TeachLivE National Research Project

Year 3 Findings

University of Central Florida

Carrie Straub, Ph.D.

Lisa Dieker, Ph.D.

Michael Hynes, Ph.D.

Charles Hughes, Ph.D.

teach live

TLE TeachLivE Year 3 Research Report

Efficacy and evolution of TLE TeachLivE™ mixed reality classroom simulator and associated scenarios for commercialization and to meet the needs of school administrators and of teachers in inclusive classrooms (Year 3).

Introduction

This report provides a summary of the varied research activities carried out as part of the Year 3 funding from the Bill and Melinda Gates Foundation. TLE TeachLivE™ (from here on referred to as TeachLivE) is a mixed reality simulator with authentic avatar interactions and responses completed in real time. In Year 1 the team completed Phase I of research with middle school avatars in the TeachLivE simulator. The research team found that mathematics teachers could significantly improve their practices in four 10-minute TeachLivE sessions with constructive feedback, and that those practices transferred back to their real classrooms. In Phase II and III, researchers looked to expand their findings to different content areas and grade levels. A new virtual classroom was developed for the simulator, with the same middle school avatars, but several years older with secondary student behaviors targeted as a high school classroom. At the conclusion of Phase II of research, the University of Central Florida (UCF) team found similar results in that the use of the TeachLivE simulator with high school avatars also improved high school teachers' practices over four 10-minute sessions with feedback, and again, these changes were observed in practice.

With the successful completion of Phase I and II national research studies, unique research ideas and questions emerged. The Phase III study (also a national study) focused on several smaller projects reflecting three domains: (1) teacher preparation, (2) student learning, and (3) preparation of other education professionals (e.g., administrators, counselors, related service providers, psychologists). Research development and methods during the Phase III study utilized middle school and high school student avatars, as well as a new adult avatar (i.e., Stacy Atkins). The goal of the Phase III research projects was to determine the efficacy of the use of TeachLivE in educational contexts. The researchers in each study explored how much time teachers needed in the simulator in order to successfully develop improved practices, how the simulator might be used to impact student learning, and what the potential uses of TeachLivE might be in other areas of P-20 learning. These research efforts were important to consider in helping to further the commercialization efforts and identify future research and development targets for the UCF team as the grant concluded.

Domain of Professional Development

The research team in Phase I and II focused on developing skills for mathematics and science teachers over four 10-minute sessions using TeachLivE. In Year 3 the team used qualitative research to examine participants' experiences using TeachLivE for professional development (PD). In the Professional Development (PD) study, the researchers built upon the results in Phase I and II, to investigate if teachers needed fewer than four sessions and less than ten minutes in each session to successfully master new material in TeachLivE. In addition to looking at dosage needed, the teachers involved in Year 3 research were able to teach lessons and interact with avatars via Skype from their homes or school classrooms, adding another new dimension for further investigation in simulation and more personalized teacher professional development.

Researchers also began four studies on PD in TeachLivE through the development of microcredentials and building on findings from Phase I and II research regarding the immediate and transferable skill improvement of teacher practices (Straub, Dieker, Hynes, & Hughes, 2014; 2015). First, research was conducted on the use of TeachLivE in relation to the microcredential work being led by Digital Promise. Microcredentials are skill-based competencies focused on fine-tuning professional skills (Fed. Reg. No. 2014-28911, 2014; Kabaker, n.d.) based on specific teacher competencies. Pilot studies in TeachLivE in the area of microcredentials focused on behavior management techniques (i.e., 4:1 Positive Praise) and co-teaching. Second, researchers from the Education Testing Services (ETS) began using TeachLivE to develop training protocols and initial licensure testing for teachers. In the ETS study, participants' interactions with avatars focused on classroom discussions, individual teacher-student interactions, and teacher-parent conferences (See Appendix A for example lesson). Third, a research team used the simulator to study cultural responsiveness as pre-service teachers honed the skills necessary to teach and involve students from urban settings. Fourth, the realm of counselor education also was investigated, using the simulator as a tool to facilitate counselor educators in role-play using avatars, compared results of role-play with other students. Professional development in this area is important to counselors' understanding and recognition of their field of work.

Research Studies

The Experiences of Secondary Teachers Who Utilized TeachLivE as a Professional Development Tool

Kathleen Becht & Lauren Delisio
University of Central Florida

Problem.

Repeated virtual rehearsals in mixed-reality computer simulated environments have been utilized as a method of PD for teachers for more than a decade in the TeachLivE^{TM} classroom laboratory. As a result of two TeachLivE studies involving PD for middle school math teachers (Straub, Dieker, Hynes, & Hughes, 2014) and high school science teachers (Straub, Dieker, Hynes, & Hughes, 2015) a need to deeply understand teachers' experiences in the use of TeachLivE emerged.

Participants.

In this phenomenological study, the experiences of nine teachers who utilized TeachLivE as a PD tool were explored across a variety of settings. These teachers were involved in Year I and II of the research and follow-up activities were conducted with volunteers from previous years to determine if training from previous years maintained and if not how many additional sessions were needed.

Method.

In Phase III of the study, participants from Phase I and Phase II took part in a follow up study to determine if the effect of TeachLivE had maintained over time. All teachers who had received TeachLivE interventions were provided the opportunity for follow up professional development with TeachLivE. Teachers volunteered to take part in the study. Research assistants observed participating teachers for one 45-minute class period using the Teacher Practice Observation Tool (TPOT) used in Phase I and II of the study. Next, each teacher received four TeachLivE PD sessions that each lasted five minutes, for a total of 20 minutes of TeachLivE sessions. The PD sessions consisted of repeated virtual rehearsal of whole-class open ended questioning using the

TeachLivE classroom remotely via Skype, in either the teachers' schools or homes, which was different from the mixed-reality lab setting, in which the sessions were facilitated by a research associate and teachers came to the research setting. Teachers were provided with immediate feedback and reflection. Furthermore, teachers were interviewed regarding their TeachLivE experiences after completion of all four of the PD sessions. Finally, the teachers were observed in their classroom again to assess frequency of open-ended questioning during the same 45-minute class (for a post-intervention count).

Results.

Teachers reported positive perceptions related to using TeachLivE. Specifically, the authenticity, interactivity, and individualization of PD in the TeachLivE classroom was perceived as positive from the teachers' interview data; however, there were noted discrepancies in the observational data that contradicted the teachers' interview responses. One teacher commented, "It didn't feel as authentic…sitting at a computer. It didn't feel like I was teaching." Conversely, another teacher who stood to use the iPad during her sessions in her classroom said, "though there may be more barriers using the iPad…. once I got into the competition and play of it, my interface with the avatars was just as real [as in the university's laboratory] and not inhibited at all…on the iPad." Additionally, a number of teachers' behaviors appeared less than professional (i.e., some teachers were sitting, teaching another class, chewing gum loudly, or using their phones during instruction in the TeachLivE (classroom) when participating in the PD in their home or school.

The diversity of technology and technological knowledge of faculty and school staff created significant difficulty with regards to access and continuity across sites. Although teachers were asked to use local area network (LAN) lines, a number connected wirelessly to the internet, creating connectivity issues, and in some cases, cancellation of the PD session. The use of Skype as the conduit to TeachLivE prevented a number of schools from participating due to school security policies.

Conclusion.

Based on the findings from this phenomenological study, the researchers identified authenticity, interactivity, and individualization of the PD, and technology access as the key themes in the data. Teachers shared their positive experiences and perspectives on the choices of setting and flexibility for PD using a virtual reality simulated classroom. The ability to individualize the PD to their own needs of time and place was a consistent theme among the teachers. While some teachers liked the choice and flexibility of PD delivered to their classrooms or homes, others maintained that they responded better to the formality of a laboratory location or setting. Further research should be conducted to examine factors and implications of delivering the intervention online in individuals' homes or workplaces, rather than formal research settings.

