly the use of simulation technology. Review of evidence-based classroom management strategies led to identification of two general high probability practices classroom teachers should be able to apply to student behavior in the classroom, including setting expectations and differential reinforcement.
Chapter 3

The purpose of this mixed methods study was to examine an instructional program using mixed reality simulation to teach two general classroom behavior management techniques to undergraduate and graduate students enrolled in an introductory course on special education. A mixed method design was used to collect and analyze data on changes in performance of skills, sense of self-efficacy of classroom behavior management, feasibility of program implementation, and social validity of the technology and procedures.

Methodology

This chapter describes the methods used to answer the following research questions:

1. What are the effects of an instructional program delivered within a mixed reality environment on the classroom behavior management skills of pre-service teachers?
   a. How does the behavioral skill set of pre-service teachers change after participating in this intervention?
   b. How feasible is this intervention practice for use in teacher preparation?

2. How prepared do participants feel to implement general behavior management techniques in an actual classroom before and after instruction?

3. What are participants’ perceptions of the validity of this instructional package for use in teacher preparation?

Design

The impact of instruction and practice utilizing mixed reality simulation on participant performance of specific classroom behavior management techniques was examined using an ABA single subject design across participants, quantitative analysis of pre and post-intervention
data, and qualitative data analysis in a mixed-methods, quasi-experimental study design (Johnson & Onwuegbuzie, 2004; Kazdin, 2011; Ong, 2014; Sandelowski, 2014). Time and budgetary limitations precluded the use of a multiple baseline across participants single subject research design; instead skill development across baseline (A), instruction (B), and maintenance (A) sessions was analyzed by graphing raw scores generated using a scoring rubric and displaying the scores in a single subject ABA line graph for each participant. In this way, each participant served as his or her own control. Treatment effects were demonstrated by repetition of results across participants. In order to examine differences between pre and post-instruction measures of teacher self-efficacy, scores on the TSES were analyzed using paired sample t-tests. Single-subject and quantitative data analysis results were triangulated by coding qualitative data for themes and patterns (Saldaña, 2015). This mixed methods design utilized an existing college course as a participant group. For this study, participants experienced a baseline session, an instructional session, and a second baseline or maintenance session with the simulated middle school classroom. Each participant received immediate verbal feedback from his/her peers immediately following his or her instructional simulation experience. Analysis of data collected before and after instruction allowed the researcher to examine changes in student performance of classroom behavior management techniques and student self-efficacy related to teaching and classroom management.

Setting

The setting for this study was the neurocognition science lab at a large state university located in the northeast United States. The lab was used in an earlier pilot study and included sufficient space for conducting TLE mixed reality simulation sessions. The room was carpeted and had tables, chairs, and computers along the perimeter. The large, flat-screen television used
for the simulation was attached to a rolling stand and was positioned in a corner of the room. Participants interacted with the virtual middle school classroom in a space in front of the television approximately five feet by five feet. Their peers were seated behind them.

**Sampling**

This study utilized a convenience sample of undergraduate and graduate students enrolled in a course required for all candidates seeking state teacher certification. The purpose of this course was to prepare teacher candidates to teach in inclusive classrooms and practice evidence-based instruction with students with disabilities. Instruction on positive behavior supports and general classroom management techniques were topics addressed within this course; thus, a focus on general classroom behavior management techniques was appropriate. This course is currently required by the state for all teacher candidates. Unfortunately, it is the only required course many teacher candidates will take that exposes them to concepts related to classroom behavior management.

**Participants**

Participants were a mix of undergraduate and graduate students from a variety of academic programs. Some undergraduate students were completing a minor in Education and others were exploring disciplines outside their major area of study. Graduate students were completing graduate degrees in specific education disciplines. Participants included seven undergraduates and eight graduates and of the fifteen, eight were female. Ages ranged from 20 to 39 years old. Participants included two students from China and three students of African-American background; the remaining participants were Caucasian. None of the participants were actively teaching although several had experience substitute teaching, one already had a placement for the upcoming academic year, and two were completing undergraduate internships.
in education. For the purpose of this study, participants who were substitute teaching on a short-term basis were not considered to be actively teaching. Table 1 provides basic information on the students included in the study sample. Pseudonyms were used to protect the privacy of participants. There were 16 students enrolled in the course; however, one student had previously taken a course at another institution that used TLE to teach classroom management and was not included in the study to avoid confounding data. Fifteen participants were included in the initial sample.
Table 1

*Participant Information*

<table>
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<tr>
<th>Student</th>
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<th>Program of Study</th>
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Human Subjects Consent

The researcher created a YouTube video describing the study and outlining consent procedures. Participants were sent a link to the video by their course instructor and it was also shown during a regularly scheduled class session. The course instructor offered additional opportunities for students to discuss course activities and ask questions. The instructor distributed consent forms to the class along with sealable envelopes. The full consent form is included in Appendix C. Students were asked to either provide or opt out of consent, seal the envelope, and sign their name across the seal. Neither the instructor nor the researcher knew which students provided consent during the course of the study. Students were also informed that they could contact the researcher at any time with questions or concerns about the study and could change their consent status at any time.

Data Collection Procedures

Demographic Data. Regularly scheduled activities in this course included completion of a pre-course survey. This survey gathered basic information from the students, including student status, program of study, teacher certification status, and number of years of teaching experience. The survey also asked questions about the students’ familiarity with specific topics in special education and their experience using classroom technology. These data were used to provide additional background information on the study participants for replication purposes.

Pre- and Post-instruction TSES. Before participants experienced the simulated middle school classroom, they were asked to complete the Teachers’ Sense of Efficacy Scale Long Form (TSES; Tschannen, Hoy, & Hoy, 1998). The TSES, specifically the Efficacy in Classroom Management subscale, provided data on participant perceptions of efficacy and preparedness to
manage difficult behavior in the classroom before and after instruction in classroom behavior management techniques.

**Baseline Simulation.** Prior to instruction on and modeling of specific classroom behavior management skills, participants interacted with the simulated middle school classroom, comprised of five avatar students. Participants were instructed to lead a group discussion with the class on one of five general subject area topics the students in the virtual class could have been studying. The order in which participants entered the simulation was randomly assigned using random.org. Observational data were collected on participants using a 360-degree video-recorder. The researcher used this camera to score each participant’s performance *ex post facto* using the scoring rubric included in Appendix B.

**Instruction and Modeling.** Instruction on and modeling of two general classroom behavior management skills, including: (a) setting expectations and (b) differential reinforcement were provided by the researcher *in vivo* during a regularly scheduled class session. These two skills were chosen based on research supporting their effectiveness, their applicability to classroom behavior, as well as the constraints posed by the simulation technology. For example, the student avatars in the simulated classroom could not leave their seats nor could their physical location within the simulated classroom be changed. It was also difficult to effectively implement several commonly used behavior management techniques such as proximity control and subtle body language due to constraints inherent with the technology. One instructional session, including lecture, modeling, and practice, was conducted with the participants. Appendix A includes definitions and task analyses for each technique. Students had the opportunity to ask questions during instruction. They were provided with written definitions and task analyses to support instruction, which they were allowed to use as a reference when
engaging with the simulation. The researcher provided explanations of what she was demonstrating and modeled both strategies. Instruction and modeling were based on the definitions and task analyses of targeted techniques included in Appendix A.

