The Impact of Simulated Interviews for Individuals with Intellectual Disability

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ABSTRACT

The purpose of this research study was to explore the efficacy of role-playing and coaching in mixed-reality environments for the acquisition and generalization of social skills leading to successful job interview performance. Using a multiple baseline across participants design, five young adults with intellectual disability practiced interviewing in a mixed-reality environment and were rated on the use of appropriate social skills and overt behaviors during the mock interviews. Generalization and maintenance were assessed by the participant's ability to display appropriate social skills and overt behaviors in a face-to-face interview in a live environment. The intervention demonstrated to be effective in fostering the acquisition of job interview skills in the mixed reality setting as well as generalization in face-to-face interviews.

Keywords

Employment skills, Intellectual disability, Mixed-reality technology

Introduction

Preparing students and families to cope with the challenges of transitioning into society is a complex process for any student and can be especially difficult for students with disabilities. The difficulty of transition is further substantiated by poor employment outcomes for students with disabilities in the United States (U.S.). Youth with disabilities are less likely to work (57% vs. 66%) once they complete secondary schooling as compared to the general population (Newman, Wagner, Cameto, & Knokey, 2009). The U.S. Bureau of Labor Statistics (BLS) (2014) reports the highest percentages of unemployed persons come from two groups: high school dropouts and people with disabilities. In October, 2015, the unemployment rate for individuals with disabilities (10.5%) was double the unemployment rate for those without a disability (4.6%) (Bureau of Labor Statistics, 2015). Even when possessing a high school diploma, an individual with a disability is far less likely to have a job than someone without a disability. For example, only 58% of individuals with disabilities are employed full-time up to four years out of high school and the majority of those individuals report having to work 2-3 part-time jobs to meet full-time hours (Newman et al., 2009).

These data are alarming and have societal implications beyond the financial well-being of individuals with disabilities and their families. The effects of unemployment are much greater than lack of income and can have a significant negative effect on happiness and life-satisfaction (Kassenboehmer & Hasisken-DeNew, 2009). Employment has a great impact on quality of life; however, to become successfully employed there are prerequisite skills needed by all employees. One such skill is the ability to secure employment through the job interview.

Social skills can have a profound impact on an individual's interview performance. The ability to identify overt or subtle cues in specific environments or situations, such as the job interview, can be the difference between a job offer and a job rejection (Smith & Matson, 2010; Wehmeyer & Schwartz, 1998). However, students with ID often struggle with social skills and self-advocacy behaviors that are expected to be displayed in successful interviews (Crites & Dunn, 2004). For example, first impressions are considered to be important (Allen, 1994; Brown, 2000; Hawkins, 2004; Shipley & Wood, 1996). First impressions are often based on one's ability to appear confident yet humble in initial conversation and behavior. However, these conversational and behavioral fluencies are often difficult for individuals with ID to attain in natural environments. Self-advocacy curriculums that include social skills content such as being assertive but not aggressive, communicating successfully in individual and group settings, negotiating, compromising, using persuasion, being a good listener, and navigating community services are important for young adults transitioning into the postsecondary environments (Wehmeyer & Schalock, 2001). These skills are also vital for a successful job interview. While the ability to self-advocate and "sell yourself" is vital in interview settings for any individual (Harrington, 1997; Hawkins, 2004; Kissane, 1997), training and preparation for those with ID may be especially important since the job interview highlights conversational and behavioral fluencies. Unfortunately, "the receipt of life skills instruction in school is not related to the receipt of life skills training/therapy after school by either individuals with mild ID or moderate/severe ID…educators who believe in the value of a life skills curriculum

will need to be creative in its implementation and look towards transition plan and activities to provide students with the needed training" (Bouck, 2010, p. 1100).