Microcredential: 4:1 Positive Praise Strategy

Matthew S. Taylor and Samantha Mrstik
University of Central Florida

Problem.

Teacher skills and behaviors (e.g., pedagogy, classroom management, and asking open-ended questions) impact student learning were addressed. These skills and behaviors should be continually honed and sharpened over a teacher's career. The 4:1 positive praise strategy (providing 4 positive statements to every 1 negative or redirecting statement) is a classroom management technique that has shown to be effective in curbing students' off-task behaviors, increasing academic engagement, and increasing student motivation (Musti-Rao & Haydon, 2011; Myers, Simonsen, & Sugai, 2011; Rathel, Drasgow, Brown, & Marshall, 2014). Praise has been shown to not only make students feel accepted and increase their self-esteem, but also to improve teacher-student relationships by establishing a positive learning environment (Musti-Rao & Haydon, 2011).

Microcredentialing is a competency-based approach to developing teachers' skills and is a national effort led by *Digital Promise.* The concept of microcredentialing is evident in recent releases from the U.S. Department of Education and is defined as a process of identifying and providing targeted professional development on specific teacher skills and behaviors to improve student learning outcomes (Fed. Reg. No. 2014-28911, 2014; Kabaker, n.d.). The purpose of this microcredential created to be used in TeachLivE was to support teachers in creating a positive learning environment by using the 4:1 positive praise strategy (e.g., Myers et al., 2011; Rathel et al., 2014) to increase student learning outcomes. Teacher preparation or professional development alone does not necessarily result in consistent increase in teacher's use of a skill, thus the teacher need practice in the targeted area that is observed, coached and provided data on performance to ensure a positive outcome on a teacher's daily behavior and in the use of 4:1 the teachers overall classroom management skills (Musti-Rao & Haydon, 2011; Simonsen, Myers, & DeLuca, 2010).

For the research study on the microcredential of 4:1 the following questions were posited: (1) Do participants earning a microcredential increase their ratio of positive praise to criticism in the TeachLivE simulator? (2) Will there be a statistically significant difference in pretest/posttest scores between the treatment and control group?

Participants.

In this study, participants ($N = 21$) from an elective course at a large university in the southeastern United States were randomly divided into two groups. The treatment group ($n = 15$) completed a pretest, experience a microcredentialing intervention package, and then completed a posttest. The control group ($n = 6$) completed a pretest and posttest only.

Method.

The participants in the treatment group were emailed a validated technology lesson plan that was used in TeachLivE in an earlier national research study a week before the intervention began. The participants were asked to familiarize themselves with a conversational piece of the lesson, but their target in teaching the lesson was on curbing off-task behavior in the classroom while in the simulator. Before beginning the intervention, a copy of the lesson plan was provided to all participants and any questions that did not affect the study were answered. All participants were provided an example of how to interact with the virtual classroom and students by one of the researchers. Participants completed three four-minute sessions in the TeachLivE simulator. During each four-minute session, the participants taught from the technology lesson plan. As they

taught, they had to correct student off-task behaviors (e.g., cell phone use, talking to neighbor, talking out) while trying to maintain a ratio of four positive praises to every criticism. Positive praise was defined as a spoken statement from the teacher to a student or students in the classroom that directly referenced a desired action (e.g., "I like how you…", "I appreciate the way…"). Positive praise also encompassed indirect statements referring to student actions or behaviors (e.g., "Good job," "Well done"). Criticisms were defined as negative statements or reprimands directed at unwanted actions or behaviors (e.g., "Don't…", "Stop…"; Myers et al., 2011). Between each session the participants were given feedback from the researchers and five minutes to reflect on their teaching and what they would change. After three sessions in the simulator, participants were asked to answer two open-ended questions regarding their experiences working with the avatars on this microcredential: 1) To what extent were you effective in decreasing off-task behavior using the 4:1 technique? 2) How can this technique benefit you in your classroom setting?

Results.

Researchers hypothesized the treatment group scores on the posttest would show gains that are statistically significant. Successful completion of the microcredential was considered a mean ratio of four positive praises to every one criticism. Participant scores on the microcredential and the posttest are varied. While the researchers provided feedback to participants after each session to improve the ratio of positive praise to criticisms, some participants removed negative statements altogether, choosing to ignore inappropriate behavior. Without criticisms in the classroom, behavioral problems have been seen to rise (Pfiffner et al., 1985), as was the case in our study. The majority of participants did not obtain the necessary ratio of 4:1 to earn the microcredential. Several limitations may have influenced these results, most prominent being the use of participants outside of the education majors. Some participants came from majors where interpersonal communications is not emphasized; therefore they had a wide range of interest in improving their skills. Some participants were early in their college careers and saw little value in improving the target skill. Thus, the data produced were difficult to analyze. Generally, there was improvement in the use of praise, but data analysis to date did not produce significance.

Conclusion.

The researchers in this study created a process and found positive outcomes in using a very short intervention intended to change behaviors in the simulator on a targeted microcredential of 4:1. Further research is needed to compare pre-service teachers to in-service teachers and to follow this work into practice. In future research, teachers need to be observed in their classrooms as a pretest or baseline. The next step should be to earn the praise microcredential with TeachLivE. Finally, the teachers should be observed once again in their classroom as a posttest. This type of structure could occur using remote observational technology such as Skype or Google Hangout to make validating the microcredential process efficient and doable on a large scale. Further research in this area should be grounded in the most important part of any change structure in teaching that of transference and maintenance of the skill in the actual teaching environment.

Educational Testing Services Assessing Preservice Teachers with TeachLivE

Carrie Straub
Mursion, Inc.

Problem.

Through the development of the Educational Testing Service (ETS®) National Observation Teaching Exam (NOTE) researchers are re-examining the foundational skills needed for today's entry-level teachers. The result of this work will be a new assessment tool that will offer a comprehensive suite of innovative measures designed for use in making the initial licensure decision for teacher candidates. The new assessment will provide important insights into the knowledge, skills, and competencies required to enhance student learning. The NOTE assessment series is an-ongoing research collaboration between ETS and TeachingWorks, the organization responsible for the identification and definition of high-leverage practices for teaching. The TeachLivE virtual classroom is being explored for use within portions of the NOTE assessment series in partnership with University of Central Florida (UCF) and the new commercialization company of TeachLivE, Mursion, Inc. ETS NOTE Interactive Interface Trial was implemented as exploratory research to prepare for upcoming pilot studies using the TeachLivE virtual classroom for proof of concept. Initial participants were teacher candidates recruited from the UCF College of Education and Human Performance Elementary Education program and were asked to participate in research for approximately 2.5 hours per candidate.

The purpose of this study was to test interactive performance tasks for the new National Observational Teaching Examination (NOTE) assessments currently being developed for initial teacher licensure in the TeachLivE virtual classroom. Researchers will determine how well the tasks (see Appendix A), technology, and scoring rubrics are working for the purpose of future pilot testing, with the expectation of using the results of this study to make adjustments to these components as needed.

Participants and Methods.