Following instruction and modeling, students practiced the targeted skills with the simulated classroom. Participants had two opportunities to practice these skills for three minutes each during one class session. During the practice session, participants were instructed to lead a group discussion with the class on one of five general topics while they practiced their assigned strategies. Participants were randomly assigned numbers using the website, random.org and then randomly assigned to one of four groups. The numbers represented the order in which they would take turns engaging with the virtual students. Participants randomly assigned odd numbers were asked to focus on setting expectations and those assigned even numbers focused on differential reinforcement. The purpose of the groups was to designate peers to score each participant’s performance and to provide feedback following the simulation session. Group members observed their peer as he or she practiced the strategies, scored his or her performance using the rubric, and then went into a smaller, private room to give feedback. Table 2 includes information on the order of the participants, group assignments, and their designated target behavior management skill. The rubric that was used to score and give feedback to peers is included in Appendix B. Video data were recorded and analyzed for each consenting participant. The scored rubrics from peer feedback were also collected and used for analysis.
Table 2

*Participant Groups and Assigned Target Skills*

<table>
<thead>
<tr>
<th>Student</th>
<th>Practice Order</th>
<th>Group</th>
<th>Assigned Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy</td>
<td>1</td>
<td>Group 1</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>John</td>
<td>2</td>
<td>Group 2</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Anne</td>
<td>3</td>
<td>Group 3</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>James</td>
<td>4</td>
<td>Group 4</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Rose</td>
<td>5</td>
<td>Group 1</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>David</td>
<td>6</td>
<td>Group 2</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Hillary</td>
<td>7</td>
<td>Group 3</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>Mary</td>
<td>8</td>
<td>Group 1</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Tracy</td>
<td>9</td>
<td>Group 2</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>Sara</td>
<td>10</td>
<td>Group 3</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Andy</td>
<td>11</td>
<td>Group 4</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>Kevin</td>
<td>12</td>
<td>Group 1</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Melissa</td>
<td>13</td>
<td>Group 2</td>
<td>Setting Expectations</td>
</tr>
<tr>
<td>Michael</td>
<td>14</td>
<td>Group 3</td>
<td>Differential Reinforcement</td>
</tr>
<tr>
<td>Adam</td>
<td>15</td>
<td>Group 4</td>
<td>Setting Expectations</td>
</tr>
</tbody>
</table>

**Maintenance Simulation.** The last simulation served as a second baseline, or maintenance session, for the purpose of allowing participants to demonstrate maintenance of the two classroom behavior management skills focused on during instruction, modeling, and practice. Video data were collected during this last simulation activity for the purpose of scoring each participant’s interactions with the simulation using the scoring rubric in Appendix B.
Following the last simulation session, participants had the opportunity to review the simulation activities and ask questions as necessary. They were also asked to complete the post-instruction TSES as well as the social validity questionnaire.

**Scoring Rubric Development**

The rubric used to score student performance of setting expectations and differential reinforcement for all phases of the study was developed over several iterations. The pilot study of this research project used a similar rubric; however, three strategies were included and there were fewer discrete steps per strategy. Feedback from the pilot research was incorporated into revisions for the second study. Additionally, the researcher returned to scholarly literature and textbook definitions to clarify discrete steps in the task analysis for each strategy: setting expectations (Cooper & Scott, 2017; Emmer & Stough, 2001; Madsen, Becker, & Thomas, 1968; Marzano & Marzano, 2003; Simonsen, Fairbanks, Briesch, & Meyers, 2008) and differential reinforcement (Cipani & Schock, 2011; Cooper, Heron, & Heward, 2007; Madsen, Becker, & Thomas, 1968; Thomas, Becker, & Armstrong, 1968). Prior to finalizing the scoring rubric, the researcher requested feedback from subject experts. A subject matter expert and long-time special education faculty member reviewed the section for setting expectations and a colleague and scholar trained in applied behavior analysis reviewed the section for differential reinforcement. Comments and suggestions were considered and revisions were made before implementing the scoring rubric.

**Statistical Analysis**

The limited number of participants in this study necessitated the use of non-parametric methods of data analysis for looking at differences in TSES scores for each participant. For a sample size of 15, an assumption of normal distribution would not be accurate. This study used
a method called Bootstrapping, which estimates “statistical parameters from the sample by means of resampling with replacement” (Ong, 2014, p. 2). Bootstrapping assumes the sample being analyzed is a suitable representation of the population and resamples using a sample size with enough power to detect changes otherwise obscured by a smaller sample; thus, over-significance and under-significance are mitigated. To analyze differences in means between pre and post-instruction rubric scores and TSES results, paired samples t tests using 100 Bootstrap samples were used. Summary data were reported to describe changes in participant performance of classroom behavior management skills.

Summary of Methods

This quasi-experimental study utilized a mixed-methods research design combining single subject data analysis of raw rubric scores from baseline, instruction, and maintenance sessions. Participants’ ability to demonstrate specific classroom behavior management skills, including: (a) setting expectations and (b) differential reinforcement was analyzed by video-recording each interaction and using a rubric to score participants’ performance ex post facto. Additionally, pre- and post-instruction measures of self-efficacy using the TSES were compared for changes in participants’ perceived ability to manage classroom behavior. Non-electronic materials used to conduct this study included: (a) TLE equipment (large flat-screen television, stand, webcam with microphone, and laptop computer), (b) written definitions and task analyses provided to the participants to support instruction, (c) scoring rubrics, (d) 360-degree video camera with tripod, and (e) hard-copies of the social validity questions.
Dependent Variables

The dependent variables measured for change in this study were related to each participant’s ability to perform two classroom behavior management skills during a simulated classroom experience as well as self-efficacy related to his or her ability to manage behavior in the classroom following instruction on the targeted skills. Single subject data were collected and graphed for each participant using raw scores on the rubric, which was scored each time a participant engaged with the simulation. Measures of self-efficacy were collected using an electronic version of the TSES administered before and after instruction. Qualitative data on social validity were collected during the study using course-assigned journal entries and following the last simulation session using a hard-copy questionnaire administered by the researcher.

Targeted Skills. The general behavior management skills targeted for instruction included: (a) setting expectations and (b) differential reinforcement of alternative behavior. These skills are defined and described in Appendix A. Performance of these skills during virtual classroom simulations was scored each time a participant interacted with the simulation using the rubric in Appendix B during baseline and follow-up sessions as well as the instruction simulation session.

TSES. The Teachers’ Sense of Efficacy Scale (Long Form; TSES; Tschannen, Hoy, & Hoy, 1998) was administered before and after instruction on targeted classroom management skills. The TSES was developed by Tschannen, Hoy, and Hoy (1998) to measure teacher and teacher candidate self-perception of ability in three broad domains: Efficacy in Student Engagement, Efficacy in Instructional Practices, and Efficacy in Classroom Management. The
TSES was scored using the directions provided by the developers. Full scale means and Efficacy in Classroom Management subscale means were analyzed for statistical significance.

Social Validity

The social validity of the instructional package, or “the extent to which interventions are considered appropriate, effective, and fair” is important considering the applied nature of research conducted within a college classroom (Finn & Sladeczek, 2001, p. 176; Wolf, 1978). The social validity of instructional procedures was assessed at the conclusion of the study by asking participants to provide written responses to the following questions:

1. What role does behavior management play in your work as a teacher or instructor currently or in the future?
2. How do you think most teachers learn classroom behavior management techniques?
3. What did you think about using this TeachLivE™ package to learn classroom behavior management techniques?
4. Would you recommend this type of training procedure to friends or colleagues? Why or Why not?

Reliability

The researcher scored all simulation sessions ex post facto by analyzing the videos collected using the 360-degree video recorder. Reliability of scoring was assessed by having a second, independent rater score 33% of all participant videos using the rubric. The TSES pre and post-instruction measures were administered electronically using Google Forms; therefore, hand scoring was not necessary and calculations were completed automatically using Google Sheets.
Independent Variable

The independent variable in this investigation was instruction on two general classroom behavior management skills using didactic instruction, modeling, and immediate peer feedback. Peer feedback has been used effectively to develop skill repertoires in pre-service teachers as part of teacher preparation programs (Wilkins, Shin, & Ainsworth, 2009). Individuals received immediate written and oral feedback from their peers following each interaction with the simulated classroom during the instruction and practice session.

