INTEGRATION OF TLE TEACHLIVE™ WITHIN HIGHER EDUCATION

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DEDICATION

To my mother, Joyce Yates-Turner, who has always encouraged me to continue learning. She has been my inspiration to continue my education and pursue my doctorate.
To my lovely wife, Annette J. Yates (Joyce Anne), who has been by my side through this chapter of my life. This dissertation would not have been completed without her encouragement and support.

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ABSTRACT

RANDY R. YATES

INTEGRATION OF TLE TEACHLIVE™ WITHIN HIGHER EDUCATION

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The scope of this research is to investigate the integration of TLE TeachLivE™ within higher education throughout the United States. The researcher explores the integration of TLE TeachLivE™, how educators identify and measure learning outcomes, and how feedback is given to and received from students in courses in which TLE TeachLivE™ is integrated. In order to determine how TLE TeachLivE™ is integrated, the researcher created and sent a survey to 41 institutions of higher education throughout the United States using TLE TeachLivE™. There were 39 participants who responded to the survey.

Data from the survey indicate that TLE TeachLivE™ is utilized in teacher preparation for: general education courses (i.e. Exploring Learning and Teaching, Teaching Diverse Learners, Teaching Strategies and Classroom Management) and special education courses (i.e. Curriculum and Instruction for Students with Mild/Moderate Disabilities, Nature of Autism: Theory and Application). In addition, TLE TeachLivE™ is being used for: administrators (Professional Development and Supervision), Bilingual/ESL programs (Bilingual Education Methods/ESL Methods), and counselors (Professional School Counseling).

Results indicate 33 out of 39 educators who utilize TLE TeachLivE^{TM} identify student learning outcomes in which they use a variety of feedback formats to determine if learning outcomes have been met. Data show that 100% of educators who utilize TLE TeachLivE^{TM} for multiple courses indicate that they identify specific student learning outcomes for their courses.

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CHAPTER I

INTRODUCTION

Background and Need for Research

Teach Live Environment TeachLivE (TLE TeachLivE™) is a mixed-reality classroom simulator developed at the University of Central Florida for teachers and pre-service teachers to practice skills in a virtual classroom environment. TLE TeachLivE™ provides a simulated teaching experience where a pre-service or current teacher can practice teaching, develop instructional and/or classroom management skills, deliver specific content, and/or to try out new techniques (Eisenreich & Harshman, 2014). The skills learned can then transfer to the instruction of real students, in a real classroom, in real time. Traditionally pre-service teachers have taught lessons to peers in their education courses or to students in a field experience, such as a student teaching or practicum placement. TLE TeachLivE™ provides an alternative setting in which pre-service teachers can develop and practice skills they will utilize in their own classroom (Dieker, Hynes, Stapleton, & Hughes, 2007). According to Straub, Dieker, Hynes, and Hughes (2014), "TLE TeachLivE™ is currently the only mixed-reality classroom simulator of its kind" (p. 6).

TLE TeachLivE™ is an acronym for: Teaching and Learning in a Virtual Environment. It utilizes a human in the loop agent to provide the realism of human behaviors within a virtual environment (Hughes, Nagendran, Dieker, Hynes, & Welch,

2015). The innovative TLE TeachLivE™ classroom simulator includes elements from both real and virtual worlds, such as a simulated classroom with desks, a whiteboard, teaching materials, and student avatars with personalities modeling real-life students. Prospective and current teachers can interact and instruct avatars in real time, much like they would interact and instruct students in a real classroom, giving a sense of immersion (Straub, Dieker, Hynes, & Hughes, 2014).

The TLE TeachLivE™ system is currently used in higher education within the United States to provide prospective teachers an opportunity to practice classroom instruction and behavior management, as well as to reflect on their own teaching and performance (Hughes et al., 2015). Judge, Bobzien, Maydosz, Gear, and Katsioloudis, (2013) state "this novel approach of a mixed-reality-based classroom experience addresses the need to improve teachers' effectiveness in managing adolescent behaviors in a way that provides for an unlimited variety of situations" (p. 89).

The simulated teaching environment of TLE TeachLivE™ serves to enhance teacher recruitment and preparation and helps with retention in education by providing an opportunity for teachers to improve their skills while working with virtual students. TLE TeachLivE™ provides a more clinical and enhanced practice environment in which teachers can develop skills to help them teach more effectively (Judge et al., 2013). The intent is to create a teaching environment in which a pre-service teacher could practice teaching skills using avatars prior to entering a classroom. In this environment the pre-service teacher can develop classroom management skills and practice delivery of content

to the virtual class (Hughes et al., 2015). TLE TeachLivE^{TM} simulation and student avatars were originally designed for teacher education programs. The design gives pre-service teachers an opportunity to practice skills in classroom instruction and management (Eisenreich & Harshman, 2014).

TLE TeachLivE^{TM} has expanded to include adult avatars, creating an opportunity for pre-service teachers to experience interactions and develop communication skills needed in working with adults (e.g., parents, teachers, paraprofessionals, and administrators) within the educational setting (Buckridge & Taylor, 2014). To address the unique and diverse student populations a pre-service teacher may ultimately work with, TLE TeachLivE^{TM} has added a second language learner avatar (Dieker, Rodriguez, Lignugaris/Kraft, Hynes, & Hughes, 2014), an avatar with Autism Spectrum Disorder (Garland, Holden, & Garland, 2015), as well as an avatar with an intellectual disability.

Billingsley and Scheuermann (2014) state, "There is a dearth of research describing virtual technologies used to augment field experiences for pre-service special education teachers" (p. 268). They note the need for more research on virtual technologies and suggest that virtual reality and cyber simulation can be utilized by teacher educators to provide pre-service teachers with opportunities to practice behavioral and instructional techniques. The research does provide a knowledge base for ways technology can be used to provide opportunities for pre-service teachers to interactively experience learning skills such as classroom management, behavior interventions, and special education processes in a controlled learning environment (Billingsley &

Scheuermann, 2014). As the TLE TeachLivE™ technology was developed, researchers continued to look at the potential impact this technology may have within education training programs.

Previous Focused Studies for TeachME / TLE TeachLivE™

- Fifteen pre-service secondary mathematics teachers, participating in TeachME (precursor of TLE TeachLivE™), were provided experiences focusing on delivery of content mastery and behavior management strategies that can be effective in the school setting (Andreasen & Haciomeroglu, 2009). Outcomes of the focused study led to the conclusion that TeachME has the potential to support the development of behavior management strategies for prospective teachers. TeachME provides a realistic setting within a virtual environment that can enhance the preparation of student teachers preparing to enter the classroom (Andreasen & Haciomeroglu, 2009).
- Five participants received training in Discrete Trial Teaching (DTT), then taught students with Autism Spectrum Disorder (ASD) in the TLE TeachLivE™ learning platform. Participants received feedback on their performance in the form of Individualized Clinical Coaching (ICC). Generalization probes within actual classroom settings indicated transference of learning in the TLE TeachLivE™ lab to the classroom (Garland, 2012). Results of the study indicate that participants demonstrated increased performance as DTT was implemented in

their classrooms. Improvement in performance was attributed to ICC received in the TeachLivE™ virtual classroom (Garland, 2012).

- Six pre-service teacher participants using TLE TeachLivE™ received training in differential reinforcement of incompatible behavior strategies to increase student engagement through on-task behavior and to decrease undesirable behaviors. Participants indicated the use of mixed-reality helped to reinforce and utilize the strategies learned (Judge et al. 2013).
- Four secondary education teachers participated in a study using real-time feedback prompts and explored the use of bug-in-ear coaching with TLE TeachLivE™. The purpose of the study was to determine if tele-coaching using bug-in-ear technology increased behavior-specific praise statements by participants. Three of the four participants' rate of behavior-specific feedback increased during the sessions (Elford, 2013). Results of this focused study indicated that participant response to the TLE TeachLivE™ lab quickly changed from initial trepidation to a rapid transition of adapting to the augmented reality environment of computer-generated images. Teachers responded positively, indicating that they would like more time in the simulation environment to practice the skills they were learning (Elford, 2013).
- Eight pre-service special education teachers participated in a study which used exploratory, mixed-method, repeated measures research to examine the impact of TLE TeachLivE™ on improving instructional strategies. The focus was on pre-

service special education teachers increasing opportunities for students to respond within the virtual learning environment. Findings from this focused study show three out of eight participants increased the number of opportunities for students to respond utilizing TeachLivE™ (Peterson, 2014).

- Six educators enrolled in a graduate special education course were selected to participate in a study that focused on System-of-Least Prompts (SLP). Participants received multiple opportunities to practice SLP within the real time TLE TeachLivE™ virtual reality environment lab. Participants worked with an avatar identified with Autism Spectrum Disorder. The use of TLE TeachLivE™ simulation, with evidence-based practices of prompting, demonstrated the efficacy of individualized clinical coaching of least-to-most prompting was effective (Garland, et al., 2015).
- Sixty-two pre-service early childhood teachers participated in a study to investigate the impact of a mixed-reality teaching environment on early childhood education majors' science teaching self-efficacy beliefs. Seventy-three percent of the participants reported they felt less confident in their abilities to teach science after using the TeachME Lab the first time. After the second and third time using the lab, 90% of the participants felt more confident in their ability to teach the science lesson. Participants indicated the mixed-reality teaching environment was more authentic than micro-teaching peers in a traditional classroom setting (Bautista & Boone, 2015).

Initial research on TLE TeachLivE™ suggests that learning in a mixed-reality simulated classroom can be effective and have a positive impact on teacher practice. The aspect of immediate feedback for participants using the TLE TeachLivE™ classroom environment is a major advantage (Eisenreich & Harshman, 2014).