Participants completed a Background Information Questionnaire (BIQ) prior to participation in the study. Participants completed four tasks in the TeachLivE virtual classroom:

a) Warm-up task: This task allowed the participant time to interact with the student avatars and become comfortable in the simulated classroom (5 minutes of preparation; 5 minutes in the simulator);
b) Tryout task for the assessment of teacher-student interaction (ASTI): Participants were given 10 minutes to prepare for a task that assesses a participant's ability to elicit student thinking about a specific content topic in either English language arts or mathematics. After preparation, participants engage in a 10-minute conference with one student avatar and spent10 minutes answering questions about the student's thinking afterwards;
c) Tryout task for the classroom based assessment (CBA): This task was designed to assess a participant's ability to facilitate a class discussion around a key learning goal in either English language arts or mathematics. Participants were given 30 minutes to prepare. Then participants led a 15-minute discussion with five student avatars; and
d) Tryout task for the assessment of teacher-guardian interaction (ATGI): This task was designed to assess a participant's ability to communicate with parents or guardians about students' progress at school.

Participants had 10 minutes to prepare. Then they were engaged in a 10-minute conference with one guardian avatar and spent 10 minutes answering questions about the interaction afterwards.

After each of the three tryout tasks, participants were asked to take a 2- to 5-minute online survey to provide feedback about the task directions and implementation. A small number of participants were invited to provide their reactions to their experiences and offer additional feedback on the tasks by participating in an interview lasting no more than one hour conducted on the same day as other participation tasks. Research data were not shared with participants nor are they provided in this report as the results of the try-outs are confidential to the ETS® organization. However, an informal summary of overall performance of UCF teacher candidate behaviors were shared with the Director of the School of Teaching Learning and Leadership upon request and this information is being used to further shape and refine the elementary teacher education program at UCF (e.g., pre-service teachers struggled with asking high order questions of students or teachers struggled teaching fraction concepts).

Infusing Culturally Responsive Strategies into STEM Instruction for Special Education Teachers

Stacey E. Hardin and Shaqwana Freeman-Green
Illinois State University

Problem.

Mathematics education for students in K-12 settings is currently in crisis considering the importance of mathematical literacy and overall mathematics knowledge in a competitive global society (Ukpokodu, 2011). Moreover, students in urban and rural areas are more susceptible to mathematics trouble due to non-engaging practices and strategies for this population of students (Ukpokodu, 2011). Historically, special education teacher preparation programs have focused on equipping teachers with knowledge of effective inclusive practices, assistive technology, and behavior management strategies (Leko, Brownell, Sindelar, & Murphy, 2012). However, a gap exists between research evidence and classroom practices (Cook & Schimner, 2006). Consequently, special education teacher preparation programs have begun offering coursework focusing on evidence-based practices more embedded in content areas for pre-service teachers to become more effective in teaching and support students in critical areas, such as mathematics, in their classrooms.

According to Aguirre, Zavala, and Katanyoutanant (2012), teachers understand the importance of mathematics and teach concepts based on mathematic fundamentals. However, by teaching only using fundamental knowledge without tying the concepts to real life situations, students remain disengaged and this need for deeper exploration is even more critical for students from diverse backgrounds. Culturally Responsive Teaching (CRT) pedagogy could offer solutions to keeping students from diverse backgrounds engaged in high stakes areas, such as mathematics. Torres-Valesquez (2005) posits "culturally responsive teaching is a dynamic form of teaching that builds on and supports students' home culture" (p. 249). By learning to implement CRT strategies in the math classroom embedded within good mathematical instruction, future teachers could begin helping students to make connections between mathematics and the real world, therefore maintaining engagement in mathematical concepts.

The purpose of the study was to examine two different professional development methods, online modules and a teacher preparation simulation (TLE TeachLivE™), to analyze differences between the two in regards to increasing the use of Culturally Responsive Teaching (CRT) Strategies.

The following research questions were posed: (1) Will the use of TLE TeachLivE™ better prepare pre-service teachers to be culturally responsive teachers? (2) Will pre-service teachers enrolled in an urban initiatives track outperform students not enrolled in the urban initiatives track in regards to creating a CRT lesson plan? Once initial Data were collected, the following questions were posed for further analysis: (1) Will pre-service teachers enrolled in an urban initiatives track outperform students not enrolled in the urban initiatives track in regards to delivering a CRT lesson plan in TLE TeachLivE™? (2) Does the use of TLE TeachLivE and online asynchronous professional development better prepare pre-service teachers to be culturally responsive teachers?

Participants.

Participants included undergraduate students studying special education with no previous clinical experience. The study consisted of a total of 62 (N=62) students who were enrolled in a Math Methods course for learners with disabilities during the Spring semester. The participants were recruited from three sections of the Math Methods course. Two sections of the course were considered urban threaded sections (n=42), while the final section was a traditional section with less emphasis on an urban school setting (n=20).

Method.

The study took place in the Midwest region of the United States at a public university. The university demographics are as follows: 20.6% are minorities (American Indian/Alaskan Native, Asian, Black/African America, Hawaiian/Pacific Islander, Hispanic, or Two or More Race Selections); 79.4% are White/Caucasian. In regards to communities in which students reside, 59.2% of university students are from Midwestern suburban areas. Within the public university, the study was set in a quiet classroom, which was equipped with the TLE TeachLivE™ technology. Participants were able to complete the study requirements within this specific setting.

Researchers used a mixed mode approach to answer two research questions. A group design was used in which participants (N=62) were randomly assigned to a control group or an experimental group. Within each group, participants were then randomly assigned to the CRT group or the High Quality Math Instruction group. Both groups, the control group and the experimental group, received access to professional development modules and created mathematics lesson plans. Although all participants received professional development modules some students received a CRT module while others received a High Quality math Instruction module, hence the need to randomly assign students within their original groupings. The differences between the control group and the experimental group in regards to what they received during the study are as follows:

Control Group	Experimental Group
Provided Professional Development Module	Provided professional development module
Create Lesson Plan	Create a lesson plan
Receive Feedback	Observed in TLE (10 min)
Reflection	Receive feedback
	Reflection

The quantitative portion of the study consists of each student's lesson plan development. Participants were asked to create a mathematics lesson plan after completing their randomly assigned professional development module. Lesson plans were analyzed based on a rubric created using CRT principles. The scores of their lesson plans are currently being analyzed to determine if differences between the control group and the experimental group as well as the CRT module group versus the High Quality Math Instruction module group exist.

The qualitative portion of the study consists of lesson plan feedback and reflections. During the portion of the study, participants were asked the following questions:

1. How confident do you feel about your lesson plan? Provide a rationale.
2. How did you implement strategies for diverse learners?
3. How can you make the section "Description of Physical Environment" more culturally responsive?
4. How can you make the section "Methodology" more culturally responsive?
5. How can you make the section "closure" more culturally responsive?
6. What is one thing you feel you did well in your lesson plan?
7. What is one thing you feel you could improve on in your lesson plan?

The responses from the questions asked will be analyzed along with the quantitative data to examine if the Experimental group used more CRT strategies after their professional development session in the TLE TeachLivE™ lab.

Further Analyses.

To maintain anonymity among the control group and the experimental group, once the initial data were collected, participants in the control group were able to experience the TLE TeachLivE™ lab. Additional data were collected from participants in the control group's TLE TeachLivE™ experience as well as the experimental group's experience. The following question was asked immediately before each participant's TLE TeachLivE™: What is one thing you hope to work on during your TLE TeachLivE session (What is your performance goal)? Following the TLE TeachLivE™ each participant was asked the following four questions: (1) After participating in your TLE TeachLivE™ session, do you feel you met your performance goal? Why or why not? (2) After participating in your TLE TeachLivE™ session, what is one thing you feel you did really well? (3) After participating in your TLE TeachLivE™ session, what is one thing you feel you would change for your next session to be more effective as a teacher? (4) After participating in your TLE TeachLivE™ session, what is one thing you feel you could transfer in to your classroom that will be beneficial to you as a teacher and to your students?