During the participants’ first simulation experience, which served as a baseline phase, no instruction or feedback was provided. Participants were simply instructed to lead a group discussion with the virtual class. The second simulation session included instruction on both general classroom behavior management skills along with in vivo modeling by the researcher. Following instruction and modeling, participants were instructed to lead a group discussion for approximately three minutes with the virtual class on one of five previously outlined general subject area topics. Participants were assigned one of the two general strategies to focus on during their interactions. The last, and final, simulation session served as a second baseline, or follow-up session, to examine whether performance of the classroom management strategies maintained several weeks following the instruction session.

Chapter Summary

In this chapter, the procedures for this mixed-methods study were outlined along with descriptions of the dependent and independent variables. This chapter also includes information on how the variables were measured and how data on reliability were collected. The next chapter provides specific descriptions of how the data were analyzed, presents the results of the
study, and includes a summary of the data gathered from course journal entries and open-ended social validity questions answered by the participants.
Chapter 4

Results

This chapter reports the results of participant performance of two general classroom behavior management strategies before and after instruction, modeling, and peer feedback. Results from single subject data analysis provide an answer for part one of the first research question: What are the effects of an instructional program delivered within a mixed reality environment on the classroom behavior management skills of pre-service teachers? Specifically, How does the behavioral skill set of pre-service teachers change after participating? Results include reported inter-observer reliability. A cost analysis of the mixed reality technology in terms of time and money will be reported to address part two of the first research question: How feasible is this intervention practice for use in teacher preparation? Quantitative data analysis of TSES full scale scores and Behavior Management subscale scores before and after instruction address the second research question: How prepared do participants feel to implement general behavior management techniques in an actual classroom before and after instruction? Finally, the results of a social validity questionnaire are presented to answer the third research question: What are participants’ perceptions of the validity of this instructional package for use in teacher preparation?

Summary of Findings

The first research question examined in this study was: What are the effects of an instructional program delivered within a mixed reality environment on the classroom behavior management skills of pre-service teachers? Part one of this question focused specifically on how the behavioral skill set of pre-service teachers changed after participating in this intervention? The graphs presented in Figures 1 through 13 include results for each participant indicating performance of the classroom behavior management strategies across baseline, intervention, and
maintenance phases. Participants were assigned to focus on one of two strategies during the intervention phase; thus, only data on one strategy were collected and graphed for each participant for that phase. Data on both strategies were reported for baseline and maintenance phases. Only participants present for the duration of class across all three phases could be included in this analysis; thus, data for two participants were not included in these results. James left the intervention session early due to illness; which did not allow for enough data points to be collected nor did he benefit from watching his peers engage in the simulation. Kevin dropped the class prior to the maintenance session and was withdrawn from participating in the study. As the data demonstrate, the remaining thirteen participants increased their performance of general classroom behavior management skills, including setting expectations and differential reinforcement. Additionally, four of the thirteen participants, Michael, Andy, Hillary, and David performed more steps in a skill during maintenance other than the one assigned to them during the targeted practice session. While it was not surprising that participants performed skills following instruction on those skills, it is worth highlighting that they were also able to perform components of skills not practiced during the simulation session. Only two participants failed to demonstrate both skills during maintenance. Neither Melissa nor Rose performed any steps of differential reinforcement; however, Rose improved her performance of setting expectations during the maintenance phase. An experimental effect is demonstrated across all thirteen participants, with only three scoring above zero during baseline. Participants were able to perform their assigned strategies during intervention as well as maintenance; however, most participants demonstrated fewer steps of their assigned strategy during the last phase.
Figure 1

*Tracy*

![Graph showing the steps completed in strategy per attempt for Tracy across baseline, treatment, and maintenance phases.]

**Tracy - Setting Expectations**

- Baseline
- Treatment
- Maintenance

Steps Completed in Strategy Per Attempt

<table>
<thead>
<tr>
<th>Attempts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

- Differential Reinforcement
- Setting Expectations

Figure 2

*Michael*

![Graph showing the steps completed in strategy per attempt for Michael across baseline, treatment, and maintenance phases.]

**Michael - Differential Reinforcement**

- Baseline
- Treatment
- Maintenance

Steps Completed in Strategy Per Attempt

<table>
<thead>
<tr>
<th>Attempts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
</tbody>
</table>

- Setting Expectations
- Differential Reinforcement
Figure 3

*Adam*

![Graph showing Adam's behavior across different phases: Baseline, Treatment, and Maintenance. The x-axis represents attempts, and the y-axis represents steps completed in strategy per attempt. The graph shows a significant increase in steps completed during the Treatment phase.]

Figure 4

*Melissa*

![Graph showing Melissa's behavior across different phases: Baseline, Treatment, and Maintenance. The x-axis represents attempts, and the y-axis represents steps completed in strategy per attempt. The graph shows a significant increase in steps completed during the Treatment phase.]

- Differential Reinforcement
- Setting Expectations
Figure 5

*Rose*

Rose - Setting Expectations

<table>
<thead>
<tr>
<th>Attempts</th>
<th>Steps Completed in Strategy Per Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6</td>
<td>Baseline</td>
</tr>
<tr>
<td>7-9</td>
<td>Treatment</td>
</tr>
<tr>
<td>10-12</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

- Differential Reinforcement
- Setting Expectations

Figure 6

*Andy*

Andy - Setting Expectations

<table>
<thead>
<tr>
<th>Attempts</th>
<th>Steps Completed in Strategy Per Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6</td>
<td>Baseline</td>
</tr>
<tr>
<td>7-9</td>
<td>Treatment</td>
</tr>
<tr>
<td>10-12</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

- Differential Reinforcement
- Setting Expectations
Figure 7

Hillary

![Hillary - Setting Expectations](image)

Figure 8

Anne

![Anne - Setting Expectations](image)
Figure 9

*Sara*

![Sara - Differential Reinforcement](image)

Figure 10

*John*

![John - Differential Reinforcement](image)
Figure 11

David

![David - Differential Reinforcement](image1)

Figure 12

Mary

![Mary - Differential Reinforcement](image2)
Data on reliability, or a measure of consistency of results from a given assessment, were calculated for each phase of the study (Warner, 2008). Interobserver agreement (IOA), a commonly used measure of data reliability that compares reported observation values between two independent observers, was assessed by having a second independent observer score a randomly selected 33% of baseline, instruction, and maintenance session videos (Cooper, Heron, & Heward, 2007). The second observer was a full-time Board Certified Behavior Analyst and a former special education classroom teacher. This observer was chosen based on her knowledge of classroom behavior management strategies and formal training on principles of applied behavior analysis. The second observer was blind to study procedures and was not informed of the specific research questions being addressed or any hypotheses made by the research team. Training the second observer consisted of jointly scoring several participant trials, comparing
scores, and discussing disagreements until agreement reached 90% or higher for two consecutive trials.