Literature and research on TLE TeachLive™ focus primarily on teacher training within the virtual environment. The premise is that pre-service and current teachers can practice teaching skills in an environment that allows them to move from theory to practice skills in a controlled setting, where instruction can be monitored, feedback can be given, and instruction can be repeated when necessary until the target skill is mastered (Bautista & Boone, 2015; Billingsley & Scheuermann, 2014; Hayes, Straub, Dieker, Hughes, & Hynes, 2013; Judge et al., 2013). Just as students learn from varying modalities of instruction, instructors learn to provide different teaching opportunities. This leads to research questions related to TLE TeachLivE™.

Research Questions

1. How is TLE TeachLivE™ being used within the higher education setting?
2. How are student learning outcomes addressed and measured for the usage of TLE TeachLivE™ within the higher education setting?

Significance of Research

This research contributes to the literature on the utilization of TLE TeachLivE™ in teacher preparation by presenting a unique aspect of research which sets it apart from previous studies. It focuses specifically on educators who are integrating TLE

TeachLivE™ within higher education, and provides information on courses and program areas in which this emerging technology is being used. The research documents how educators address and measure learning outcomes and methods of feedback given to and received from students by educators in course(s) utilizing TLE TeachLivE™.

Definition of Terms

Avatar (virtual avatar) is a digital representation of a human being which reflects human behavior, typically in real time, by a specific human being. The avatars movements are controlled by a facilitator to appear humanlike (Nagendran, Pillat, Hughes, & Welch, 2012). Bell (2008) defines an avatar as "any digital representation (graphical or textual), beyond a simple label or name, that has agency (an ability to perform actions) and is controlled by a human agent in real time" (p. 2).

Mixed-reality (virtual learning environment) occurs when real and virtual worlds are created, providing users with a sense of presence. Mixed-reality environments allow participants to perceive a virtual environment as authentic, much like the real world (Straub, Dieker, Hughes & Hynes, 2014).

Pre-service teacher is an individual who is being educated and/or trained prior to becoming a certified teacher. Pre-service teachers are typically completing required coursework, practica, or other program specific requirements prior to completion of a teaching degree leading to teacher certification. Learning is often based upon the actual life experiences of an individual that is interactive, experimental, and purposive in nature (Dewey, 1938).

Simulator (simulated environment) is a fully immersive virtual environment utilizing a mixed – reality setting, to provide a sense of real presence for training and development of specific skills (Dieker, Rodriguez et al., 2014).

Teach Live Environment TeachLivE (TLE TeachLivE^{TM}) is a mixed-reality, virtual learning environment providing participants the opportunity to practice teaching skills. TLE TeachLivE^{TM} offers participants the opportunity to become immersed in an environment that looks like a typical classroom, including desks, whiteboards, and simulated students (Dieker, Rodriguez et al., 2014). TLE TeachLivE^{TM} is an acronym for: Teaching and Learning In a Virtual Environment. It utilizes a human in the loop agent to provide the realism of human behaviors within a virtual environment (Hughes et al., 2015).

TeachMe is a type of simulation technology and is the precursor of TLE TeachLivE^{TM}. As the University of Central Florida began creating the mixed-reality program which eventually became TLE TeachLivE^{TM}, the term TeachMe was used. When University of Central Florida applied for a trademark for the term TeachMe, that trademark was already taken. (L. Dieker, personal communication, February, 2015).

Virtual environments (virtual learning environments) are computer-generated activities in which users interact with 2-Dimensional (2D) or 3-Dimensional (3D) space alone or by collaborating with others (Ludlow, 2015).

CHAPTER II

LITERATURE REVIEW

A review of the literature surrounding the beginnings of TLE TeachLivE^{TM} focuses on the impact that the use of this technology has on recruiting, preparing, and training teacher recruits and current teachers. Literature related to TLE TeachLivE^{TM} indicates that while virtual technology for training in the simulation field has a long history in medicine, aviation, and the military, only recently has the application of similar technologies been used in teacher preparation and training programs (Dieker, Hynes, Hughes, & Smith, 2008).

The process used to locate articles for the purpose of this review included a systematic search of online databases including Google Scholar, Dissertation Abstracts, and ProQuest. Search terms included: *augmented reality simulation, digital puppetry, educational avatars, mixed reality, simulated educational environments, student learning outcomes, TLE TeachLivE^{TM}, virtual classroom,* and *virtual environment.* References from journals and webpages were also sources for this review.

The use of technology within the field of education for teacher preparation and training has steadily progressed and is increasingly being utilized as an important component of instruction and learning. Technologies continue to make in-roads into educational settings. The utilization of current technology in the training of students is important for them to be knowledgeable and skilled in emerging technologies for their

profession. From the early beginnings of formal education, various technologies have been developed, embraced, and integrated within the field and scope of education. Education has moved from the simplest of transitions to the increasingly complex technologies:

- clay → papyrus scrolls → paper books → e-books
- inkwell → pencil → iPad
- slate and chalk → whiteboard → smart board
- film-strip → Video Home System (VHS) → YouTube
- over-head projector → ELMO → 3D Projection
- Kodak slides → PowerPoint and Prezi
- mimeograph → Xerox color copies
- paper spreadsheets → Excel

Technologies emerge and continue to develop within the field of education. This is in response to the ever-changing world in which educators increasingly find themselves confronted with, adapting to and perhaps ultimately immersed in technology.

Professors in teacher educator programs continue to adapt and transition as they integrate technology in order to prepare their students to teach in real world settings with confidence and skill. Within higher education, some faculty are blending traditional methods of class lecture, student observations, and ultimately student teaching with the integration of virtual classrooms, virtual students, and simulated teaching environments, as they prepare pre-service teachers to enter the classroom. A small sector of higher

education institutions currently utilize the real-time, mixed-reality technology known as TLE TeachLivE^{TM}.

Simulated and virtual environments are entering the world of education in much the same way that Microsoft Word, PowerPoint, interactive whiteboards, and mobile devices have become standard operational tools within many classrooms today (Dieker, Straub, Hugues, Hynes & Hardin, 2014). As new technologies continue to emerge, professional educators endeavor to utilize and integrate technologies within their classrooms and as a core component of teacher educator programs. The diversity of student learners and innovations in the world make it a necessity for educators to challenge the way they prepare their pre-service students.

The use of technological innovations is one way to address this challenge. Dieker et al., (2008) note the importance of technological innovations and their impact on the world. They state that Generation M (born between 1982 and 1998) "is exposed to and expects that technology will be a part of their daily life" (p. 1). The authors address the importance of integrating current technologies into the training of future teachers who will serve Generation M students, noting the reality that technology impacts virtually every aspect of an individual's life, including the way students learn, live, and interact each day. Realizing this, they report that teacher educators must change the way they train pre-service teachers. Teacher educators must adapt, evolve, transition, and utilize technological tools in order to shape teacher practice and teacher pre-service training (Dieker, Rodriguez et al., 2014).

This shift from traditional classroom instruction, student observation, and student teaching to the inclusion of a mix of virtual reality and real time interaction with avatars in a simulated class setting is one of the latest emerging technologies available for utilization in the field of teacher education today (Dieker, Rodriguez et al., 2014). According to Judge et al., (2013), "the development of visual technologies to train and educate has grown increasingly sophisticated and now includes virtual learning environments, often known as simulators" (p. 88). Technological advances are available for utilization within teacher educator programs, providing simulated teaching experiences in virtual classrooms with avatars as students. TLE TeachLiveE™ is a virtual classroom simulator designed for use in training educators, teachers, and pre-service teachers (Behrens & Franceschi, 2014).

TLE TeachLivE™ is an emerging simulation technology designed to be used in the training of both current teachers as well as students who are preparing to enter the teaching profession. The TLE TeachLivE™ simulator is unique in that it is the only mixed-reality classroom simulator of this type, with this technology in use in over 40 universities (Straub, Dieker, Hynes & Hughes 2014). The design of TLE TeachLivE™ incorporates and utilizes simulation as a means of giving students the opportunity to practice teaching skills, behavior management techniques, presentation, and interaction in an environment that allows for mistakes, repetition, and immediate feedback. It assists in building confidence and competence, making a significant contribution to the growth of prospective and current teachers.

TeachMe, the precursor of TLE TeachLivE^{TM}, was a mixed-reality classroom simulator developed at the University of Central Florida that allowed teachers and pre-service teachers to practice behavior management skills in a virtual classroom environment prior to transfer of skills when managing real students, in a real classroom, in real time (Andreasen & Haciomeroglu, 2009). TLE TeachLivE^{TM} was developed through collaboration between computer scientists, teachers, actors, researchers, digital artists, computer programmers, faculty members, and students working together to develop and harness the power of a virtual environment in education that they believed has great potential to influence teaching practices of the future (Dieker, Straub et al., 2014).

TLE TeachLivE^{TM} was designed originally as a teacher education simulation using student avatars. TLE TeachLivE^{TM} has expanded to include adult, parent, and, teacher avatars (Buckridge & Taylor, 2014). In this mixed-reality virtual simulation, the students are virtual while the teacher is live. The virtual students or avatars are computer-generated characters designed to look and behave like real people. Individuals tend to respond to avatars in much the same way they respond to humans, and avatars are able to connect with real people in meaningful and complex ways (Swartout et al., 2013). The pre-service teacher interaction with student avatars in the TLE TeachLivE^{TM} classroom is similar to what is experienced in a general classroom setting.