Participants also completed a perceptions survey. The perceptions survey (Hardin, 2013) addresses the participant's perceptions of the effectiveness of the lab. Questions such as did the participant feel better prepared to teach after their TLE TeachLivE™ session and did the simulation feel like a real classroom were asked in the survey.

Even within the further analyses section of the current study, the researchers were continuing a mixed methods approach. The reflection questions (shown above) will be qualitatively analyzed, while the perceptions survey will be quantitatively analyzed. Researchers will take a different approach when looking at the "further analyses" section. A comparison between the urban threaded section and the traditional section will be conducted as well as a comparison between participants who completed the CRT module verses those who completed the High Stakes Math module.

Conclusion.

Although incomplete, the current study examined the differences between two professional development methods, as well as the effectiveness and student perceptions of the TLE TeachLivE™ lab. Researchers will continue analyzing the collected data to add to the existing body of literature in the fields of mathematics education, teacher preparation, and professional development.

Counselor Education: TeachLive Research Project

Olivia Uwamahoro

Problem.

There is a high need for competent professional counselors because of the increasing number of children and adults presenting mental health concerns each year in the United States (National Institute of Mental Health, 2012). Counselor educators are tasked with the duty of preparing counselors-in-training (CITs) to be competent clinicians. In order for counseling professionals to be considered competent clinicians, they must demonstrate competence in three domains: (a) knowledge, (b) skills, and (c) behavior (ACA, 2014; CACREP, 2009).

The goal of this study was to contribute to further understanding the most effective instructional approach to facilitating role-play while instructing pre-practicum counseling students. The purpose of this study was to examine the effect of virtual simulation training on the development of basic counseling skills, the immersion experience, levels of anxiety, and levels of counselor self-efficacy (CSE) among CITs using student-to-avatar and student-to-student role play. A quasi-experimental research design was used to investigate the effect of the treatment on the constructs.

Methods.

In this Counselor Education study, the following research questions were proposed:

1) Is there a difference in the development of basic counseling skills (as indicated by the Counselor Competencies Scale [CCS; UCF Counselor Education Faculty, 2009]) between counseling students who participate in student-to-avatar role play and counseling students who participate in student-to-student role play?
2) Is there a difference in the immersion experience and authenticity rating of mock counseling (as indicated by the Maastricht Assessment of Simulated Patients (Modified) [MaSP; Wind, Dalen, Muijtjens, & Rethans, 2004]) between counseling students who participate in student-to-avatar role play and counseling students who participate in student-to-student role play?
3) Is there a difference in overall self-efficacy scores (as indicated by the Counselor Self-Efficacy Scale [CSES; Melchert, Hays, Wiljanen, & Kolocek ,1996]) between counseling students who participate in student-to-avatar role play and counseling students who participate in student-to-student role play?
4) Is there a difference in anxiety (as indicated by the Beck Anxiety Inventory [BAI; Beck & Steer, 1990]) between counseling students who participate in student-to-avatar role play and counseling students who participate in student-to-student role play?

Participants.

The population for this study was counselors-in-training (CITs) enrolled in a counseling techniques course during the fall 2014 semester at a large CACREP accredited program located in the southeast United States. A Purposive sample was used. The sampling approach resulted in 12 counseling students in the experimental group and 9 counseling students in the comparison group, which created a total sample size of 21 participants (see table 1 for demographic information).

Conclusion.

The researcher found that there was no statistically significant difference between the two groups across all four constructs. A split-plot analysis of variance, trend analysis, and repeated measures between factor multivariate analysis of variance were used to analyze the data. The results of this study indicated that exposure to virtual simulation training did not affect the development of basic counseling skills, immersion experience, counselor self-efficacy, and anxiety. The results also

showed that virtual simulation did not hinder the development of basic counseling skills, or negatively influence immersion experience, counselor self-efficacy or anxiety.

Table 1: Sample Demographic Information

	Experimental Group		Comparison Group	
Gender	*n*	%	*n*	%
Female	12	100	6	66.7
Male	0	0	3	33.3
Ethnicity				
African American	0	0	1	11.1
Asian American	1	8.3	0	0
Hispanic	1	8.3	1	11.1
Caucasian (Non-Hispanic)	8	66.7	7	77.8
Other	2	16.7	0	0
Program Track				
Marriage, Couples, and Family	4	33.3	1	11.1
Clinical Mental Health	4	33.3	3	33.3
School Counseling	4	33.3	4	44.4
	M	*SD*	*M*	*SD*
Age	29.8	13.1	28.3	8.5
Clinical Experience	.83	.72	.67	1.1
Prior Counseling Courses Taken	6.7	1.8	6.1	1.5
Current Counseling Courses	3.1	.30	3	.71

Domain of Professional Development Overall Discussion

Research teams using the TeachLivE simulator to increase and strengthen professional development (PD) have brought innovative research to the realm of education. In studying the experiences of teachers using TeachLivE as a PD tool, researchers found mixed results. Although teachers noted that they felt virtual training to learn PD was a valuable experience, researchers found in the observational data that some teachers did not feel that the experience was authentic. Others did not participate fully due to teaching obligations at the time of the scheduled PD. Several teachers had difficulty accessing Skype or connecting to the Internet, which brought interruptions to the study and at times cancellation of sessions. Future studies in this area should be conducted with teachers during an uninterrupted time and should initially prepare teachers for interaction over a video conversation application (e.g., Skype, Google Chat).

Microcredentialing is new and challenging. Educational representatives need to rethink how teachers show mastery of skills and continue developing in personalized areas of needed growth. Similarly, Education Testing Services (ETS) is developing new methods of assessing pre-service teachers applying for initial licensure. These areas are aimed at developing more competent teachers entering the work force and to support those that are already established in their careers. Continuing research will focus on developing standardized teacher assessments in microcredentialing and for ETS. Future research will also focus on using TeachLivE for professional learning experiences from remote locations (e.g., using Skype). Remote access to the simulator will aid teachers in skill growth without sacrificing time outside of the classroom.

Researchers of both pre-service teacher education and counselor education used the TeachLivE simulator to create role-play situations to develop student competency and preparedness in their respective fields. Future research in these areas should include how to use the simulator to aid development of basic teaching and counseling skills, role-playing, and self-efficacy.

Domains of Student Learning

The purpose of teaching is to develop student learning. Several "experiment" have been completed that focused on student learning rather than teacher professional development. The TeachLivE team researched the use of school-aged children acting as peer tutors in the simulator. The students were given the task of teaching the avatars lessons pertaining to phonics. The TeachLivE team partnered with Beyond Z to work with graduating high school students of poverty to strengthen job-interviewing skills.

TeachLivE researchers were interested in the development of social and problem solving skills of students with intellectual disabilities and autism spectrum disorder (ASD). Deficits in these areas affect a student's ability to interact with others, successfully transition into adulthood, and maintain employment (Howlin, 2013). One study, Innovative Facilitation of Requisite Communication Skills for Employment (IN-Force) worked with young adults with intellectual disabilities, practicing job- training skills including problem solving and explanation of varying circumstances. In another study, young adults with ASD used TeachLivE in their homes to practice development of social skills, questioning, and student-led conversations with peer avatars over a six-week period (Improvement in Communication of Students with ASD study). In depth descriptions of each of these studies follow.

Research Studies

TLE TeachLivE™ Peer Tutoring: A Research Study

Cailtyn Bukaty

Problem.