A modified trial-by-trial IOA was calculated as a percentage of agreement by dividing the number of trial agreements by the total number of disagreements plus agreements (Cooper, Heron, & Heward, 2007). For the purpose of this study, a trial represented an attempt comprised of six discrete steps (see scoring rubric in Appendix B). The number of steps completed during a trial yielded a raw score for that attempt. Because setting expectations had a clear onset and offset, took longer to complete, and was generally demonstrated early in the simulation, participants did not have as many opportunities to attempt this skill. On the other hand, differential reinforcement could happen multiple times throughout the simulation without clear onset and offset. Because of this, one minute intervals were used to delineate trials for differential reinforcement. For example, if a participant engaged with the simulation for three minutes, she would have three, one minute opportunities to demonstrate differential reinforcement. During baseline and intervention sessions, participants had two opportunities to enter the simulated classroom. This yielded a total of 30 video clips for baseline and 29 for intervention (James left halfway during the intervention session and only experienced the simulation one time). Participants only had one opportunity to enter the middle school classroom simulation during maintenance; thus, a total of thirteen video clips were analyzed with five randomly selected for maintenance phase IOA. IOA for ten of the thirty baseline scores was 97.4%. Calculated agreement was 96.7% for the intervention phase and 91.7% for maintenance. IOA for all phases was higher than 80%, which is generally accepted as a minimum threshold for observer agreement (Kazdin, 2011).
The second part of the first research question asked: How feasible is this intervention for use in teacher preparation? To answer this question, it was necessary to look at the cost of the instructional program in terms of budget expenditures, dedicated personnel time, class time, and opportunity costs associated with personnel commitments, student and course instructor time, and facilities utilization. For the purpose of this study, estimated start up costs were not included in the data analysis; however, they will be reported as background information. Table 3 includes a descriptive analysis of the costs associated with this project.

Table 3

<table>
<thead>
<tr>
<th>Component</th>
<th>Expense</th>
<th>Time</th>
<th>Opportunity Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment(^a)</td>
<td>0</td>
<td>9 hours</td>
<td>0</td>
</tr>
<tr>
<td>Technology(^b)</td>
<td>$1,150.00</td>
<td>8 hours</td>
<td>0</td>
</tr>
<tr>
<td>Facilities</td>
<td>0</td>
<td>15 hours</td>
<td>Others were not able to use the lab during sessions</td>
</tr>
<tr>
<td>Researcher</td>
<td>0</td>
<td>10 hours</td>
<td>Preparation, planning, and set up for sessions was time consuming</td>
</tr>
<tr>
<td>Course Instructor</td>
<td>0</td>
<td>5 hours</td>
<td>Additional meetings and course planning time could have been used for other tasks</td>
</tr>
<tr>
<td>Students</td>
<td>0</td>
<td>1 hour (outside of class)</td>
<td>Time could have been used to complete other tasks for this course</td>
</tr>
<tr>
<td>Class Time</td>
<td>0</td>
<td>8 hours</td>
<td>Coverage of additional course topics</td>
</tr>
<tr>
<td>IT Personnel</td>
<td>0</td>
<td>1 hour</td>
<td>Time devoted to this project could have been used for something else</td>
</tr>
</tbody>
</table>

\(^a\)Equipment for mobile unit was purchased prior to study. Approximate value of equipment was $1,550.00.\(^b\)Initial start up costs were realized prior to study and were not included in the table. Approximate start up costs for an institution sharing a license for this technology with four other entities was approximately $8,500.00 (S. Raimondi, personal communication, July 13, 2017).
A college or university program already using TLE would have previously incurred the cost of equipment (approximately $1,550) and initial start up costs associated with obtaining an initial contract (roughly $8,500 per institution if a hypothetical consortium of five organizations purchased one license). Beyond start up inputs, the costs for implementing this type of instruction in a course would vary based on the number of students in the class, which would impact the amount of time needed in the simulation. According to research by Straub, Dieker, Hines, and Hughes (2014), participants need roughly ten minutes in the simulation across four sessions to learn and maintain skills taught within the virtual classroom environment. Ideally, the research participants in the current study would have had a similar amount of time in the simulation; however, given the number of students in the class, time constraints, and other course objectives, this was not possible.

In this research project, fifteen students participated in simulation activities during each of three sessions. The first two sessions were three hours long and the last one was two hours. Participants received the same amount of time, approximately six minutes total, in simulation for both baseline and intervention and three minutes in the following maintenance phase. The three hour sessions cost a total of $425 ($300 for the first two hours and $125 for an additional hour), whereas, the two hour session was $300. Therefore, the total cost of purchasing eight hours of TLE time resulted in an expenditure of $76.67 dollars per participating student.

Inputs associated with personnel devoted to running an instructional package using TLE technology was considerable. Even if the time contributions of the researcher were not included, an additional five hours of course instructor time was required for planning and organizing instruction. Additionally, students were asked to devote slightly more preparation time outside of class to the activities related to this project and a university IT person was on call for at least the
first half hour of each session. The real money spent plus the value of the time inputs leads to
discussion of cost versus benefit for this instructional package.

Borrowing from economic theory, a cost benefit analysis serves the purpose of providing
a consistent procedure for evaluating a decision (Drèze & Stern, 1987). Because the potential
realized benefit of an instructional package is “learning,” a construct arguably difficult to
quantify, a true cost-benefit analysis related to study outcomes is not possible. On the other
hand, it was possible to calculate fixed costs as well as descriptive opportunity costs to develop a
more accurate view of all the inputs associated with this instructional program. According to the
Oxford English Dictionary, opportunity costs are defined as the costs associated with making one
choice in favor of another choice (“opportunity cost”, 2017). In this study, use of the simulated
classroom as an instructional tool was chosen over alternative means for teaching the same
material and in-depth coverage of classroom behavior management strategies was prioritized
over other important topics. Opportunity costs in terms of time and facilities are listed in the last
column of Table 3.

The opportunity costs assumed by the researcher are not relevant for the purpose of
deciding whether to use this instructional program in teacher preparation; however, the
opportunity costs associated with the facilities, the instructional time used during class sessions,
the time devoted by the course instructor, and support by university IT personnel must be taken
into consideration. As alluded to previously, this course is potentially the only formal instruction
some future teachers will receive in special education; thus, the pressure to cover all possible
domains of special education is great. This project devoted nine hours of instructional time to
classroom behavior management strategies at the exclusion of other relevant topics. Similarly,
the course instructor, IT personnel, and students could have used the time devoted to TLE to
other projects and topics and the physical space of the lab could have been utilized by other researchers. These tradeoffs illustrate the concept of opportunity costs and how they relate to and must be factored into answering questions about program feasibility.

To summarize the descriptive cost analysis, this type of instructional program took a minimum initial startup investment of $10,050. Beyond startup costs, the price for using the virtual classroom environment was $1,150 for eight hours, resulting in a cost of $76.67 per participant. In addition to realized monetary expenses, the time spent preparing for, setting up, and implementing the instruction led to “costs” for the course instructor, students, and other university personnel. Additionally, the opportunity cost of covering more course material was a significant trade-off.

In looking at the impact of targeted instruction on classroom behavior management using a simulated classroom, there were increases in all participants’ performance of their assigned technique, with eleven of the thirteen participants demonstrating steps for both strategies. In order to answer the second part of the first research question regarding the feasibility of using this instructional package in teacher education, careful consideration of all costs was critical. For smaller colleges and universities, the financial burden of startup costs for the technology alone could preclude the use of it in teacher preparation. Other programs might not have the personnel time to devote to implementation and still more programs might not see the instructional benefits and opportunity costs as outweighing the financial inputs and time commitments. In the end, answering the question of feasibility remains the responsibility of stakeholders with decision-making power in teacher preparation programs. The results of this study demonstrate that benefits in performance of general classroom behavior management strategies can be realized, at least in the short-term; however, these gains come with obvious, as well as hidden costs.
The second research question asked: How prepared do participants feel to implement general behavior management techniques in an actual classroom before and after instruction? Comparison of TSES scores collected before instruction and again after instruction was used to address this question. The researchers analyzed pre and post-instruction scores for the full scale TSES as well as the Effective Classroom Behavior Management subscale. Data analysis results suggested there were not statistically significant differences between total score averages and subscale averages from pre-instruction to post-instruction. Again, bootstrapping was applied and results are based on 100 bootstrap samples. Even after controlling for gender and student status, whether a student was an undergraduate or graduate, there was no statistical significance in pre and post-test means.