The impact that simulation can have within the field of education and teacher training is significant (Dieker et al., 2008). Behrens and Franceschi (2014) suggest that

professional learning in mixed-reality simulated classrooms can be effective in impacting teacher practice. Student and faculty feedback on informal and formal evaluations indicated that the students highly value the TLE TeachLivE^{TM} lab session, and faculty felt their session had a significant impact on their individual growth as prospective teachers (Floyd et al., 2013).

With TLE TeachLivE^{TM}, pre-service teachers are able to experience a virtual classroom environment. TLE TeachLivE^{TM} can be utilized in teacher preparation programs. These virtual classrooms allow pre-service teachers the opportunity to deliver classroom instruction, manage student behavior, and deliver instruction and re-teach multiple times (Eisenreich & Harshman, 2014).

The purpose of the visual-based simulated teaching environment of TLE TeachLivE^{TM} is to enhance teacher recruitment, preparation, and retention in education by allowing teachers to improve their skills with virtual students, and to provide a more clinical and enhanced approach to learning the art of teaching. This approach of a mixed-reality-based classroom experience addresses the need to improve teachers' effectiveness in managing adolescent behaviors in a way that provides for an unlimited variety of situations (Judge et al., 2013). Buckridge and Taylor (2008) state "the use of avatars and virtual teaching provides authentic practice where mistakes do not impact real students, and through reflective practice, feedback and coaching, novice educators can deepen their practice" (p. 16).

Pan, Cheok, Yang, Zhu, and Shi (2005) state that "mixed reality (MR) is the incorporation of virtual computer graphics objects into a real three dimensional scene, or alternatively the inclusion of real world elements into a virtual environment" (p. 20). This blending of real and synthetic content is seen in the inventive environment of mixed-reality that comprises TLE TeachLivE™. It is in this blended environment that prospective teachers can interact with virtual students while practicing teaching skills (Judge et al., 2013). Vinayagamoorthy, Steed, and Slater (2005) state "the more visually realistic the representation gets, the more naturalistic users expect the virtual character to act" (p. 119) and present the premise that:

"If virtual characters with an acceptable level of visual fidelity displayed subtle behaviors typical of a certain mental state, users interacting with the virtual character in the virtual environment will respond in a manner consistent with those of the physical world" (p. 119).

Nagendran, Pillat, Kavanaugh, Welch, and Hughes (2013) concur that "a human in the loop (interactor) can control any of these digital avatars, allowing them to gesture, change facial expressions, and hold bi-directional conversations that are both contextual and meaningful depending on the pre-determined scenario" (p. 145).

Research on the use of TeachMe and TLE TeachLivE™ within teacher training programs focuses on how pre-service teachers' skill development, instructional strategies, and behavior management can be learned and enhanced through practice and feedback. It also includes the use of evidence-based practices and real-time learning in this mixed-

reality environment, as pre-service teachers work with targeted subjects, skills, or student groups.

In a study focusing on the value of using this innovative, virtual, mixed-reality teaching environment (TeachMe), beginning teachers were given the opportunity to practice and develop classroom and behavior management skills prior to entering the classroom. This study was conducted at the TeachMe Lab housed at the University of Central Florida (UCF). In a semester-long methods course, 15 pre-service secondary math teachers were randomly divided into five groups where they developed and taught lessons in a mixed-reality environment (Andreason & Haciomeroglu, 2009). Pre-service teachers focused primarily on the delivery of a lesson to accommodate a diversity of students and manage classroom behavior. The virtual students mimicked student behaviors in a realistic classroom in that they were sometimes unenthusiastic, unmotivated, or even disrespectful (Andreason & Haciomeroglu, 2009). Prospective teachers spent 15-20 minutes during each TeachMe session focusing on their delivery of content as well as the management of student behaviors. Data were collected through videos of teaching episodes and classroom discussions, interviews, classroom observations, students' lesson plans, and reflections (Andreason & Haciomeroglu, 2009). There were 15 teaching episodes that the pre-service students presented in the mixed-reality classroom. This study showed potential for TeachMe. Prospective teachers could develop skills for managing student behavior that would enable the teacher to more effectively deliver content. Findings from this study suggested the potential for using

mixed-reality for not only deepening content knowledge but also for developing behavior management strategies in order to permit learning to occur (Andreason & Haciomeroglu, 2009). Paolini (2015) noted that in our Western society which is technologically driven, the integration of technology within the classroom setting is a key component of student engagement, and should be a part of instruction. Attention should be given to the negative impact on student ability to conceptualize material, practice skills, and process and apply knowledge in a classroom where a solely didactic approach is utilized (Paolini, 2015).

Garland (2012) focused on the level of transference and generalization that would occur within an actual classroom setting in a study that measured the impact of utilizing a virtual reality learning modality (TLE TeachLivE^{TM}) with individualized clinical coaching. Five pre-service teachers experienced an immersive, real-time, mixed-reality environment concentrating on autism. Garland (2012) stated that "Discrete trial teaching has been recognized as an effective teaching methodology for children who are on the autism spectrum" (p. 6). The pre-service teachers were trained in Discrete Trial Teaching (DTT), a method to teach attending, imitation, and symbolic play skills (Garland, 2012). After each session, the pre-service teachers received individualized clinical coaching on their teaching. Participating teachers were given four baseline probe sessions and up to a total of seven treatment intervention sessions with the goal of demonstrating mastery of delivering DTT at 90% or above for three sessions in a row. Although the participants indicated that they were initially uncomfortable in the TLE TeachLivE^{TM} lab during the

baseline probes, participants became more comfortable with the technology and indicated that they would continue to use DTT as an intervention with the avatars (Garland, 2012). Results of the study indicated that all pre-service teachers benefited from learning DTT with individualized clinical coaching and that the teachers expressed a preference for learning within the TLE TeachLivE^{TM} lab, rather than learning through a traditional course approach of classroom instruction. It was concluded that the efficacy of individualized clinical coaching was demonstrated by the teachers' fidelity of implementing DTT both within the TLE TeachLivE^{TM} lab and the transference of the use of DTT within the teachers' classroom (Garland, 2012).

McLeskey (2011) reported on similar findings and advocated professional development that was intensive and learner-centered. This approach provided teachers with in-depth knowledge regarding innovative practices within a context simulating a classroom in which teachers can practice the use of the innovation. Follow-up support in an actual classroom setting helped ensure teachers were well prepared to use these innovative, effective, research-based teaching practices (McLeskey, 2011).

A similar study investigated pre-service teachers' use of Differential Reinforcement of Incompatible Behavior (DRI), a strategy for reducing undesirable classroom behaviors and reinforcing desirable behaviors. DRI was taught to six pre-service general secondary teachers. The pre-service teachers then used DRI in a TLE TeachLivE^{TM} setting to practice skills taught (Judge et al., 2013). The goal of DRI instruction was to teach the pre-service teachers how to identify effective behavior

management strategies that will enable them to deliver high-quality, effective instruction to all students, increasing student engagement through on-task behavior and decreasing undesirable behaviors that can interfere with student learning. Pre-service teachers practiced behavior management techniques, and feedback was given on their ability to implement techniques within the virtual classroom. The pre-service teachers, who received immediate feedback, reported they gained the most from the training (Judge et al., 2013). The pre-service teachers were also asked to respond to how they felt TLE TeachLivE™ had influenced their performance as a teacher and what aspect of the study they felt benefited them the most as well as the least. Results of the study indicated that all participants showed an increase in the use of DRI strategies. The pre-service students using the mixed-reality simulator had mixed reactions: some indicated that they found it to be a useful setting in which to hone their teaching skills, while others felt hampered by the limitations of the virtual students and the mixed-reality environment itself. Participants overall noted that learning and practicing was a positive aspect of participation in the study (Judge et al., 2013).

Elford, Carter, and Aronin (2013) reported similar findings in a research study where four secondary teachers were given the opportunity to practice classroom management skills within TLE TeachLivE™, a virtual classroom setting. Bug-in-ear coaching, utilizing Bluetooth technology, was used to encourage teachers to follow a specific feedback formula routine when teaching. This routine of redirect, re-engage, and reinforce used student feedback to address student behaviors. Each teacher presented a

math, social studies, or language arts lesson which he or she divided over the course of four TLE TeachLivE^{TM} sessions. The sessions were five minutes in length, followed by an exit interview to discuss the experience. The percentage of disruptive behaviors addressed using positive feedback increased when participants were coached using bug-in-ear technology. Elford, et al. (2013) reported one participant stated: "getting this kind of practice is so much more meaningful than just listening to someone talk about how to do a certain strategy" (p. 43).

Elford (2013) also indicated similar results from her research on how feedback within the TLE TeachLivE^{TM} reality simulation environment affected teacher behavior. Elford (2013) "examined the social validity of using TLE TeachLivE^{TM} as a setting for developing and practicing evidence-based strategies for classroom management" (p. 36). Four secondary teachers participated in a study to evaluate the effects of tele-coaching using bug-in-ear technology within a mixed-reality environment (Elford, 2013). To increase behavior-specific praise statements delivered by these secondary teachers, bug-in-ear tele-coaching technology was used within the TLE TeachLivE^{TM} classroom. This bug-in-ear technology was used to give immediate feedback to teachers as they practiced delivering behavior-specific praise (Elford, 2013). Participants were asked to use behavior-specific praise as a technique to minimize classroom disruptions. Participants received an information sheet that described behavior-specific praise prior to baseline. They also participated in an introductory session explaining the sheet and session routine, and then individually participated in an unstructured session to familiarize themselves

with the TLE TeachLivE^{TM} environment. Participants completed a four-phase treatment design, baseline, intervention, withdrawal, and follow-up where a coach provided teachers with verbal, bug-in-ear feedback for delivering behavior-specific praise during 10 minute mini-lessons with a short after-action review. Participants were scheduled for three sessions a day for six days (Elford, 2013). All sessions were videotaped for data collection to examine the frequency of the teachers' behavior-specific praise statements and the occurrence of the students' disruptive behavior during each lesson. When results were examined, three of the four teachers increased their average rate of behavior-specific feedback when tele-coaching occurred during the TLE TeachLivE^{TM} session. The four participants in this study were enthusiastic about their experience in the TLE TeachLivE^{TM} environment, and they all described the positive benefits of tele-coaching within this mixed-reality setting. Data from the study support TLE TeachLivE^{TM} as an appropriate and effective setting in which teachers can develop and practice classroom management strategies (Elford, 2013).