TeachLivE has been applied and studied for the purpose of teacher preparation. Limited research has been conducted with school-aged children in the virtual classroom. This study allowed researchers to examine the impact of one-on-one sessions with an avatar on student learning, specifically in the content area of phonics. Researchers were afforded the opportunity to examine graduate student clinician's interpretations of the sessions and use of these interpretations to drive instruction.

Methods.

The peer tutoring model developed in this study placed elementary-aged students in the 'tutor' role of a peer tutoring relationship. The TeachLivE avatar took on the 'tutee' role, allowing the *student tutor* to guide his completion of an assigned activity. Graduate student clinicians providing instruction in the reading clinic in which this study was conducted were assigned to work with the student tutors at a one-to-one ratio. Clinicians were responsible for assessing student content knowledge and designing and providing instruction to build necessary skills.

According to Robinson and colleagues (2005) a student assigned as the tutor in a peer tutoring model showed gains comparable to those of the tutee in both content area knowledge and other school-related areas, such as time spent on task, organizational skills, and behavior. When assigning a student to the role of the tutor the intent is *not* to appoint students with content 'expertise', as a student is not likely to be an expert; rather, competence within this model is shown in the student tutor's ability to assist the avatar in completing the content-related task while exchanging dialogue and sharing their point of view (Duran & Monereo, 2005). Based on these findings in te current literature, student tutors completed complete pre and post assessments in the form of spelling inventories (Bear, Invernezzi, Templeton, & Johnston, 2003). These assessments

were administered and scored by the graduate student clinicians and analyzed for individual change. Content knowledge was compared to that of elementary students participating in the traditional model of the reading clinic without access to TeachLivE Peer Tutoring.

In addition to the administration and scoring of the spelling inventories to assess change in content knowledge, a second inquiry within the project examined the clinic director's use of observation of peer tutoring sessions to provide feedback to clinicians to drive planning and delivery of instruction to student tutors.

Data were collected on the perceptions of the peer tutoring experience from the point of view of both the student tutors and the clinicians. One factor in the experience of virtual environments such as TeachLivE is an element known as "presence", a state experienced when a participant is able to disregard the 'medium' in an interaction (Lombard & Ditton, 1997). In the case of this research, the medium was the technology supporting the interaction within the virtual world. Another element for consideration in a virtual learning environment is the educational impact of the experience. In a study on the effect of a technology-based intervention for reading and writing skills, Fasting and Lyster (2007) concluded that although they expected the role of the instructor to diminish as the student became proficient in engaging with the technology, this was not the case. The role of the instructor remained integral, specifically in the aspect of identifying student progress and misconceptions. For this reason, a questionnaire was used to collect data from both the clinician student tutor. The questionnaire was administered twice, once following the elementary students' first experience in the virtual peer tutoring environment and again following the final experience.

Conclusion.

The results of this study showed that both students and clinicians found the peer tutoring model using TeachLivE positive for presence and academic experience. All social interactions with the avatars were also rated as positive. There were not any score decreases in the treatment group between pretest and posttest. The results of this study are of particular interest to those preparing educators and those committed to the educational growth of students with disabilities. The elementary students participating in the reading clinic in which this study was conducted were enrolled voluntarily to improve reading skills. This same model is applicable for many students with and without disabilities to improve proficiency across content areas. Within the scope of teacher preparation the use of analysis and feedback related to the work of the graduate school clinicians participating in this study modeled innovative opportunities for teacher educators to observe pre-service educator field practice and provide feedback. Clinicians in this study were also afforded the opportunity to reflect on video recordings.

Beyond Z Research Project

Laura Knisley
Beyond Z

Problem.

Beyond Z (BZ) is an early-stage not-for-profit organization that is committed to discovering, developing and connecting extraordinary, diverse, young people who have the focus, drive and talent to become experts and leaders in our world. BZ proposes to partner with TeachLivE (TLE) in a pilot for the 2014-2015 school year focused on its seventh grade and college sophomore programs in the San Francisco Bay Area.

Broadly, BZ is interested in studying the impact of practice in the simulator to determine if it leads to accelerated learning, skill development, and maintenance of certain personal

development and professional skills. In addition, through its programs, BZ wants to ensure that its participants see increases in major attributes (e.g., growth mindset, self-confidence, overcoming failure, pride in who they are).

Research questions proposed in the BZ study included: (1) What metrics should we use to measure the effectiveness of the TLE simulator? (2) What rubrics/protocols, survey instruments, and/or systems does TLE/BZ need to gather data on these metrics? (3) What logistical factors (e.g., equipment, timing, location, data collection) does BZ need to consider when designing the study such that fidelity of implementation is maintained?

Participants.

Participants for this study will include 70-75 seventh graders at Willow Oaks School and East Palo Alto Phoenix Academy in the Bay Area, 50-75 college sophomores at San Jose State University, and 23-33 Teacher Leaders and Leadership Coaches (school leaders, and working professionals, college seniors and graduate students volunteering 10-12 hours a month with BZ) in the Bay Area.

Methods.

In consideration of pilot study design, the number of BZ participants was divided in half and sorted into a test (treatment) group, which received the TLE intervention in addition to the BZ program and a comparison (control) group that received the BZ program, without the TLE intervention.

Results.

Under the original design of the experiment, we intended to have seven groups of three students each participate in the TLE TeachLivE simulator intervention, for a total of 21 students in the test group. The groups of three would experience the simulator in a "fishbowl", meaning they would get to observe the other two students in their group interact with the avatar.

Due to some cancelations and scheduling difficulties, only 18 students participated in the intervention. Most groups had three students in the fishbowl; however, there was one group of two and one individual who had to go through the intervention alone. Of the 18 participants who participated in the intervention, three of these students did not complete either the pre- or post-intervention mock interview that was a necessary part of our research study, so their Data were excluded when the data analysis was completed.

Much of the treatment was delivered as intended. The facilitators generally adhered to the timeline proposed based on observations from the individual who designed the study. They also adhered to the script proposed based on observations from the individual who designed the study. The facilitators seemed to give constructive and pertinent feedback (based on observations). The participants seemed to take the process seriously and did not "break character" (based on observations). Likewise, the avatar did not break character.

However, there were a few elements of the intervention that did not go as planned. As mentioned above, two of the fishbowls were not full (one group of two participants, one group of one participant). There were some technical difficulties with the avatar during the study, including the avatar freezing and trouble with the microphone used to communicate with the avatar.

Results.

The comparison results were not what we expected. There was no statistical significance in the pre and post interview results when comparing the rubric scores compiled by the interviewers. The small number of participants meant that we could not determine the effectiveness of the coaching with any reliable analysis. Therefore, neither research question could be answered positively.

Conclusion.

The data collected did not support the original hypothesis. There were several weaknesses to our study design. Perhaps most importantly, our sample size was very small, in part due to the small size of our 2014-2015 college program at San Jose State University. Scheduling with a small group of busy college students was also a barrier to implementing the intervention effectively. For future studies, a larger sample size will increase the statistical power, which will hopefully improve the analysis results.

We should have been more prescriptive about the way the interviewers asked the questions, the way the coaches promoted skills during the intervention, and the way the adult avatar's questions aligned with the same decisions the interviewers are using to ask interview questions. Aligning the coaching that occurred during the intervention with the Teach For America rubric utilized in the pre- and post-mock interviews may have strengthened our results.

Additionally, we should have trained the interviewers and the adult avatar to use a decision tree to determine what questions to ask during the mock interviews and the intervention. We should have established reliability for scoring the interview rubrics. We think that our research design – comparing groups – is sound, but we need to improve our measures.