While a definitive answer to the second research question was difficult to obtain through the procedures used in this study, some conclusions can be drawn. First, it is unlikely that one instructional session on a topic as complicated as classroom behavior management would increase an individual’s sense of self-efficacy on a detectable level. Additionally, there may have been a mismatch between the instrument used to assess self-efficacy in behavior management and the procedures used to teach these techniques. Regardless, the second question was at least partially answered by the results that indicated participants felt no more prepared to implement general behavior management techniques after instruction than they did before instruction, at least as measured using the TSES. Research question two will be addressed in more depth in the next chapter.

The last research question addressed the social validity of instructional procedures and asked: What are participants’ perceptions of the validity of this instructional package for use in
A social validity questionnaire was administered to the participants by the researcher following the final TLE data collection session.

The questionnaire consisted of the following questions:

1. What role does behavior management play in your work as a teacher or instructor currently or in the future?
2. How do you think most teachers learn classroom behavior management techniques?
3. What did you think about using this TeachLivE™ package to learn classroom behavior management techniques?
4. Would you recommend this type of training procedure to friends or colleagues? Why or Why not?

Fourteen participants returned the social validity questionnaire. All fourteen had participated in three sessions of TLE; thus, a summary of results from all questionnaires will be presented. The first question asked: What role does behavior management play in your work as a teacher or instructor currently or in the future? In their answers to this question, all respondents indicated that the role classroom behavior management plays in their work as a current or future teacher is: “major,” “very important,” “large,” “huge,” or “crucial.” Most of the participants also described the connection between student behavior and an effective learning environment. To illustrate, one individual’s answer to Question 1 was, “[behavior management is] extremely important to ensure that any learning environment is safe and conducive for all student learning.” Another participant stated, “it leads to performance and affects students’ academic learning.” Several others also described the impact of poor classroom management, stating, “a mismanaged class can make it difficult to learn” and “bad behaviors might disrupt the
whole class.” Overall, responses to the first question suggested that participants were aware of the critical role classroom behavior management plays in teaching.

Social Validity Question 2 asked: How do you think most teachers learn classroom behavior management techniques? The most common answer to this question fell in the category of “on the job” training. One participant indicated teachers learn behavior management “by being put into real life classrooms.” Another participant stated, “I think teachers learn with trial and error.” The next two most popular answers were “by observation of other teachers,” such as during student teaching and through “professional training.” Four of the fourteen respondents included coursework and training in their answers to this question. These answers were different from the responses collected during the pilot study. Not one of the pilot participants suggested that teachers learn classroom management through coursework and teacher training. Two students included online resources as a means for learning classroom behavior management techniques and two more suggested that individuals may recall how their previous classroom teachers managed the classroom. Although several respondents did include academic coursework and training as a source for knowledge of classroom behavior management, it is telling that the majority of participants described on the job experience as the primary learning mechanism. Essentially, what these individuals indicated was future teachers do not learn about classroom behavior management until they are in real classrooms working with real students.

The third social validity question touched on the participants’ experiences during instruction using mixed reality simulation. Question 3 stated: What did you think about using this TeachLive™ package to learn classroom behavior management techniques? With the exception of one, participants gave overwhelmingly positive responses, although some included
constructive criticism as well. Individuals answered that they found the experience to be positive and thought the technology was: “really helpful,” “a good opportunity,” “a chance to practice the skills we’ve learned in the classroom,” “a positive experience,” “effective,” or “authentic.” One participant wrote, “it gives a vivid picture of what various behavior students have” and another indicated, “It’s a pretty valid depiction of students in a real classroom setting.” Critiques included indications that several participants thought the technology was “unrealistic” or “limited” and the “small class size can not replicate real life class scenarios.” One student wrote, “It doesn’t always feel like there is a connection between TeachLivE and real world classrooms” and yet another said he thought it was, “Terrible. I don’t think this is an effective way of teaching classroom behavior management techniques.” On the other hand, thirteen out of fourteen respondents supplied answers suggesting that TLE was an effective way for future teachers to experience classrooms and difficult behavior before going into real-life classrooms. The fourteenth student wrote that he “thought it wasn’t an adequate representation of a classroom.”

The last question asked: Would you recommend this type of training procedure to friends or colleagues? Why or Why not? Eleven out of fourteen respondents indicated they would recommend this training to friends and colleagues. One participant stated that TLE “prepares future teachers in advance before going to teach in real life situations” while another suggested it was “low stress and you can experiment and gain confidence.” One student recommended that this be used in an Applied Behavior Analysis course; however, her other answers were positive so this may simply represent an idea for another way to use the technology. Another participant stated, “It depends. For someone who has no experience in a classroom it can be a good starting point, but for those who have live experience I don’t believe it gives much valid experience.” The fourteenth student wrote that he would not recommend this type of training, did not find it to
be effective, and “there were a lot of limitations.” This was the same participant who indicated he thought TLE was “terrible.”

To summarize, all participants indicated that classroom behavior management plays a critical role in working as a teacher. Despite overwhelming agreement that classroom behavior management plays an important role in teaching, most participants suggested teachers learned these techniques while on the job working with actual students. These responses indicate that targeted instruction on classroom behavior management strategies is an area of need and a socially valid focus for teacher preparation programs. Additionally, participants enjoyed the technology and found the opportunity to practice in an immersive and risk-free environment beneficial. Participants overwhelmingly indicated they would recommend this type of instruction to friends and colleagues.

**Chapter Summary**

This study investigated the impact, feasibility, and social validity of teaching general classroom behavior management strategies to future teachers using mixed reality simulation. The data presented in this chapter were used to evaluate this instructional methodology with regard to benefits as well as costs and to determine the social validity of preparing future teachers to implement behavior management strategies using the TLE/Mursion technology. Results suggested that while there may not have been changes in perceived self-efficacy around classroom behavior management, there were demonstrated increases in skill performance and participants indicated this type of instruction was important before working in actual classrooms. Despite the benefits demonstrated with these participants, there are also costs for teacher preparation programs to consider. For some college and university programs, benefits may outweigh the costs associated with implementation while other programs may see the financial
and personnel costs as significant barriers. Chapter Five focuses on the implications of these findings, limitations of the study, and potential ways to address weaknesses and obtain more accurate results in future studies.
Chapter 5

Discussion

Chapter Five reiterates the purpose of this study, reviews the research questions with corresponding results, and presents limitations, which impact the generalizability of results. This chapter also highlights the gap in research on teaching classroom management skills to preservice teachers as well as the feasibility of integrating mixed reality simulations into preparation programs. Implications for teacher education and directions for future research will be discussed.

Purpose

The purpose of this mixed method study was to explore the impact and feasibility of an instructional program on classroom management using mixed reality simulation implemented with pre-service teachers in an introductory special education course required for all teacher candidates. Because technologies like mixed and virtual reality may be associated with significant costs in terms of money and time, it was critical to look at not only the benefits of this modality of instruction, but also examine whether the benefits potentially justify the implementation costs for teacher education programs. Additionally, it was critical to look at the social validity of the instructional package to determine whether participants felt that this type of instruction met a critical need and was valuable to them as future teachers. To this end, a mixed method study design incorporating single subject components, statistical analysis of pre and post-instruction measures, and qualitative data analysis was used to answer the research questions.
Review of Literature

Scholars and researchers have documented the importance of preparing teacher candidates for managing behavior in the classroom as well as the pervasive lack of explicit classroom management instruction that is logically and coherently tied to clinical experiences in actual classrooms (Baker, 2005; Freeman, Simonsen, Briere, & MacSuga-Gage, 2014; Greenberg, Putnam, & Walsh, 2014; Landau, 2001; Marzano & Marzano, 2003; Pankowski & Walker, 2016; Siebert, 2005; Stough, 2006; Wang, Haertel, & Walbert, 1993). The gap in scholarly literature is not related to clarification of the need or further elucidation of the problem, but rather the identification of efficient and effective methods of pre-service teacher preparation in classroom management. As demonstrated by the results of a brief, but systematic literature review, very little empirical research has been done on how to prepare pre-service teachers to implement specific classroom behavior management strategies with students. The bulk of the extant research found through this search explored the use of various types of simulations, from low tech role-playing simulations to high-tech, computer-based simulations. The rest of the research studies found through this search covered a variety of instructional methodologies, including the use of scripted responses to disruptive behavior, clinical experiences, professional development, feedback and reflection, and video/multimedia to teach pre-service teachers how to implement effective classroom management strategies.