Peterson (2014) evaluated the effect that TLE TeachLivE^{TM} virtual learning environment had on improving the use of instructional strategies among pre-service special education teachers, which focused on how often they provided opportunities for student response. The study also investigated the efficacy of post-session, after-action review as a tool for preparing pre-service teachers and the perceptions of the special education teachers' experiences within the TLE TeachLivE^{TM} virtual learning environment. Eight pre-service special education teachers were randomly chosen from a

group of interested participants who volunteered for and agreed to participate in the study (Peterson, 2014). Participants completed a pre- and post- Teacher Sense of Efficacy Scale and post-session self-reflections. Four participants also received after-action review: a one-on-one meeting with the researcher in which they discussed observations regarding opportunities to respond. Each pre-service teacher participated in five sessions, using TLE TeachLivE^{TM} virtual learning environment over a six-week period. Each session was observed by the researcher to record the frequency of opportunities to respond at the beginning, middle, and end of the lesson. An exploratory, mixed-methods, repeated measures design was utilized for the study. Findings showed that three out of eight pre-service teachers increased in overall frequency of providing opportunities to respond (Peterson, 2014). Two of the four participants in the treatment group internalized and utilized suggestions and feedback from the research, allowing students open-ended responses in addition to yes/no questions. Findings indicated that after-action review provided teachers the opportunity for self-reflection as they thought about how to provide opportunities for student response in subsequent TLE TeachLivE^{TM} sessions. Results from this study support the continued use of TLE TeachLivE^{TM} as an effective tool to impact teaching practices, such as opportunities to respond, and to prepare pre-service special education teachers to enter the classroom (Peterson, 2014).

A study utilized the TLE TeachLivE^{TM} virtual-reality classroom laboratory setting as a platform to train participants in real time, research-based System of Least Prompts (SLP), providing Individualized Clinical Coaching (ICC) to the participants. Six

educators who were enrolled in a graduate special education course that focused on evidence-based practices were selected as participants in this study (Garland et al., 2015). Participants received instructions for implementing SLP prior to their first baseline session, followed by an intervention and maintenance phase of implementation of SLP. A social validity form was given to all participants. Each participant responded to six items using a five-point Likert-type scale and indicated the degree to which they agreed or disagreed with each statement (Garland et al., 2015). Each participant delivered 15-minute sessions using SLP until they had individually met the criteria of 80% mastery over three consecutive sessions. The teacher focused on evidence-based practices for teaching learners with autism using SLP. Results from visual analysis of the study suggested that individualized clinical coaching in TLE TeachLivE^{TM} was successful in increasing fidelity across all participants while implementing a system of least prompts (Garland et al., 2015). Participants noted the importance of learning SLP in the TLE TeachLivE^{TM} setting, indicating that this skill could be transferred in their work with a student with ASD in other settings. Participants also noted the value of modeling and they highly valued their preparation of SLP when receiving ICC in the TLE TeachLivE^{TM} environment (Garland et al., 2015).

Sixty-two pre-service teachers majoring in early childhood participated in a study which investigated the impact of a mixed-reality teaching environment on self-efficacy beliefs. Each participant was asked to respond to 23 items on a four-step Likert scale and complete five guided journal entries of open-ended questions (Bautista & Boone, 2015).

The first journal entry was completed before participants learned about TLE TeachLivE^{TM}. The other entries were submitted after using the TLE TeachLivE^{TM} lab for practice and at the end of the semester. Results were suggestive that both personal efficacy and outcome expectancy of early childhood pre-service teachers increased from pre-semester to post-semester. Seventh-three percent of the pre-service teachers' self-efficacy beliefs drastically decreased after the first practice session and an increase was noted after the next two practices (Bautista & Boone, 2015). The pre-service teachers stated the importance of having a strong science content knowledge as a basis for having high confidence to teach science. Results of the study suggested that TeachMe (precursor to TLE TeachLivE^{TM}) is a worthwhile technology that can be used in teacher preparation courses to teach skills that can be utilized by teachers in the classroom setting (Bautista & Boone, 2015).

Summary

This chapter reviewed literature encompassing TLE TeachLivE^{TM} research which focused primarily on pre-service teachers and the teaching and behavior management skills learned through the utilization of TLE TeachLive^{TM} technology. Evidence from research in this review indicate that the virtual environment of TLE TeachLivE^{TM} can be effective in helping to develop teaching skills for pre-service teachers. The studies indicate a positive benefit from the utilization of TLE TeachLivE^{TM} learning environment for pre-service teachers as they develop specific skills. These classroom management and instructional skills can then be transferred to actual classroom practice.

The use of mixed-reality technologies such as TLE TeachLivE^{TM} offers teacher educators and pre-service special education teachers interactive scenarios where students can interactively experience a myriad of opportunities to practice instruction, classroom management, target behaviors, and interventions. Research describes virtual technologies utilized in field experiences, yet much remains to be learned and more controlled empirical research methods can be utilized in order to draw sound conclusions about the efficacy of using virtual technology for pre-service special education teachers (Billingsley & Scheuermann, 2015; Brandenburg, Donehower & Rabuck, 2014; Dieker, Rodriguez et al., 2014; Eisenreich & Harshman, 2014).

CHAPTER III

METHODOLOGY

Purpose of Research

Literature and research on TLE TeachLivE™ have focused primarily on teacher training within the virtual environment. The premise is that pre-service teachers can practice skills in an environment that allows them to move from theory to practice with identified skills in a safe and controlled setting, where instruction can be monitored, feedback given, and instruction repeated when necessary until the target skill is mastered (Bautista & Boone, 2015; Billingsley & Scheuermann, 2014; Hayes et al., 2013; Judge et al., 2013).

Given the current usage of TLE TeachLivE™ in education and teacher preparation programs, and its potential to improve teaching methodology and the skills of teachers entering the field of education, it is important to identify how faculty are integrating TLE TeachLivE™ within higher education, including student learning outcomes and methods of feedback. This information could be beneficial in demonstrating how TLE TeachLivE™ is being used in institutes of higher learning. It would also provide insight into the potential range of TLE TeachLivE™ usage, including the potential for incorporating or expanding TLE TeachLivE™ use within current teacher preparation programs.

Research Questions

1. How is TLE TeachLivE™ being utilized within the higher education setting?
2. How are student learning outcomes addressed and measured for the utilization of TLE TeachLivE™ within the higher education setting?

Method

The researcher used the TLE TeachLivE™ website (teachlive.org/partners) to create a list of higher education institutions that currently have TLE TeachLivE™ labs. Each higher education school website was explored to identify the contact person for TLE TeachLivE™.

The Institutional Review Board (IRB) approved the study to be conducted (Appendix A). An introductory e-mail (Appendix B) was sent to the contact person at each of the higher education institutions explaining the proposed study and requesting that the e-mail be forwarded to all faculty who use or have used TLE TeachLivE™ in one or more courses. This e-mail had a link to the survey through PsychData. A second e-mail (Appendix C) was sent as a reminder the following week to the higher education contact as a reminder. A final e-mail (Appendix C) reminder was sent to the higher education contact during the third week.

Data from the survey were analyzed to determine how TLE TeachLivE™ was being utilized within the higher education setting. The data were analyzed to identify which classes are using TLE TeachLivE™ and how student learning outcomes are addressed and measured.

Participants

Participants were educators (i.e., faculty) who (a) were teaching at a public or private institution of higher education that had a TLE TeachLivE^{TM} lab and (b) who use or have used TLE TeachLivE^{TM} in one or more courses. All respondents to the researcher-created survey agreed to participate in this research.

Instrument

The researcher used PsychData to create the survey. Questions for the survey were constructed to elicit responses from educators in higher education institutes who have used and/or currently use TLE TeachLivE^{TM}. The questions were designed to identify how faculty and staff are utilizing TLE TeachLivE^{TM} and to determine if and how student learning outcomes are being addressed and measured. In addition, the survey elicited information regarding how educators provide feedback and receive feedback from their students regarding the usage of TLE TeachLivE^{TM}.

Three professors within a higher education setting who have used TLE TeachLivE^{TM} were asked to preview and complete the survey and provide feedback. Changes to the survey were made based upon the feedback provided. The format for the survey was comprised of 15 questions in short answer and multiple choice, with opportunities to provide additional information (Appendix D). The revised survey was then sent to the TLE TeachLivE^{TM} e-mail addresses of coordinators to be forwarded to faculty that use TLE TeachLivE^{TM} (Appendix D). The survey was comprised of

questions related to student learning outcomes and how they were measured when using TLE TeachLivE™.

Data Analysis

The researcher e-mailed the survey to 41 institutes of higher education that utilize TLE TeachLivE™. Data were analyzed to determine how TLE TeachLivE™ has been integrated within the higher education setting. The data detailed faculty demographics utilizing TLE TeachLivE™, the courses in which TLE TeachLivE™ was being used, and how the faculty identified and measured student learning outcomes. Data collected by the researcher also reported if and how educators provided feedback to and received feedback from their students when using TLE TeachLivE™ in their courses. The data gathered were analyzed by the researcher using frequency (descriptive statistics).