Although this pilot study did not produce the results we expected regarding pre and post interview results for the experimental group, we did learn that just participating in TeachLivE improved the participants' perceptions of their performance and contributed to their self-efficacy which correlated with their communication scores on the rubric. We hope that with some tweaks to the research design, we could have a much more robust study (and results) in the future.

Innovative Facilitation of Requisite Communication Skills for Employment (In-FORCE): Using Mixed Reality Simulation to Prepare Young Adults to Problem Solve in the Workplace

Caitlyn Bukaty
University of Central Florida

Problem.

According to the U.S. Department of Labor (DOL; 2014) 31% of 20 to 24 year olds with disabilities were employed in 2013. In comparison, almost 63% of young adults in the same age group without disabilities were employed. According to the National Longitudinal Transition Study 2 (NLTS2; 2003), 12.2% of young adults with intellectual disabilities (ID) who quit their most recent job or a previous job reported doing so because of "problems with their boss or co-workers." This represented the third most popular response. The lack of problem solving skills within the realm of social communication in young adults with intellectual disabilities (ID) negatively impacts this population of students' ability to find and maintain gainful employment. This indicates the need for specific workplace problem solving skill-building instruction for young adults with ID if they are to become productive members of our 21st century society.

In-FORCE research was conducted to address the need for improved verbal problem solving skill-building instruction through the synthesis of newly developed technology and a workplace skills curriculum developed by the U.S. Department of Disability Employment Policy (ODEP; n.d.). Transition-age young adults participated in mixed-reality interactions where they discussed a workplace problem scenario with a virtual peer and worked to solve that same problem with a virtual supervisor.

The following research questions were used to guide this study: (1) To what extent do In-FORCE problem solving intervention sessions increase the abilities of young adults with intellectual disabilities to implement workplace problem solving skills, as measured by the rate of independently achieved objectives in the In-FORCE Problem Solving Checklist? (2) To what extent do In-FORCE participants feel their experiences with the virtual avatars increased their problem solving abilities as measured by the *Perceptions of In-FORCE Training* social validity survey? (3) To what extent do In-FORCE participants feel their experiences with the virtual avatars will help them in future employment endeavors as measured by the *Perceptions of In-FORCE Training* social validity survey?

Participants.

Participants were drawn from two sources: (1) students enrolled in a post-high school transition program at a local school district based on a college campus in the southeast United States and (2) young adults registered with an advocacy organization for individuals with intellectual disabilities in the southeast United States. Seven young adults participated; four were recruited from the school district transition program and three were recruited from the advocacy organization. Demographically, four participants were 20 years old and three were 21. The sample included four men and three women. Six participants were identified as having intellectual disabilities and one participant was identified as having an "other health impairment." The school instructor and director of the advocacy group recommended young adults for participation based on their age and potential to benefit from the intervention.

Method.

In-FORCE was implemented using a single case, repeated acquisition design. Participants faced six different workplace problem-solving scenarios. Problem solving achievement was measured

in three conditions for each scenario. Each condition was comprised of one, scripted 5-minute interaction with a TeachLivE™ avatar: (1) the initial supervisor avatar interaction, (2) the peer avatar interaction, and (3) the final supervisor avatar interaction. This allowed the researcher to analyze the acquisition of the problem solving skills for each unique scenario presented in each of five or six sessions (Kennedy, 2005).

Participants were presented with a conflict scenario, adapted from a career skills curriculum developed by the U.S. DOL (n.d.). Problem scenarios were available in video, audio, and text format. Closed captioning was enabled in video format based on feedback from a preference assessment administered to a group of four young adults with ID not participating in the In-FORCE intervention. Each scenario was validated by a group of six experts in the fields of transition and entry-level employment. Following creation of the video versions, 33% were validated for accurate portrayal of the text version by two of the experts.

After reviewing the scenario, participants engaged in a 5-minute "problem solving" interaction with an adult supervisor avatar to determine baseline skill; this was followed by a 5 minute "brainstorming" interaction with a virtual peer, then by another 5 minute "problem solving" interaction with an adult supervisor avatar.

The first 5-minute interaction included data collection on problem solving objectives achieved with the supervisor avatar. In addition to providing opportunities for participants to achieve each verbal objective, any non-verbal objectives not achieved by the participant were addressed by the supervisor avatar during the session.

The second interaction included participation in a brainstorming session with a peer avatar. After reviewing the problem scenario a second time, participants were asked to collaborate with the peer avatar to develop a solution for the problem scenario. The avatar was prepared to support participants in addressing each of the 10 problem solving criteria to be measured in the evaluation as needed. Sessions followed a gradual release model in which the avatar prepared the participant to take initiative in the achievement of all 10 objectives.

In the third and final interaction of each session, the participant reviewed the workplace problem-solving scenario a final time and engaged in a second mixed-reality interaction with a supervisor avatar. The participant was directed to meet with the supervisor avatar one more time to solve the problem scenario.

The *In-FORCE Problem Solving Checklist* was used to examine. This checklist was created based on the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (1991) and aligned to *Framework for 21st Century Learning* (The Partnership for 21st Century Skills, 2009). Researchers used this instrument to rate each interaction with the virtual avatars during participants' intervention sessions. Each checklist objective was operationally defined and aligned to 21st Century Skills. Prior to implementation of the checklist, experts in the fields of entry level employment and employment of individuals with ID validated all items for applicability to workplace problem solving situations.

Following their final intervention session, participants were asked to complete the *Perceptions of In-FORCE Training* social validity survey. The survey addresses three classes of questions: (1) whether or not the virtual avatars were realistic, (2) whether or not the participant felt the experience would have a positive effect on future employment outcomes, and (3) whether or not the experience provided a unique social experience on the university campus.

Results.

Data from participant achievement on the problem-solving checklist are being analyzed. The number of participant responses to each question of the *Perceptions of In-FORCE Training* survey

are shown in Table 1.

Table 1
Responses to *Perceptions of In-FORCE Training* Survey

Question	Responses	
	Yes	No
1. Did the supervisor avatar look like a real boss?	7	0
2. Did the supervisor avatar talk like a real boss?	7	0
3. When you met with the supervisor avatar did you feel like you were meeting with a real boss?	6	1
4. Do you think working with the supervisor avatar helped you become a better problem solver?	6	1
5. Do you think working with the supervisor avatar helped get ready for a job?	7	0
6. Did the peer avatar look like a real friend?	7	0
7. Did the peer avatar talk like a real friend?	7	0
8. When you met with the peer avatar did you feel like you were meeting with a real friend?	7	0
9. Do you think working with the peer avatar helped you become a better problem solver?	7	0
10. Do you think working with the peer avatar helped get ready for a job?	7	0
11. Did you come to a new part of the college campus?	7	0
12. Did you see other college students close to your age at the research site?	6	1

Conclusion.

The impact of the intervention on problem solving is still being assessed. At this time the researchers can report that participants: (1) indicated feeling that both avatars provided realistic interactions, (2) indicated the impression that working with the peer avatar (C.J.) improved their problem-solving skills and contributed to their preparation for employment, and (3) indicated the impression that working with the supervisor avatar (Stacey Adkins) improved their problem solving skills and contributed to their preparation for employment. These conclusions are based participant responses to the *Perceptions of In-FORCE Training* social validity survey.

Using TeachLivE to Improve the Conversational Skills of Adolescents with Autism Spectrum Disorders

Claire Donehower
University of Central Florida

Problem.

Social skill and pragmatic language impairments are well-documented in individuals with autism spectrum disorders (ASD) across the lifespan (American Psychological Association, 2013; Baghdadli et al., 2012; Bal et al., 2013; Howlin, Moss, Savage, & Rutter, 2013). Social challenges impact the individuals' ability to be successful in their school and community, access employment, and demonstrate independence as they transition into adulthood (Howlin, 2013).