With regard to specific classroom management strategies, there is a large body of research supporting the use of a range of techniques to address disruptive behavior in the classroom. Simonsen, Fairbanks, Briesch, and Myers (2008) identified numerous evidence-based classroom management practices through a systematic search of empirical research. The two general classroom management strategies chosen for instruction in the current study
combined components identified by Simonsen et al. (2008) and included setting expectations and differential reinforcement.

Research Questions and Conclusions

Question one asked: What are the effects of an instructional program delivered within a mixed reality environment on the classroom behavior management skills of pre-service teachers? This line of inquiry was probed further by separating the investigation of the impact of instruction on the participants from discussion of the practical elements of implementing this kind of program. Two subquestions queried: (a) How does the behavioral skill set of pre-service teachers change after participating in this intervention? and (b) How feasible is this intervention practice for use in teacher preparation?

The results of this study demonstrate that when an instructional package utilizing mixed reality was implemented in a teacher education course, thirteen out of thirteen participants increased their performance of general classroom behavior management skills, including setting expectations and differential reinforcement. Participants were assigned one of two strategies to practice implementing with the TLE virtual middle school classroom; however, they had several opportunities to observe their peers implementing different strategies and then giving their peers feedback. For this reason, it was also worth noting that eleven of the thirteen participants increased their use of strategies not assigned to them. This indicates there was an impact on performance through observational learning and the practice of giving feedback to their peers.

The second sub question addressed the feasibility of this instructional program for use in teacher education programs. Due to the potential cost in money and time for teacher preparation programs to utilize this type of technology, examination of cost versus benefit is important. For the college of education involved in this study, an initial start up investment of $10,050 was
required. This covered other projects and instructional programs not related to the current study and was funded by several grants won by a consortium of Colleges and Universities as well as a grant won by the faculty advisor overseeing this particular study.

The cost in terms of money for this study included the price for using the virtual classroom environment, which was $1,150 for eight hours, resulting in a cost of $76.67 per participant. The time spent implementing the program is also worth noting. Even without taking into consideration the time required by the researcher to design, plan, and implement the study, other opportunity costs related to personnel time were not insignificant. Beyond the typical time required for an instructor to prepare for a course, the participating instructor lent an additional five hours to this project to help with preparation, set-up, and implementation. Additionally, IT personnel were available before each session to ensure technology ran as planned, meaning they were not available to assist with other needs in the department.

Another important opportunity cost worth noting was the trade-off in content which was necessary to cover classroom management in-depth at the expense of covering other important topics. Given that this class was the only required course for future general education teachers that addressed topics of inclusion and teaching children with exceptionalities, this may have been the most significant cost associated with this research project. Based on the expertise of cited scholars in the field of teacher preparation and classroom management, arguments could be made to support this trade-off; however, proponents of thorough preparation of teachers in classroom management would likely suggest that an entire course covering classroom management should be required for all teacher candidates. Ultimately, this instructional package is likely not feasible for some programs, but is for others depending on availability of financial and personnel resources. A stand-alone course on evidence-based and practice-based classroom management
incorporating a variety of hands-on instructional methods, including simulation, is potentially the most impactful solution.

Research question two asked: How prepared do participants feel to implement general behavior management techniques in an actual classroom before and after instruction? A comparison of pre- and post-instruction results on the TSES was used to attempt to answer this question. While results indicated there was not a statistically significant difference in total score means or Effective Classroom Behavior Management subscale score means, several conclusions can still be drawn. First, this study only included a single practice session using specific classroom behavior management strategies and opportunities to receive peer feedback. Logically, one class meeting is not enough to promote the development of confidence and self-efficacy in implementing classroom management. Second, although some participants had experience working with children or substitute teaching and were completing requirements to obtain initial certification and licensure, no participants were actively teaching in a classroom. It would be naïve to suggest that experiencing a simulated classroom for such a brief period of time could precipitate changes in a domain as deep and complex as teacher self-efficacy. As suggested by Gimbert (2008), self-efficacy regarding the ability to manage classrooms and impact student outcomes does not come overnight, but rather with real-life opportunities to practice strategies, receive feedback, and take time to reflect on practices that work and those that are not as effective.

The final research question asked: What are the participants’ perceptions of the validity of this instructional package for use in teacher preparations? This question attempted to address the social validity of the focus of this instructional program as well as the experience of participants as they engaged in the learning activities. All participants who completed the social
validity questionnaire indicated that classroom management is critical for teachers and plays a significant role in effective instruction; thus, participants indicated a high level of social validity for instruction on classroom management strategies. Subsequently, participants reported believing most teachers learn classroom management strategies “on the job.” Only four participants mentioned coursework or other learning opportunities outside of actual classrooms. Finally, all participants, except one, noted that they enjoyed the experience and stated they would recommend the instructional package to friends and colleagues.

**Observations**

As noted in Chapter 4, all participants had limited experience teaching in actual classrooms. Watching the participants interact with mixed reality student avatars provided an opportunity to observe interesting anecdotal responses to the virtual students. First, direct observations of the participants as they interacted with the student avatars indicated a level of anxiety and apprehension. Students were overheard talking about being nervous, being intimidated, and being afraid of certain avatars. It could be hypothesized that their feelings toward the avatars were reflective of typical pre-service teachers’ lack of experience with real students as well as the high level of ‘presence’ inherent in this type of simulation technology (Walker & Raimondi, 2016). Participants were overheard discussing specific avatars and how they might react during simulation sessions. In some instances, it was clear that participants were not prepared for some of the highly personal disruptive behaviors demonstrated by the student avatars, such as talking about breaking up with a boyfriend, commenting on clothing, arguing, being disrespectful, or discussing current events. These unexpected experiences should be considered quite valuable, as student teachers may not have opportunities to reflect on how they would manage these types of behaviors in a real classroom setting.
With regard to teaching the two general classroom management strategies, it was clear based on participant performance and maintenance data that one instructional session with opportunities to practice and receive peer feedback was not enough to develop new and durable classroom management skills. The student avatars were highly effective at getting participants off topic. Several participants commented on not even being able to get to the content they had prepared ahead of time for their turn in the simulation due to student behavior. This also appeared to be a meaningful experience for the participants as it demonstrated the importance of effective classroom management in a very real and salient way. It may also have caused them to realize they knew less about classroom management and handling disruptive student behavior than they might have claimed prior to this experience.

**Limitations**

An obvious limitation of this study is the sample size. Given the number of students enrolled in the course, participants already had an extremely limited amount of time in the simulation; a larger number of study participants would have resulted in reduced contact with the virtual classroom for each person. The benefit of a larger sample size would have been greater statistical power and enhanced potential to draw conclusions from results. On the other hand, a smaller number of students would have allowed for a more in-depth, single-subject, multi-element or multiple baseline design with participants engaging in more frequent interactions with the simulated classroom; however, this would have required excluding some of the students enrolled in the course from the study and this was not possible. Additionally, the time commitment and cost necessary for conducting a multiple-baseline or multi-element study was prohibitive. Another limitation of conducting applied research in an intact college course is attrition. Using a single-subject, ABA design and analysis of pre- and postinstruction data
necessitated the collection of data from participants who were present for all three data collection sessions. As was expected, data from several participants could not be used because of missing opportunities to engage with the simulation.