CHAPTER IV

RESULTS

The focus of this research was to examine how TLE TeachLivE™ has been integrated within the higher education setting and how student learning outcomes have been addressed and measured, with input from educators utilizing TLE TeachLivE™. Results of the research are comprised of data collected from 39 respondents out of 41 surveys sent to institutes of higher education who currently use TLE TeachLivE™.

Demographic Information

The demographic information collected from the survey included the following: faculty position at respective higher educational institution; years of experience in higher education; program area of instruction; semesters utilizing TLE TeachLivE™; number of courses taught; and academic level of students enrolled in the courses for which faculty had utilized or were utilizing TLE TeachLivE™.

Faculty Position Held at College or University

The faculty position held at the college or university setting of higher education, as indicated by the 39 respondents, included: 9 Professors; 7 Associate Professors; 6 Assistant Professors; 12 Instructors/Lecturers; 3 Adjuncts; and 2 Others identified as (a) Doctoral Students and TLE TeachLivE™ Coordinators and (b) Faculty Administrators and Instructors.

Table 1

Faculty Position

Position	Respondents	Percent
Professor	9	23.1
Associate Professor	7	17.9
Assistant Professor	6	15.4
Instructor/Lecturer	12	30.8
Adjunct	3	7.7
Other	2	5.1

Years of Experience in Higher Education Setting

Survey participants indicated that they have taught in a higher education setting from 1 to 22+ years. Survey data show that: 4 participants have taught 1-3 years; 11 participants have taught 4-6 years; 9 participants have taught 7-9 years; 2 participants taught 10-12 years; 4 participants have taught 13-15 years; 4 participants have taught 16-18 years; and 5 participants have taught 22+ years within a higher education setting, for a total of 39 respondents participating in the survey.

Table 2

Years Taught in Higher Education

Years Taught	Respondents	Percent
1-3	4	10.3
4-6	11	28.2
7-9	9	23.1
10-12	2	5.1
13-15	4	10.3
16-18	4	10.3
22+	5	12.7

Program Area of Instruction

Educators were asked to identify the program area in which they currently teach. Participants indicated the following program areas of instruction: 16 General Education; 10 Special Education; 1 Education Administration; 2 Bilingual; 3 Counseling; and 7 Other (1 Early Childhood Education, 1 General and Special Education, 1 Instructional Design and Educational Technology, 1 Mathematics Education, 2 Secondary Education, and 1 Teacher Education), for a total of 39 respondents.

Table 3

Faculty Program Area

Program Area	Respondents	Percent
General Education	16	41.0
Special Education	10	25.6
Educational Administration	1	2.6
Bilingual/ESL	2	5.2
Counseling	3	7.7
Other	7	17.9

Semesters Utilizing TLE TeachLive™

Survey participants within higher education indicated they have utilized TLE TeachLive™ within their courses from 1 semester to 15 semesters. Five participants indicated this was the first semester to use TLE TeachLive™; eight participants have used it for two semesters; nine participants have used it three semesters; three participants have used it for four semesters; one participant used it for five semesters; three participants used it for six semesters; one participant used it for seven semesters; four

participants used it for eight semesters; three participants used it for 12 semesters; one participant has used it for 13 semesters; and one participant has used it for 15 semesters, for a total of 39 respondents participants in the survey.

Table 4

Semesters Using TLE TeachLivE™

Semesters Taught	Respondents	Percent
1	5	12.7
2	8	20.4
3	9	23.1
4	3	7.7
5	1	2.6
6	3	7.7
7	1	2.6
8	4	10.3
12	3	7.7
13	1	2.6
15	1	2.6

Number of Courses Taught Using TLE TeachLivE™

Survey participants who utilize TLE TeachLivE™ indicated using this technology between one and five courses. Twenty participants utilized TLE TeachLivE™ for one course; 14 participants utilized it for two courses; three participants have utilized it for three courses; while two participants have utilized it for five courses.

Table 5

Number of Different Courses Taught Using TLE TeachLivE™

Courses Taught	Respondents	Percent
1	20	51.3
2	14	35.9
3	3	7.7
5	2	5.1

Research Questions

The following questions provided a basis for this study:

1. How is TLE TeachLivE™ being used within the higher education setting?
2. How are student learning outcomes addressed and measured for the usage of TLE TeachLivE™ within the higher education setting?

Research Question One

How is TLE TeachLivE™ being used within the higher education setting?

To determine how TLE TeachLivE™ is being used within the higher education setting, the researcher reviewed data from responses to four of the survey questions which related directly to TLE TeachLivE™ usage. The first of these survey questions asked: What is your program area? This question was asked to determine the program area(s) utilizing TLE TeachLivE™ within higher education. Data from responses indicated that TLE TeachLivE™ is being used within the higher education setting in the program areas of General Education (41%), Special Education (25.6%) Educational Administration (2.6%), Bilingual/ESL (5.1%), Counseling (7.7%), and Other (17.9%) which includes: Early Childhood (2.6%), General and Special Education (2.6%),

Instructional Design and Educational Technology (2.6%), Secondary Education (5.1%), and Teacher Education (2.6%).

Table 6

Program Areas in Which TLE TeachLivE™ is Used

Program Areas	Respondents	Percent
General Education	16	41.0
Special Education	10	25.6
Educational Administration	1	2.6
Bilingual/ESL	2	5.1
Counseling	3	7.7
Early Childhood Education	1	2.6
General/Special Education	1	2.6
Inst. Design and Educ. Tech.	1	2.6
Mathematics Education	1	2.6
Secondary Education	2	5.1
Teacher Education	1	2.6

The second of the survey questions related directly to how TLE TeachLivE™ is being used within the higher education setting was: Which of the following area(s) are your focus when using TLE TeachLivE™? Data from responses indicated that the focus when using TLE TeachLivE™ was Teaching Skills and Pedagogy (71.8%), Specific Content (12.8%), Managing Student Behaviors (59%), Individual Student Goals (5.1%), and Other (20.5%) which includes: Parent Conferencing (10.4%), Mock IEP meetings (2.6%), Professionalism, Collaboration, and Advocacy (2.6%), Spanish Language Use (2.6%), Technology Integration Skills and Analyzing Simulations as an Instructional Method (2.6%).

Table 7

Areas of Focus When Using TLE TeachLivE™

Areas of Focus	Respondents	Percent
Teaching Skills and Pedagogy	28	71.8
Specific Content	5	12.8
Managing Student Behavior	23	59.0
Individual Student Goals	2	5.1
Parent Conferencing/Engagement	4	10.4
Mock IEP Meetings	1	2.6
Professionalism, Collaboration, Advocacy	1	2.6
Spanish Language Use	1	2.6
Technology Integration Skills	1	2.6

A third survey question related directly to how TLE TeachLivE™ is being used in higher education asked respondents to: List the title of the course(s) in which you have either used or are currently using TLE TeachLivE™. Participant responses indicated that TLE TeachLivE™ is being used within the higher education setting in a variety of instructional courses. The courses can be categorized broadly into the areas of Methods, Behavior Management, Counseling, Administration, Introduction to Education, Technology, and Other.

Table 8

Subject and Number of Courses Taught Using TLE TeachLivE™

Subject Area	No. of Classes	Sample Class(s)
Methods	43	Creating Inclusive Classrooms Teaching Diverse Learners Learning Theory and Development
Behavior Management	19	Classroom Management Crisis Intervention Classroom Environment & Management
Counseling	3	Group Counseling Professional School Counseling
Administration	2	Professional Development & Supervision
Introduction to Education	1	Introduction to Exceptional Education
Technology	1	Multimedia Development
Other	3	Course numbers only

The fourth survey question that directly addressed TLE TeachLivE™ usage was: How many semesters have you used TLE TeachLivE™? This question was designed to investigate whether faculty were using TLE TeachLivE™ on a repeating basis. Participant responses indicate that educators have been using TLE TeachLive™ within their courses from 1 semester up to 13 semesters. Nine participants indicated that this was their first semester to use TLE TeachLive™; 12 participants have used it for two semesters; one participant used it three semesters; six participants have used it for four semesters; two participants used it for five semesters; two participants used it for six

semesters; one participant used it for seven semesters; four participants used it for eight semesters; one participant used it for 12 semesters; and one participant used it for 13 semesters, for a total of 39 respondents.

Table 9

Number of Semesters Taught Using TLE TeachLivE™

Semesters Using TLE TeachLivE™	Respondents	Percent
1	9	23.1
2	12	30.8
3	1	2.6
4	6	15.4
5	2	5.1
6	2	5.1
7	1	2.6
8	4	10.3
12	1	2.6
13	1	2.6

Research Question Two

How are student learning outcomes addressed and measured for the usage of TLE TeachLivE™ within the higher education setting?

This research question was designed to investigate if or how educators who utilize TLE TeachLivE™ within the higher education setting have addressed and measured student learning outcomes, and also to explore methods of feedback educators use. The researcher analyzed data from five survey questions designed to determine if and how educators address and measure learning outcomes; whether educators provide feedback

for the utilization of TLE TeachLivE^{TM} within their classroom; and/or whether students provide feedback to the educator from their session(s) of using TLE TeachLivE^{TM}.

The first question related to how student learning outcomes are addressed was: Did you identify specific student learning outcomes for using TLE TeachLivE^{TM} in this course? Of the 39 respondents, 33 (84.6%) participants indicated that they identify specific student learning outcomes for the courses they teach. There were 6 (15.4%) participants that stated they do not identify specific student learning outcomes for their courses.