The purpose of this study is to examine the effects of a social skills training package for adolescents with ASD that combines peer-mediated interventions and virtual environments by utilizing avatars as peer trainers. Since both types of intervention (i.e., peer-mediated and virtual environments) show evidence of efficacy in improving targeted social skills and promoting generalization, it is important to investigate whether the combination of treatments leads to more significant and durable outcomes for participants. Additionally, using avatars as peers may lead to increased procedural fidelity and decreased training time as compared to traditional peer-mediated interventions.

The research questions proposed for this study were: (1) To what extent does a peer-avatar-mediated intervention affect the total frequency of social behaviors (i.e., initiations, responses, and continuations) for adolescents with ASD? (2) To what extent does a peer-avatar-mediated intervention affect the individual frequency of social behaviors (i.e., initiations, responses, and continuations) for adolescents with ASD?

Participants.

The participants in this study were three individuals who (a) have a diagnosis of ASD, autism, or pervasive developmental delay (PDD); (b) are between the ages of 13-21; and (c) show interest in interacting with avatars.

Method.

A reversal design (A-B-A-B) was employed to assess the effect of the peer-avatar-mediated intervention. Baseline and intervention sessions occurred 2 times weekly (Schmidt & Stichter, 2012) throughout the course of the study. Additionally, a pre and posttest measure of social reciprocity will be administered using the Social Responsiveness Scale (SRS). During baseline and intervention phases, frequency Data were collected on the following target behaviors: (a) initiations, which are operationally defined as any motor or vocal behavior directed to a peer that attempts to occasion a response, (b) responses, which are operationally defined as any motor or vocal behavior directed to a peer that acknowledges an initiation within five seconds, and (c) continuations, which are operationally defined as any response (e.g., comment or question) directed to a peer that maintains an ongoing interaction (Schmidt & Stichter, 2012).

During baseline conditions, the peer-avatars would (a) introduce themselves to the participant, (b) refrain from initiating further interactions with the participant, (c) respond to any initiations or continuations from the participant for one conversational turn, and (d) repeat as necessary. During the intervention condition, the peer-avatars would (a) introduce themselves to the participant, (b) get the participant's attention by saying their name or using a greeting, (c) initiate conversation on a preferred topic, (d) provide praise or reinforcement and an appropriate response (e.g., question or comment) every time the participant responds, (e) if the conversation

stops, re-initiate conversation after 5-10 seconds, and (f) repeat as necessary.

Results.

Preliminary results show that all three participants showed an increase in at least one of the targeted social behaviors. Additionally, the quality of the social interactions dramatically improved for two of the three participants.

Conclusion.

This research study contributes to the bodies of research on social skills instruction with adolescents and adults with ASD and the research on the use of technology-based interventions with individuals with ASD. Future research should look at the efficacy of this intervention with different target social skills and with participants of different ages or with different communication profiles. Additionally, future research should examine the most effective "dosage" of this intervention (i.e., frequency and length of intervention sessions).

Domain of Student Learning Overall Discussion

Researchers gained valuable information in the TeachLivE Peer Study regarding the effects of students teaching students to master reading skills. Research results included positive responses from students and clinicians to TeachLivE Peer Tutoring Model for presence and academic experience. There were not any students in the treatment group who experienced decreased scores from pretest to posttest. The Beyond Z research team found perception of performance and self-efficacy in TeachLivE was helpful for student reflection practices. Although the findings of this study were not as expected regarding interview results, participants gained an important career quality in reflection practice. Continued research in this study will take into account research design, number of participants, and additional training for inter-actors and facilitators.

Six students with intellectual disabilities participated in the In-FORCE study and demonstrated development in social skills when working with a student avatar. The three participants with ASD that took part in the Improvement in Communication of Students with ASD study showed development of social skills with all the high school student avatars. In both studies, the true test of effectiveness of social training with TeachLivE will be in future research assessing the transfer of skills from the simulator to real life scenarios. Important future research in both studies will provide the foundation for replication studies with different age groups and populations. Need for widespread replication is true of the social training of students with ASD, as early intervention in this area could be important for strengthening important skills. Another area of future research in both areas is the most effective length of time for students to work with the avatars (i.e., the dosage).

Continuing Research using TLE TeachLivE

Continuing research with the TLE TeachLivE simulator will focus on new avenues of development and build upon existing studies. In physical therapy, among other professional disciplines, researchers have run a pilot study in delivering the same information from a case file to three different audiences (i.e., medical doctor, teacher, and parent). This type of communication skill is pertinent in the field, and many other practices (e.g., teachers, therapists, doctors) may benefit from developing the ability to inform varying audiences.

Continuing TeachLivE research will also focuses on teacher readiness. In Phase I and Phase II, gains in teacher learning and skill application were evident after four 10-minute sessions in the simulator. Extended research on professional development for teachers through the use of TeachLivE should focus on teachers' time spent using the simulator and if the number of sessions needed to learn a skill is less than found in Phase I and II. Researchers should also study the use of TeachLivE in person compared to interacting through video-conferencing tools (i.e., Skype, Google Chat).

Next steps in research of microcredentials include continuing studies in new badges, such as co-planning and cross-discipline content (e.g., education and physical therapy). Lesson co-planning between educators is essential to developing interpersonal skills, cooperation among colleagues, and most importantly, recognizing how to reach every student during a lesson. Behavior management (e.g., 4-1 positive praise to criticism technique, establishing rules, effective use of a behavior chart) is an area that has many avenues for professional and skill development beneficial to all teachers. Communication skills for teachers and other professions can also focus on interviewing skills, delivering information in a parent-teacher conference, developing individualized education programs and 504 plans, and conducting professional learning communities. Future studies on microcredentials, teacher readiness, and counselor readiness (as well as other disciplines) will continue to focus on skills acquisition and professional development over short-time periods.

The In-FORCE study and the Improvement in Communication of Students with ASD study have begun to investigate the potential of using TeachLivE to increase social skills of adults with disabilities. Both studies also investigate the most effective length of time in the simulator to increase students' social skills. Another area to consider is working with students of different ages; students with ASD may benefit from social skills training beginning at a young age and continuing throughout the adolescent years.

The TeachLivE simulator currently houses middle school, high school, and adult avatars. The development of elementary avatars began in May 2015. Although the middle school and high school avatars are sets of the same students at different points in their education, the elementary avatars will introduce new avatars with differing abilities, personalities, and physical qualities. The creation of a kindergarten classroom with meeting areas, small group workstation, and centers will bring the classroom simulation to life for TeachLivE participants. The class will be interactive, such that the participant can move between areas in the classroom to work with different groups of students, as is custom in teaching.

Conclusion

Research completed by the University of Central Florida team during Phase I and Phase II with funding from the Bill and Melinda Gates Foundation focused on developing mathematics teachers' and science teachers' skill development in their respective fields using the middle school and high school TLE TeachLivE avatars (Straub et al., 2014; 2015). Significant results from these studies spurred researchers to consider effects of using the TLE TeachLivE simulator to focus on teacher

preparation, student learning, and preparation of educational professionals. Researchers utilized the middle school avatars, high school avatars, and the adult avatar to study skill development and mastery in several different areas related to teaching (i.e., professional development, pre-service teachers, counselor education, young adults with intellectual disabilities, and young adults with autism spectrum disorder). The goals of the Phase III research projects were to determine how much time teachers (amongst other participants) needed in the simulator in order to successfully develop improved practices, how the simulator might be used to impact student learning, and to explore potential use of TeachLivE in other areas of P-20 learning.