Additional concerns were related to measuring performance of newly learned behaviors following only one face-to-face instructional session with limited opportunities to practice the strategies being taught. It is likely that additional instructional sessions would have yielded more dramatic results. One suggestion for addressing this limitation would be to develop an entire course on classroom management with many opportunities to practice discrete skills with the students in the virtual classroom. On the social validity questionnaire, one of the participants stated, “I think it would be cool if a whole class was dedicated to learning methods and strategies and implementing them with TeachLivE.” From a related point of view, there was not enough time for students to receive instructor feedback along with peer feedback. The amount of time the class had with the simulation was already minimized due to the class size; thus, taking up additional time for instructor feedback was not feasible.

Another limitation in this study was an absence of fidelity data on instruction and modeling to ensure clear demonstration of every component of the two general classroom behavior management skills presented to the participants. The researcher failed to turn on the video recorder prior to giving instruction and modeling the two strategies using the virtual students. Collection of these data would have provided a means by which to ensure the participants were provided the didactic instruction and skill modeling necessary to score their subsequent performance based on the scoring rubric. Study results should be interpreted in light of the absence of instructional fidelity data.
Finally, there were limitations with regard to the TLE technology. First, the student avatars and the participants are limited in regards to movement. For example, in a real classroom a teacher might rely on the option to move disruptive students within the classroom. Additionally, the use of proximity control (unobtrusively moving close to a particular student) to address mild disruptive behavior was not possible. For this reason, only strategies that could be implemented with the virtual student avatars could be targeted for instruction. One of the participants stated, “I had a lot of issues with this because you can’t physically interact with these students. There are a lot of tactics in classroom management that are non-verbal, and TeachLivE is all verbal.” Another concern was inconsistent levels of disruptive behavior across data collection sessions. Because TLE technology utilizes a ‘human in the loop,’ there is the potential for student avatars to feel slightly different from one simulation to the next. In this study, there were notable differences in the frequency and intensity of disruptive behavior across virtual students and across sessions. This created a problem during the instructional session because some participants had fewer opportunities to practice their assigned strategies than their peers. During the last session, which served as the maintenance phase, some participants dealt with new topographies of disruptive behavior, while others only had mild disruptive behavior that did not require them to use the classroom management strategies they had learned. Future studies should attempt to address these inconsistencies by requesting the same ‘human in the loop’ for all sessions along with providing specifications on the number of disruptive behaviors per minute.

**Implications for Teacher Education**

The results of this study demonstrate a functional relationship between instruction on and practice of classroom management strategies and corresponding changes in participants’ ability
to implement these techniques with student avatars. Regarding the study and course activities, one of the participants wrote in a journal entry:

I look at this research and its application as a teaching tool as important for two reasons: one, it allows future educators to get real experience with live people in order to begin to understand how a classroom will give you situations you are not prepared for, and it does so in an environment where first time educators can feel comfortable doing something they may never have experienced before. Second, it allows researchers some insight into what does and does not work when teachers are put into a brand new environment, where many of whom do not have prior experience or training with students.

Implications for teacher education are three-fold. First, bridging traditional lecture-based instruction on classroom management and student teaching experiences with mixed reality simulation could potentially be a solution to ensuring teacher candidates are prepared to manage classrooms, including disruptive student behavior, before stepping foot in front of a real student. Second, pre-service teachers understand the importance of classroom management and want to be better prepared in this domain. As indicated by a recurring theme in responses from this group of participants, managing students and the classroom environment is a pre-requisite for effective instruction. And last, while monetary and time costs may be a current barrier for some programs, advances in technology, specifically with regard to immersive virtual reality capabilities, may make classroom management simulation experiences for pre-service teachers more feasible in the future.
Directions for Future Research

This study indicates additional research is needed on evidence-based methods for teaching classroom management that bridge the divide between traditional didactic instruction and student teaching experiences. While extant research supports the use of mixed reality simulations like TLE, there is certainly room for more empirical studies examining differential impacts on teacher performance of critical classroom management skills. With a greater focus on including children at-risk for behavioral concerns in general education classrooms, behavior management is no longer a topic that can be relegated to the special education domain in teacher preparation programs. Future research should examine ways to measure learning and professional development in the domains related to classroom management. Finally, empirically validated instructional practices in classroom management must be implemented in teacher preparation programs and follow-up research should target potential student outcomes tied to effective preparation in classroom management.

Chapter Summary

The results of this study describe the impact of an instructional package utilizing mixed reality simulation to prepare pre-service teachers to implement two general classroom management strategies, setting expectations and differential reinforcement. All participants increased their performance of at least one of the two targeted strategies. Data regarding budgetary expenses, time requirements, and opportunity costs were presented to allow for determination of feasibility. Given the costs, some teacher preparation programs would not find the program feasible, while others could justify costs based on potential benefits. None of the participants indicated a higher level of self-efficacy regarding classroom behavior management following instruction; however, this is unsurprising given participants’ brief experiences.
Additionally, eleven of fourteen participants indicated that they enjoyed the experience, found it to be a valid method to teach classroom management, and would recommend it to friends and colleagues.

**Final Conclusions**

I have a strong passion for improving the lives of individuals with behavioral concerns. One of the issues I see in teacher preparation is a deep separation between general and special education disciplines. Unfortunately, this creates problems when general educators attempt to differentiate instruction and manage behavior across a wide range of student needs. For many students with difficult behavior, the general education classroom is the least restrictive environment and most appropriate environment for academic and social development; yet, many educators lack the skills to effectively manage challenging behavior and provide instruction at the same time. Teacher preparation programs should be designed to ensure future teachers are well equipped to provide effective instruction along with classroom management skills to guarantee student success in any classroom environment. Ultimately, all teachers must be prepared, to the greatest extent possible, to address the needs of any student that walks into his or her classroom. It is no longer acceptable for general and special education teachers to view students with behavioral concerns as “theirs” and “ours.” With an increasing focus on measuring student achievement, the impact of mismanaged disruptive student behavior must be taken into account. In an ideal world, teacher preparation programs would include at least one required course on classroom behavior management that offered opportunities to practice strategies and receive feedback as well as explicit connections to student teaching experiences. By glossing over behavior management curriculum, teacher preparation programs are contributing to this
issue by failing to adequately prepare all teacher candidates for what they will encounter in the classroom.
References


Cooper, J. T., & Scott, T. M. (2017). The keys to managing instruction and behavior:


Setting Expectations: The teacher briefly, but specifically describes student behaviors that are necessary for the completion of the task. For a group discussion task, several behaviors can be highlighted that will allow the group to focus on content while encouraging a respectful classroom environment. These could include: participation in group discussion, being respectful to others when they are talking, raising your hand, staying on topic, not using cell phones, etc.

Task Analysis:

1. Think about the appropriate student behaviors that you want to see during a whole class discussion.
2. Choose two behaviors that you want to see during the lesson.
3. Tell the class that you want to see __________ and __________ during the group discussion.
4. Briefly tell them why these behaviors are important.
5. Give an example of desired behavior.
6. Think of a specific behavior you do not want to see during the task.
7. Tell the class that you do not want to see __________.
8. Briefly give the rationale for why the behavior(s) is undesired.
9. Ask individual student(s) to restate the behavior(s) necessary for completing the task.
10. Start the discussion.
**Differential reinforcement:** The teacher focuses on and provides verbal affirmation of appropriate behaviors while not attending to inappropriate behavior. For a group discussion lesson, appropriate behaviors are those that will allow the group to focus on content while encouraging a respectful classroom environment. These could include: participation in group discussion, being respectful to others when they are talking, raising your hand, staying on topic, etc.