Survey participants were asked to list or summarize their specific learning outcomes for courses in which they used TLE TeachLivE^{TM}. Responses have been categorized by the researcher into four areas. A sampling of participant responses to the survey are included:

- **Classroom Management (Behavior Strategies) Targeted Behaviors:**
    - Specific praise (rate and quality of statement)
    - Praise around (ignoring misbehavior by praising another student, then praising target student once he or she has complied)
    - Management of student off-task behaviors
    - Movement around learning space
    - Proximity control
    - Prepare and deliver a lesson while managing behaviors

- Respond to problem behaviors and utilize appropriate techniques to de-escalate a situation
- Implement evidence-based practices (i.e., praise, opportunities to respond, prompting) and use those skills to increase the likelihood of appropriate behavior
- Use strategies to manage student behaviors (i.e., proximity, redirect, alternative assignment, and effective/meaningful praise)
- Manage behavior; explicit behavior; chart frequency of behavior; developing goals and objectives to change target behavior
- Redirect student behaviors
- Strategies – Precision Commands; reductive consequences
- Manage surface behavior
- Identify, describe, and utilize interventions to foster social competence for students with disabilities and students at-risk for behavior challenges
- How to handle a student who wants to interrupt instruction with a story

- **Teaching Strategies:**
  - Determine most appropriate teaching/learning strategies based on the student characteristics and behaviors
  - Modify communication to reach various levels of English language learners
  - Model development of productive environment for classroom learning

- Participate in three specific classroom contexts: Pre-instruction; Session Openings such as engaging students, taking role, reviewing the last session, state current objectives, behavioral expectations, materials expectations, ask if there were questions; Start of an instructional lesson
- Design and communicate instructions for a technology-integrated assignment and facilitate a discussion on the goals for learning and technology in the assignment
- Demonstrate stages of lesson execution (i.e., hook, direct instruction, guided practice, independent practice, and closure)
- Demonstrate a knowledge of specific teaching strategies
- Demonstrate opportunities to respond (rate and question type) and error correction (model, test, delayed test)
- Teach a literacy strategy
- Teach a lesson on poetry

- **Conferencing (Parent/Teacher or Student):**
  - Participate in a mock parent/teacher conference
  - Present information to the parent on RtI
  - Share data with parent during a conference
  - Increase ability to conduct post conferences in the supervision cycle with specific attention on use of subjective versus objective feedback
  - Use student data when conducting a parent conference

- Increase level of competency or comfort when conducting crucial conversations with a parent
- Use data to identify areas of academic concern and communicating with a parent

- **Collaboration:**
  - Demonstrate a knowledge of co-teaching skills
  - Demonstrate professional communication and collaboration skills
  - Build student confidence and participate in co-teaching
  - Collaborate with other students on how to handle difficult students

As indicated by the responses, desired learning outcomes are specified and targeted by 84.6% of the participants who use TLE TeachLivE^{TM}.

The survey participants were asked to identify how student learning outcomes were measured within the course(s) they have taught using TLE TeachLivE^{TM}. Each participant was asked to indicate which of the following ways learning outcomes were measured: Observation, Student Questionnaire/Survey, Rubric, Recorded Session for Student/Professor Review, and Pre-/Post-Test/Survey. The survey responses indicated that 34 (87.2%) use observation to measure student learning outcomes; 16 (41%) use a student questionnaire/survey as a measurement for student learning outcomes; 9 (23.1%) use a rubric to measure student learning outcomes; 6 (15.4%) use a recorded session for the student and professor to review as a means of measurement for student learning outcomes; and 4 (10.3%) used a pre-/post-test/survey to measure student learning

outcomes in their courses. Although the majority of participants (87.2%) indicated they use observation to measure learning outcomes, respondents used more than one formal and informal form of measurement.

Table 10

How Student Learning Outcomes Were Measured

Measurement of Student Learning Outcomes	Respondents	Percentage
Observation	34	87.2
Student Questionnaire/Survey	16	41.0
Rubric	9	23.1
Recorded Session	6	15.4
Pre/Post-Test/Survey	4	10.3

Respondents were asked: From your student learning outcomes measurements, what percentage of students met the learning outcomes? There were 29 participant responses indicating that a range of 81-100% of the students met the learning outcomes; there were four participant responses indicating that 61-80% of the students met the learning outcomes; there was one participant indicating that 21-40% of the students met the learning outcomes; five participants did not respond to the question. This could be because of the previous question where they may have indicated that they did not measure student learning outcomes for their course of instruction.

If you gave feedback to the students using TLE TeachLivE^{TM}, what type of feedback was given? The participant was asked to choose between verbal or written feedback and to indicate the timing: During TLE TeachLivE^{TM} session; Immediately after session; Before the next class session; During the next class session; Did not give

feedback; or Other, where the respondent indicated differing forms of feedback not listed in the feedback choices given. Of the respondents, 92.3% gave verbal feedback to the students; 59% gave written feedback; 19% gave feedback during the TLE TeachLivE^{TM} session; 71.8% gave feedback immediately after the TLE TeachLivE^{TM} session; 17.9% gave feedback to the students before the next class; 23.1% gave feedback during the next class session; and 2.6% stated they don't give any feedback to the students. Additional responses regarding feedback from participants included:

- Professor and other students in the class completed a Lesson Plan Feedback Form which was given back to the students at the end of their session
- Took data on the frequency of the students' behaviors (i.e., praise, opportunities to respond, and prompting) and shared these data with the students in addition to qualitative feedback
- Created a discussion board where students were able to read feedback and discuss the positive and negatives during their session
- If the student did not execute any part of the seven components to the opening, the facilitator slowed the opening down by having the student avatars ask a question (i.e., "Are you going to take role today?" "Do we need any materials for this class?"). I also asked the facilitator to reinforce at least one positive action by student "I like the way you used our names when you asked us questions."

- Students received coaching in the virtual lab and then submitted a video in which they applied DTT with students in their classrooms. A rubric for coaching was also applied to the classroom videos and feedback was provided.
- Take data on the target skill, after each teaching turn the observing teachers as asked to identify something the teacher did well on the target skill, then the collected data is shared with the teacher and asked to verbalize something he or she will improve on his or her next turn. There are three sessions per teacher. After the final turn of the session, the final question is adapted and the teacher is asked to make an explicit connection between the target skill practiced and his or her classroom.
- Students grouped in teams of three and watched each other with professor commenting on what is being seen. The last student to perform had the benefit of observations made by professor on the first two. The first student listened to professor comment on the others. The combination of feedback from the facilitator and ongoing analysis by professor seemed to be valued by students.

Table 11

How Feedback Was Given to Students

Feedback Given to Students	Respondents	Percent
Verbal	36	92.3
Written	23	59.0
During Session	19	48.7
Immediately After Session	19	48.7
Before Next Class	28	71.8
During the Next Class	7	17.9
Did Not Give Feedback	1	2.6
Other	3	7.7

If students gave feedback from their session of using TLE TeachLivE^{TM} , what type of feedback was given? The participant was asked to choose from verbal or written feedback and to indicate the timing; During TLE TeachLivE^{TM} session; Immediately after session; Before the next class session; During the next class session; Did not give feedback; or Other, where respondent indicated other forms of feedback not listed in the feedback choices given. Of the respondents who have their students give feedback, 69.2% state the students give a verbal feedback of their session; 64.1% of the respondents state the students give a written feedback of their session; 23.1% state the students give feedback during the TLE TeachLivE^{TM} session; 56.4% state the students give feedback immediately after the session; 17.9% state the students give feedback to their TLE TeachLivE^{TM} session before the next class session; and 25.6% state students give feedback during the next class session. Additional responses from participants include:

- There were three reflections (from students), one for each session. Specific questions and content were given by the professor to look for and include in their reflection of the session.
- Online discussion between professor and students to discuss target skills and how it is working in their classroom
- Students wrote a short reflection paper about their experiences in the sessions.
- Students complete an online survey in the week following their experience in the lab. They also complete an After Action Review immediately upon finishing the coaching session.
- Students give verbal feedback after the sessions and written feedback at the end of the semester.
- Students are required to submit reflection.

Table 12

How Students Gave Feedback

Feedback Given by Students	Respondents	Percent
Verbal	27	69.2
Written	25	64.1
During Session	9	23.1
Immediately After Session	22	56.4
Before Next Class	7	17.9
During the Next Class	10	25.6
Did Not Give Feedback	0	0.0
Other	3	7.7

Data Results

Data for this study were collected using a survey design. Data results were analyzed by the researcher.

The first research question asked: How is TLE TeachLivE^{TM} being utilized within the higher education setting?

Based on the responses provided by the survey, TLE TeachLivE^{TM} is being used primarily by educators within education courses such as general education, special education, educational administration, bilingual/ESL, early childhood, secondary education, and teacher education. Responses also indicated TLE TeachLivE^{TM} is used in courses such as counseling, instructional design, and educational technology. Educators that utilize the TLE TeachLivE^{TM} lab indicated they use TLE TeachLivE^{TM} for addressing individual student goals, for focusing on teaching skills and pedagogy, for practice managing student behavior, for parent conferencing, for practicing an IEP setting, for practicing professionalism, and for collaboration and advocacy. One participant utilized TLE TeachLivE^{TM} to practice Spanish language usage. Another faculty member indicated using TLE TeachLivE^{TM} for technology integration skills and analyzing simulations as an instructional method. Respondents of the survey also listed the course(s) in which they were utilizing TLE TeachLivE^{TM}.