References

American Counseling Association (ACA). (2014). *ACA code of ethics*. Washington, D.C.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Aguirre, J. M., Zavala, M. R., & Katanyoutanant, T. (2012). Developing robust forms of pre-service teachers pedagogical content knowledge through culturally responsive mathematics teaching analysis. *Mathematics Teacher Education and Development, 14*(2), 113-136.

Baghdadli, A., Assouline, B., Sonie, S., Pernon, E., Darrou, C., Michelon, C., … Pry, R. (2012). Developmental trajectories of adaptive behaviors from early childhood to adolescence in a cohort of 152 children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *42*(7), 1314–1325. doi: 10.1007/s10803-011-1357-z

Bal, E., Yerys, B. E., Sokoloff, J. L., Celano, M. J., Kenworthy, L., Giedd, J. N., & Wallace, G. L. (2013). Do social attribution skills improve with age in children with high functioning autism spectrum disorders? *Research in Autism Spectrum Disorders*, *7*(1), 9–16. doi:10.1016/j.rasd.2012.07.004

Bear, D. R., Invernezzi, M., Templeton, S. R., & Johnston, F. (2003). *Words their way: Word study for phonics, vocabulary, and spelling instruction* (3rd ed.). United States of America: Pearson\Merrill\Prentice Hall.

Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: The Psychological Corporation.

Bureau of Labor Statistics, U.S. Department of Labor. (2014). *Persons with a disability: Labor force characteristics - 2013* (No. USDL-14-1076) (p. 11). Retrieved from http://www.bls.gov/news.release/pdf/disabl.pdf

Cook, B. G., Tankersley, M., Cook, L. & Landrum, T. J. (2008). Evidence-based practices in special education: Some practical considerations. *Intervention in School and Clinic, 44*, 69-75.

Council for Accreditation of Counseling and Related Educational Programs (CACREP). (2009). *CACREP Mission.*

Duran, D., & Monereo, C. (2005). Styles and sequences of cooperative interaction in fixed and reciprocal peer tutoring. *Learning and Instruction*, *15*(3), 179–199. doi:10.1016/j.learninstruc.2005.04.002

Fasting, R. B., & Halaas Lyster, S.-A. (2007). The effects of computer technology in assisting the development of literacy in young struggling readers and spellers. *European Journal of Special Needs Education*, *20*(1), 21–40.

Fed. Reg. No. 2014-28911, at 73425 (2014).

Howlin, P. (2013). Social disadvantage and exclusion: Adults with autism lag far behind in employment prospects. *Journal of the American Academy of Child & Adolescent Psychiatry, 52*(9), 897–899. doi:10.1016/j.jaac.2013.06.010

Howlin, P., Moss, P., Savage, S., & Rutter, M. (2013). Social outcomes in mid- to later adulthood among individuals diagnosed with autism and nonverbal IQ as children. *Journal of the American Academy of Child and Adolescent Psychiatry*, (6), 572-581. doi: 10.1016/j.jaac.2013.02.017

Kabaker, J. (n.d.). *Supporting deeper learning in the classroom*. Retrieved from http://www.digitalpromise.org/blog/entry/supporting-deeper-learning-in-the-classroom

Kennedy, C. H. (2005). *Single-case designs*. Boston, MA: Pearson Education, Inc.

Leko, M. M., Brownell, M. T., Sindelar, P. T., & Murphy, K. (2012). Promoting special education preservice teacher expertise. *Focus on Exceptional Children, 44*(7), 1-16.

Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication, 3*(2), 0. doi:10.1111/j.1083-6101.1997.tb00072.x

Melchert, T. P., Hays, V. L., Wiljanen, L. M., & Kolocek, A. K. (1996). Testing models of counselor development with a measure of counseling self-efficacy. *Journal of Counseling and Development, 74,* 640–644.

Musti-Rao, S., & Haydon, T. (2011). Strategies to increase behavior-specific teacher praise in an inclusive environment. *Intervention in School and Clinic, 47*(2), 91–97. http://doi.org/10.1177/1053451211414187

Myers, D. M., Simonsen, B., & Sugai, G. (2011). Increasing teachers' use of praise with a response-to-intervention approach. *Education & Treatment of Children (ETC), 34*(1), 35–59.

National Institute of Mental Health. (2012). Health and education. Retrieved from http://www.nimh.nih.gov/statistics/index.shtml

National Longitudinal Transition Study 2. (2003). NLTS2 data tables. Retrieved from http://www.nlts2.org

Office of Disability Employment Policy. (n.d.). Youth in transition, soft skills: The competitive edge. Retrieved October 26, 2014, from http://www.dol.gov/odep/topics/youth/softskills/

The Partnership for 21st Century Skills. (2009). Framework for 21st Century Learning. Retrieved November 29, 2014, from http://www.p21.org/our-work/p21-framework

Rathel, J. M., Drasgow, E., Brown, W. H., & Marshall, K. J. (2014). Increasing induction-level teachers' positive-to-negative communication ratio and use of behavior-specific praise through e-mailed performance feedback and its effect on students' task engagement. *Journal of Positive Behavior Interventions*, *16*(4), 219–233. http://doi.org/10.1177/1098300713492856

Robinson, D. R., Schofield, J. W., & Steers-Wentzell, K. L. (2005). Peer and cross-age tutoring in math: Outcomes and their design implications. *Educational Psychology Review*, *17*(4), 327–362. doi:10.1007/s10648-005-8137-2

Simonsen, B., Myers, D., & DeLuca, C. (2010). Teaching teachers to use prompts, opportunities to respond, and specific praise. *Teacher Education and Special Education, 33*(4), 300–318.

Straub, C., Dieker, L., Hynes, M., & Hughes, C. (2014). Using virtual rehearsal in TLE TeachLivE™ mixed reality classroom simulator to determine the effects on the performance of mathematics teachers. *2014 TeachLivE National Research Project: Year 1 Findings*. University of Central Florida: Orlando, FL.

Straub, C., Dieker, L., Hynes, M., & Hughes, C. (2015). Using virtual rehearsal in TLE TeachLivE™ mixed reality classroom simulator to determine the effects on the performance of science teachers: A follow-up study (year 2). *2015 TeachLivE National Research Project: Year 2 Findings.* University of Central Florida: Orlando, FL.

Torres-Velasquez, D. (2005). Culturally responsive mathematics teaching and English Language Learners. *Teaching Children Mathematics, 11*(5), 249-255.

U.S. Department of Labor. (n.d.). Skills to pay the bills: Mastering soft skills for workplace success. Retrieved from http://www.dol.gov/odep/topics/youth/softskills/softskills.pdf

U.S. Department of Labor, Secretary's Commission on Achieving Necessary Skills. (1991). *What work requires of schools: A SCANS report for America 2000* (p. 60). Washington, DC.

Ukpokodu, O. N. (2011). How do I teach mathematics in a culturally responsive way? Identifying empowering practices. *Multicultural Education,18*(3), 47-56.

University of Central Florida Counselor Education Faculty (2009). *The Counseling Competencies Scale (CCS): A measure of counseling skills, dispositions, and behaviors*. Unpublished instrument. Correspondence regarding the CCS should be addressed to Glenn W. Lambie, Ph.D. at glambie@mail.ucf.edu

Wind, L. A., Dalen, J. V., Muijtjens, A. M. M., & Rethans, J. J. (2004). Assessing simulated patients in an education setting: The MaSP (maastricht assessment of simulated patients). *Medical Education*, *38*, 39–44.