Task Analysis:

1. Think about the appropriate student behaviors that you want to see during a whole class discussion.
2. Ignore students engaging in disruptive behavior.
3. When you see a student engage in a behavior or behaviors you want to see more of point out the appropriate behavior.
4. Pair specific praise with a short affirmation, such as “nice job,” “thank you,” “that’s great,” etc.
5. Use student names when giving praise.
6. Follow up with a student who was previously being disruptive, but now is engaging in desired behavior.
7. Point out the appropriate behavior.
8. Use student names when giving praise.
9. Pair specific praise with a short affirmation, such as “nice job,” “thank you,” “that’s great,” etc.
10. Return to discussion.
Appendix B

Scoring Rubric

Participant: ___________________ Date: _______________ Session: ______ Time: ______

Score “1” or “0” per Sub-skill. Total the column for each attempt. Include comments in the notes section at the bottom about what was done well and what can be improved for next time.

<table>
<thead>
<tr>
<th>Sub-skill</th>
<th>Attempt:</th>
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<tbody>
<tr>
<td>1. Describes behavior(s) necessary to complete task</td>
<td></td>
</tr>
<tr>
<td>2. Indicates importance of desired behavior(s)</td>
<td></td>
</tr>
<tr>
<td>3. Provides example of desired behavior(s)</td>
<td></td>
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<td>4. Briefly describes undesired behavior(s)</td>
<td></td>
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<tr>
<td>5. Provides rationale for why behavior(s) is undesired</td>
<td></td>
</tr>
<tr>
<td>6. Asks individual student(s) to restate the behavior(s) necessary for</td>
<td></td>
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<tr>
<td>completing task</td>
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<tr>
<td>TOTAL</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-skill</th>
<th>Attempt:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ignores student(s) engaging in disruptive behavior</td>
<td></td>
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<tr>
<td>2. Identifies a student engaging in desired behavior</td>
<td></td>
</tr>
<tr>
<td>3. Uses specific praise to point out desired behavior</td>
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<tr>
<td>4. Uses student’s name before or after specific praise statement.</td>
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<tr>
<td>5. Pairs with a short affirmation, such as “nice job,” “thank you,” “that’s great,” etc.</td>
<td></td>
</tr>
<tr>
<td>6. Follows up with a student who was previously being disruptive, but now is engaging in desired behavior. Repeat steps 3 through 5 with this student</td>
<td></td>
</tr>
<tr>
<td>a. Use specific praise to point out desired behavior</td>
<td></td>
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<tr>
<td>b. Use the student’s name</td>
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<tr>
<td>c. Pair with short affirmation</td>
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<tr>
<td>TOTAL</td>
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Appendix C

Permission to Take Part in a Human Research Study

University at Buffalo Institutional Review Board (UBIRB)
Office of Research Compliance | Clinical and Translational Research Center Room 5018
875 Ellicott St. | Buffalo, NY 14203
UB Federalwide Assurance ID#: FWA00008824

Title of research study: Preparing Future Teachers to Manage Classroom Behavior: Evaluation of an Instructional Package Utilizing Mixed Virtual Reality

Version Date: 1/16/17

Investigator: Heather Walker

Why am I being invited to take part in a research study?
You are being invited to take part in a research study because you are a student in LAI 474 or LAI 574: Teaching the Exceptional Learner in the General Education Classroom.

What should I know about a research study?
- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to?
If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at hwalker@buffalo.edu or 901-335-8491, or your instructor, Dr. Sharon Raimondi. You may also contact the research participant advocate at 716-888-4845 or researchadvocate@buffalo.edu.

This research has been reviewed and approved by an Institutional Review Board (“IRB”). You may talk to them at (716) 888-4888 or email ub-irb@buffalo.edu if:
- You have questions about your rights as a participant in this research
- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You want to get information or provide input about this research.

Why is this research being done?
The purpose of this study is to examine the effectiveness of an instructional package by comparing teacher candidate performance of classroom behavior management strategies from
pre-instruction to post-instruction. Instructional components include lecture-based instruction, modeling, rehearsal using a simulated, mixed virtual reality environment, and immediate feedback.

**How long will the research last?**
Collection of some surveys will take place prior to the start of the first class. Other surveys, questionnaires, and video-recorded observational data will take place during regularly scheduled class sessions over a period of six weeks. Surveys and questionnaires are brief and should take no more than 30 minutes total for participants to complete.

**How many people will be studied?**
We anticipate that 15 people will participate in this study.

**What happens if I say yes, I want to be in this research?**
*If you agree to participate in this research, your data from LAI 474/574 course activities will be used to answer several research questions. Your consent means:*

- **Release of Pre- and Post-course Surveys 1 and 2 by your instructor to the PI for analysis**
- **Release of video-recorded data from class activities for analysis**
- **Completion and release of several pre and post-instruction surveys and questionnaires for the purpose of analyzing your experiences during class instruction on classroom behavior management**

**What are my responsibilities if I take part in this research?**
If you take part in this research, you will be giving the primary investigator permission to analyze data collected during regularly scheduled class activities and consent for analysis of video-recordings of those activities.

**What happens if I do not want to be in this research?**
Your participation in this research study is voluntary. If you choose not to be included in the study, you will still complete all related class activities including surveys, questionnaires and video taping, but we will not analyze any of your data. Your decision will have absolutely no impact on your grade for LAI 474/574 as the consent form will not be opened until after grades are posted and you are no longer a student in this class. No one will know whether or not you decided to take part in this study until the semester has ended.

**What happens if I say yes, but I change my mind later?**
You can leave the research at any time and it will not be held against you. Your decision will have absolutely no impact on your grade for LAI 474/574. If you decide to leave the research, contact the investigator so that the investigator can ensure your data is not analyzed. Students who wish to change their participation status can complete a new consent, including the unique username/number they chose, seal it in the provided envelope, sign the seal, and request their original sealed consent be given back to them. By adhering to this process, the instructor and PI will be unaware of any student’s participation status, even those who change their mind.
Is there any way being in this study could be bad for me?

*There are no known risks associated with these procedures.*

Will being in this study help me in any way?

We cannot promise any benefits to you or others from your taking part in this research.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study or education records, to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of this organization.

Can I be removed from the research without my OK?

The principal investigator can remove you from the research study without your approval. Possible reasons for removal include partial participation in class activities (e.g., missing one or more regularly scheduled class sessions) or withdrawal from the course.

What else do I need to know?

You will need to create a unique username or number that you will use for all surveys and questionnaires completed as part of this class. Your unique username/number will not be associated with your name; thus, the researchers will not have access to information that would associate you with your data.

Several of the surveys and questionnaires used in this study will be administered electronically. Pre and post-course surveys are administered through UBLearns and your privacy is protected through the security of that technology. Only your instructor will be able to link you with your responses. Another pre and post-instruction questionnaire will be administered using Google forms. By using your unique username/number instead of your name, your data will be kept private and no one, including your instructor, will be able to associate you with your responses.

You will not be paid for participating in this study.

Participation in this study has absolutely no impact on your grade in LAI 474/574. Sealed envelopes containing your signed or unsigned consent forms will not be opened until grades are final for the course.

Participants will be informed of study results in the form of a written report distributed by your course instructor, Dr. Sharon Raimondi by email.
Signature Block for Capable Adult

Your signature documents your permission to take part in this research. By signing this form you are not waiving any of your legal rights, including the right to seek compensation for injury related to negligence or misconduct of those involved in the research. By signing this form you are giving the investigator permission to analyze survey, questionnaire, and video-recorded data collected during the course of your regularly scheduled class activities.

_________________________________________   ____________________________
Signature of student                                Date

_________________________________________
Printed name of student

_________________________________________   ____________________________
Signature of person obtaining consent              Date

_________________________________________
Printed name of person obtaining consent