Data from research question one provide information on how TLE TeachLivE^{TM} is being integrated within multiple institutes of higher education. Data gathered in this

research identify the positions held by educators in higher education who have integrated TLE TeachLivE^{TM}, and lists various course(s) of instruction. Data also document if and how educators provide feedback to and receive feedback from their students regarding the utilization of and experience in TLE TeachLivE^{TM}. In addition, data from research document how TLE TeachLivE^{TM} has been used by educators within multiple institutions of higher learning, throughout multiple program area(s), varied courses of instruction, and often over multiple semesters.

The second research question asked: How are student learning outcomes addressed and measured for the utilization of TLE TeachLivE^{TM} within the higher education setting?

Survey data show how educators within higher education have addressed and measured learning outcomes and methods of feedback for the usage of TLE TeachLive^{TM}. Survey data indicate that 84.6% of the participants indicated they have specific student learning outcomes in the courses they teach for the utilization of TLE TeachLivE^{TM}. There were questions within the survey that asked how student learning outcomes were measured and addressed. The survey asked if instructors used verbal, written, or other feedback and identified if and when feedback was given to the students. There were also questions as to how students gave feedback to faculty after using TLE TeachLivE^{TM} to determine if learning outcomes were being met. A majority of the survey participants within higher education identify learning outcomes that are measured by both verbal (92.3%) and written (59%) feedback, including discussion right after the

session (48.7%). Data from the respondents indicates that 69.2% of students give verbal feedback to instructors and 64.1% provide written feedback after their TLE TeachLivE™ session.

This process of providing feedback is similar to a study done by Garland et al. (2015). In this study six educators were asked to give a lesson using TLE TeachLivE™, the participants were given a checklist as well as coaching on their teaching style and asked to teach a different lesson. From the coaching and checklist, the teachers felt more confident in their teaching after using TLE TeachLivE™ (Garland et al., 2015).

CHAPTER V

SUMMARY AND DISCUSSION

TLE TeachLivE™ is a mixed-reality virtual classroom environment that has been used within the higher education setting, primarily in the field of education, to support students learning and developing specific skills as determined by their instructors. The main purpose of this research was to determine how TLE TeachLivE™ is being integrated by professors within higher education, and how instructors identify and measure student learning outcomes. The researcher created on on-line survey which was sent to 41 schools of higher education within the United States. There were 39 respondents to the survey who participated in this research. The researcher identified if and how instructors gave and received student feedback regarding the utilization of TLE TeachLivE™.

Results

Responses to the on-line survey provided data on how TLE TeachLivE™ is being integrated within higher education. Results from 39 respondents indicated that TLE TeachLivE™ is being utilized primarily within the field of education, in the program areas of general education (41%), special education (25.6%), bilingual/ESL education (5.1%), early childhood education (2.6%), secondary education (5.1%), teacher education (2.6%), and educational counseling (7.7%). The focus of TLE TeachLivE™ utilization is primarily for teaching skills, pedagogy, and management of student behaviors. TLE

TeachLivE™ is being utilized in multiple institutions of higher education in a variety of courses, on a repeating basis, and often over several semesters. TLE TeachLivE™ technology is being integrated within the field of education as a component of many teacher educator programs. Data also indicate TLE TeachLivE™ is being used in the areas of counseling, administration, and technology. TLE TeachLivE™ is used by faculty in institutes of higher education at all professional levels, i.e., professor, associate professor, assistant professor, instructor/lecturer, adjunct, doctoral students, and TLE TeachLivE™ coordinators.

Research data document that TLE TeachLivE™ is being utilized by educators within higher education whose experience ranges from beginning to veteran professors with years of experience ranging from 1 to 22+ years (see Table 2). Data also identify the program area for which TLE TeachLivE™ has been utilized within institutes of higher education. The areas of TLE TeachLivE™ utilization include not only general and special education programs, but usage has expanded to areas such as educational administration, bilingual/ESL, counseling, early childhood education, instructional design, and educational technology (see Table 3).

Survey data show that TLE TeachLivE™ has been utilized by instructors within higher education from 1 to 15 semesters, indicating that TLE TeachLivETM is being used by various educators over multiple semesters (see Table 4) and multiple courses (see Table 5). Fourteen participants indicate having taught two courses. Three participants

indicate they have taught three courses. Two of the participants indicated having taught five courses in which they integrated TLE TeachLivE^{TM}.

The data from research also reveal that 84.6% of instructors in institutes of higher education who utilize TLE TeachLivE^{TM} identify specific student learning outcomes. These learning outcomes are measured primarily through teacher observation (87.2%), use of student questionnaire/survey (41%), and rubric (23.1%). The measurement of learning outcomes gives the instructor data to indicate if the student has met the criteria set and has mastered the target outcome. Feedback for students using TLE TeachLivE^{TM} is generally given verbally immediately after the session or written at some point following the session.

Data from this research show that the emerging TLE TeachLivE^{TM} simulator is being used by educators within higher education to prepare students for careers within education. Data indicate that students using this technology are meeting the identified learning outcomes set by their instructors and mastering skills that can be utilized in the classroom. TLE TeachLivE^{TM} technology is continuing to impact the field of teacher education preparation. The survey shows that 85.3% of students met the learning outcomes established by their professors. Dieker, Rodriguez et al. (2014) stated "Any simulated environment must be grounded in effective teaching practice" (p. 24). The survey data show that 29 out of 39 participants indicate that their students are meeting learning outcomes set for courses utilizing TLE TeachLivE^{TM} at a rate of 81% or higher. The research data show that 84.6% of participants identify specific student learning

outcomes when utilizing TLE TeachLivE™. Thirty-three participants indicated that students met the identified student learning outcomes they had set for their course(s).

Conclusion

The results of this study add to the field of research on TLE TeachLivE™ by documenting the utilization of TLE TeachLivE™ as an emerging technology within higher education. The analyzed data indicate that TLE TeachLivE™ is being utilized not only for its intended design of preparing pre-service teachers to enter the field of education with skills in behavior management, content delivery, and classroom leadership, but also to train administrators, counselors, and teachers in program areas within education. TLE TeachLivE™ is being used by educators in various ways, varying courses, and from one semester to another. This emerging technology is being used by all levels of educator experience and expertise. Beginning educators and veteran professors alike are utilizing TLE TeachLivE™ in the courses and program areas of instruction. TLE TeachLivE™ is being utilized with a specific learning outcome in mind by 84.6% of participants and by 100% of those participants who utilize TLE TeachLivE™ on a recurring basis. TLE TeachLivE™ is extending beyond pre-service teacher training, with the potential for expansion to other program areas within the field of education. All of the survey respondents using TLE TeachLivE™ are within the field of education.

Limitations

This research is limited by the survey format. Information on which institutes and what faculty of higher education who utilize TLE TeachLivE^{TM} was anonymous. The researcher was dependent on the TLE TeachLivE^{TM} coordinator of each school of higher education to forward the e-mail with the survey link to faculty that utilize TLE TeachLivE^{TM} within their courses. The format of the survey did not permit the researcher to determine if TLE TeachLivE^{TM} is being utilized on a continual basis in specific or multiple institutes of higher education, if usage of TLE TeachLivE^{TM} is declining within institution(s), or if usage is being expanded to other fields beyond education and teacher preparation. The survey format also limits the ability to determine if successful mastery of learning outcomes is being met in all institutes of higher education utilizing TLE TeachLivE^{TM}, or in only a select few, and whether the faculty position was linked to students meeting the learning outcome criteria.

Data from respondents serve to document how educators identify and measure learning outcomes and how feedback is given to and received from students when TLE TeachLivE^{TM} is utilized. Without a listing of all institutes of higher education, the researcher is unable to report data in this research as all-inclusive for utilization of TLE TeachLivE^{TM} within higher education. The findings of this study are also limited by the number of respondents. There were 41 e-mails sent to higher education within the United States with 39 faculty responding. Names and contact information were only available

from websites as public information. E-mails were located from exploring the websites of institutes of higher education who have utilized TLE TeachLivE™.

Implications

The scope and findings of this research contribute to the literature on TLE TeachLivE™. First, the researcher presents documentation of the utilization of TLE TeachLivE™ within higher education in the United States, including data on courses and program areas in which TLE TeachLivE™ has been utilized. Second, data from this research is presented to show how faculty within higher education measure student learning outcomes and provide feedback for the utilization of TLE TeachLivE™. Third, the researcher contributes to the literature on the utilization of TLE TeachLivE™ in teacher preparation by presenting a unique aspect of research encompassing TLE TeachLivE™, which sets it apart from previous studies by focusing specifically on the educators who are utilizing TLE TeachLivE™ within higher education.

Information obtained from this study relates to how TLE TeachLivE™ is being utilized within higher education, how student learning outcomes are being met and measured for TLE TeachLivE™ within higher education, and how feedback is being given to students. Information from the survey may give faculty of higher education institutions insight as to how to implement and measure student learning outcomes within courses that utilize TLE TeachLivE™. It may provide educators areas to explore for additional utilization of TLE TeachLivE™ within their respective institutions of learning. Data documented in the research have the potential for institutes of higher education to

incorporate or expand TLE TeachLivE™ usage within teacher preparation programs, as they begin or continue utilizing this technology.

Summary

This study examined how TLE TeachLivE™ has been integrated by educators in higher education settings. Data collected from survey participants were used to identify courses and fields of study in which faculty have utilized TLE TeachLivE™; to determine how learning outcomes have been addressed; and to identify methods of feedback faculty provide to and receive from students regarding the use of TLE TeachLivE™ in their course(s) within higher education.

These data indicate that TLE TeachLivE™ is being utilized by faculty at all levels within higher education settings, as well as coordinators of the TLE TeachLivE™ labs. These data also indicate that TLE TeachLivE™ is being utilized on a recurring basis for multiple courses and from one semester to another and from year to year. TLE TeachLivE™ is being utilized by educators with a range of experience from novice to expert and first year to veteran teachers. TLE TeachLivE™ is emerging and educators are incorporating this technology into their teaching.

Future Research

There is still much to learn about how and the extent to which TLE TeachLivE™ is being utilized within higher education. Further research could help to determine the validity of how student learning objectives for the utilization of TLE TeachLivE™ are being identified and measured. Future research could target how feedback for TLE

TeachLivE™ is given to and received from students by their instructors. Ongoing research could serve to document the effectiveness of this mixed-reality, virtual technology in teacher training programs that are preparing students to transfer skills into the classroom setting.

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APPENDIX A

Letter of IRB Approval

Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378
email: IRB@twu.edu
http://www.twu.edu/irb.html

DATE: March 3, 2016

TO: Mr. Randy Yates
Teacher Education

FROM: Institutional Review Board (IRB) - Denton

Re: Exemption for Integration of TLE TeachLivE Within Higher Education (Protocol #: 18958)

The above referenced study has been reviewed by the TWU IRB (operating under FWA00000178) and was determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. Because a signed consent form is not required for exempt studies, the filing of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been closed, any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Jane Pemberton, Teacher Education
Graduate School

APPENDIX B

Initial E-Mail Sent to Participating Universities

Attn: Teachlive Coordinator

My name is Randy Yates. I am currently working on my doctoral degree at Texas Woman's University (TWU) in the area of special education, with an interest in Teachlive. In an effort to better understand how objectives are measured within Teachlive, I am asking faculty who currently use or have used Teachlive prior to this semester to participate in a (fill in number) question survey.

I would respectfully request that if you are not the Teachlive coordinator that you please forward this e-mail to the appropriate person.

I would respectfully request that you please forward this e-mail to those faculty who are currently using, or have used Teachlive requesting their participation.

Your participation in this study is voluntary and may be discontinued at any time without penalty. All information that you provide is strictly confidential, and no individual or university will be identified. The information gathered will be used for analysis only.

The approximate time to take the survey will be from 10-15minutes. There is a potential risk of loss of confidentiality in downloading and internet transactions. Confidentiality will be protected to the maximum extent allowed by law.

There is no direct benefit for participation in this research; Information obtained may be used for the development of programming recommendations to support how Teachlive is utilized and how objectives are measured.

To participate in the study, please click on the link below. The completion and submission of your completed survey will constitute your informed consent to act as a participant in this research. If you would like a copy of the findings as a result of this study, please e-mail me at ryates1@twu.edu) your name and address and I will send it to you at the completion of this research.

For questions regarding this research, you may contact either myself or Dr. Jane Pemberton at:

Randy Yates, M.Ed.
ryates1@twu.edu

Jane Pemberton, Ph.D.
jpemberton@twu.edu

If you have questions about your rights as a participant in this research, or the way this study has been conducted, you may contact Texas Woman's University Office of Research and Sponsored Programs at 940.898.3378 or via e-mail at IRB@twu.edu.

Thank you in advance for your time, participation and for the information provided in your responses to this survey.

SURVEY LINK

APPENDIX C

Reminder E-Mail Sent to Participating Universities

Attn: Teachlive Coordinator

My name is Randy Yates. I am currently working on my doctoral degree at Texas Woman's University (TWU) in the area of special education, with an interest in Teachlive. In an effort to better understand how objectives are measured within Teachlive, I am asking faculty who currently use or have used Teachlive prior to this semester to participate in a (fill in number) question survey.

I would respectfully request that if you are not the Teachlive coordinator that you please forward this e-mail to the appropriate person.

I would respectfully request that you please forward this e-mail to those faculty who are currently using, or have used Teachlive requesting their participation.

I originally e-mailed you on (fill in date), asking that you forward the e-mail requesting faculty who currently use or have used Teachlive prior to this semester, to participate in a study designed to get a better understanding of how Teachlive is used in higher education. I am requesting that you again forward this e-mail, as a reminder for those professors that may not have completed the survey. I have also attached a copy of the original e-mail for your review, if needed.

Your participation in this study is voluntary and may be discontinued at any time without penalty. All information that you provide is strictly confidential, and no individual or university will be identified. The information gathered will be used for analysis only.

The approximate time to take the survey will be from 10-15minutes. There is a potential risk of loss of confidentiality in downloading and internet transactions. Confidentiality will be protected to the maximum extent allowed by law.

There is no direct benefit for participation in this research; Information obtained may be used for the development of programming recommendations to support how Teachlive is utilized and how objectives are measured.

To participate in the study, please click on the link below. The completion and submission of your completed survey will constitute your informed consent to act as a participant in this research. If you would like a copy of the findings as a result of this study, please e-mail me at ryates1@twu.edu) your name and address and I will send it to you at the completion of this research.

For questions regarding this research, you may contact either myself or Dr. Jane Pemberton at:

Randy Yates, M.Ed.
ryates1@twu.edu

Jane Pemberton, Ph.D.
jpemberton@twu.edu

APPENDIX D

Survey

TeachLivE

You have been asked to complete this survey because you have used TLE TeachLivE™ (TeachLivE) (now Mursion) in one or more courses you teach. This survey is to look at how TeachLivE is integrated in your course(s). The survey process should take 10-15 minutes to complete. The completion and submission of your completed survey will constitute your informed consent to act as a participant in this research.

Thank you for taking your time to complete this survey.

*

What is your position at the college/university?

Professor Associate Professor Assistant Professor Instructor/Lecturer Adjunct Graduate or Teacher Assistant Other (please specify)

*

Including this year, how many years have you been teaching courses (full- or part-time) in higher education?

--Select--

*

Which of the following is your program area?

--Select--

Other:

*

Including this semester, how many semesters have you used TeachLivE within your courses?

--Select--

Which of the following area(s) are your focus when using TeachLivE? (select all that apply)

Teaching skills and pedagogy Specific content Managing student behaviors Individual student goals Other (please specify)

*

How many different course(s) have you taught that use TeachLivE?

1 2 3 4 5

For the remainder of questions, please answer for each course in which you have used TeachLivE. (There are up to five different course areas to fill in if needed)

If you taught this course more than one semester, base your answers on the last semester you taught the course.

List the title of course 1 in which you have either used or are currently using TeachLivE.

List the title of course 2 in which you have either used or are currently using TeachLivE.

List the title of course 3 in which you have either used or are currently using TeachLivE.

List the title of course 4 in which you have either used or are currently using TeachLivE.

List the title of course 5 in which you have either used or are currently using TeachLivE.

	Course 1	Course 2	Course 3	Course 4	Course 5
How many semesters have you used TeachLivE with this course?					

	Course 1	Course 2	Course 3	Course 4	Course 5
What was the academic level of students?	--Select--	--Select--	--Select--	--Select--	--Select--

	Course 1	Course 2	Course 3	Course 4	Course 5
Did you identify specific student learning outcomes for using TeachLivE in this course?	--Select--	--Select--	--Select--	--Select--	--Select--

If you answered YES, list or summarize your identified specific learning outcomes for each course.

Course 1:

(1000 characters remaining)

Course 2:

(1000 characters remaining)

Course 3:

(1000 characters remaining)

Course 4:

(1000 characters remaining)

Course 5:

(1000 characters remaining)

How were student learning outcomes measured? (select all that apply)

	Course 1	Course 2	Course 3	Course 4	Course 5
Observation	☐	☐	☐	☐	☐
Student Questionnaire/Survey	☐	☐	☐	☐	☐
Rubric	☐	☐	☐	☐	☐
Recorded session for student/professor review	☐	☐	☐	☐	☐
Pre/Post-test/survey	☐	☐	☐	☐	☐

	Course 1	Course 2	Course 3	Course 4	Course 5
From your student learning outcomes measurements, what percentage of students met the learning outcomes?	--Select--	--Select--	--Select--	--Select--	--Select--

If you gave feedback to the students using TeachLivE, was it: (select all that apply)

	Course 1	Course 2	Course 3	Course 4	Course 5
Verbal	☐	☐	☐	☐	☐
Written	☐	☐	☐	☐	☐
During TeachLivE session	☐	☐	☐	☐	☐
Immediately after session	☐	☐	☐	☐	☐
Before the next class session	☐	☐	☐	☐	☐
During the next class session	☐	☐	☐	☐	☐
Did not give feedback	☐	☐	☐	☐	☐
*Other	☐	☐	☐	☐	☐

*Other: Please be specific with course number and what you did for feedback if you used other ways of feedback that were not mentioned, or you want to give further detail about your feedback procedure.

(1000 characters remaining)

If the students gave feedback from their session of using TeachLivE, was it: (select all that apply)

	Course 1	Course 2	Course 3	Course 4	Course 5
Verbal	☐	☐	☐	☐	☐
Written	☐	☐	☐	☐	☐
During TeachLivE session	☐	☐	☐	☐	☐
Immediately after session	☐	☐	☐	☐	☐
Before the next class session	☐	☐	☐	☐	☐
During the next class session	☐	☐	☐	☐	☐
Students did not give feedback	☐	☐	☐	☐	☐
*Other	☐	☐	☐	☐	☐

*Other: Please be specific with course number and what your students did for feedback if you used other ways of feedback that were not not mentioned, or you want to give further detail about your feedback procedure.

(1000 characters remaining)

Continue ONLY when finished. You will be unable to return or change your answers.

Thank You