Gonca and Karaman (2011) also posit that educators should be creative in reconsidering the aim of education and removing all imaginable constraints. Removing all constraints includes considering how technology can be used to teach students valuable social skills. Virtual learning environments are one such technological innovation that holds promise. Virtual environments have provided opportunities for students with disabilities to actively participate in learning while controlling the learning process by manipulating the inputs and outputs the students receive (Smith et al., 2014; Brooks, Rose, Attree, & Elliot-Square, 2002; Cobb & Sharkey, 2007). Virtual environments have also allowed students to acquire specific metacognitive skills (Brooks et al., 2002; Cobb & Sharkey, 2007; Rose et al., 2000) across a variety of settings. Most recently, social cognition training in virtual environments has shown significant increases in real life social and occupational functioning for young adults with high-functioning autism (Kandalaft, Didehbani, Krawczyk, Allen, & Chapman, 2012, Vasquez et al., in press). Virtual environments created specifically for use in education have also been used to help prepare pre-service and existing educators by providing opportunities to practice new methods of instruction and classroom management before stepping foot into the classroom (Andreasen & Haciomeroglu, 2009; Dieker, Hynes, Hughes, & Smith, 2008).

TLE TeachLivE™ is a mixed-reality laboratory that combines a physical space with simulated people. The TLE TeachLive™ laboratory prepares individuals in simulated situations that combine virtual individuals with realistic scenarios. TLE TeachLivE™ has been instrumental in training pre-service and in-service teachers, developing transition skills for students with significant disabilities, providing immediate feedback through bug-in-ear technology to pre-service teachers, developing discreet trial skills in teachers, and preparing teachers in the use of STEM-related instructional strategies (TLE TeachLivE, 2014). The advantage of using the TLE TeachLivE™ lab for this study was that the virtual interviewer could be reset and used for repeat experiences, thus the individual had the ability to repeat interviews without sacrificing the valuable first impression. The ability to manipulate impressions is unlike a real employment interview that only affords the interviewee one opportunity to make a first impression on the interviewer. Further, by taking advantage of the ability to practice interview skills with the multiple interviewers/interactors available in TeachLivE™, participants can be exposed to a variety of situations and experiences with the intention of desensitizing them to new experiences and even new interviewers.

The purpose of this exploratory study was to investigate the efficiency of providing interview practice in a virtual learning environment along with live, face-to-face behavioral coaching based on interview performance in order to promote generalization of the skills and behaviors to the natural setting with young adults with ID. The intervention was delivered as a treatment package. Specifically we asked the following two questions: (1) To what extent will the combination of interview practice in the TLE TeachLivE™ lab and coaching increase job interview performance for 18-22 year old participants with intellectual disability as measured by an interview rubric?, and, (2) Will social skills presented during job interviews, as demonstrated following the combination of interview practice in the TLE TeachLivE™ lab and coaching, transfer to a live simulated job interview for young adults ages 18-22 with intellectual disability? While virtual learning environments have been associated with gains in academic skills for certain groups, the ability to increase social skills in an interview setting would be a novel and, potentially, powerful use of virtual environments.

Method

Participants

This study included five 18-22 year-old participants with an intellectual disability. An intellectual disability is defined as significant, sub-average general intellectual and adaptive functioning which manifests during the developmental period and significantly delays an individual's acquisition of academic skills (Florida Department of Education, 2015). All five participants attended a large public school transition program and had IQ scores in the 55-65 range. Key characteristics of each participant are summarized in Table 1 and described below.

Table 1. Descriptive summary of participant characteristics

Name	Age	Sex	Transition program year	Prior interview experience	Strengths	Weaknesses
Jane	18	F	Second	No	Adaptable	Timid Needed support
Anne	20	F	First	No	Motivated Made progress	Lack of confidence
Carlitos	20	M	Second	Yes	Outgoing Motivated	Mobility
Elana	21	F	Second	Yes	Confident Socially comfortable	Easily Fixated
Belle	21	F	First	No	Confident Outgoing Motivated	Processing Disorder

Jane was an 18-year-old female was in the second year of the transition program. Jane presented as very timid, especially around males. Jane had no prior formal interview experience. Anne was a 20-year-old female was in the first year of the transition program. Anne did not have any diagnostic records from her high school. Her teachers noted she had shown significant progress during her first year in the transition program. Anne had no prior formal interview experience. Carlitos was a 20-year-old male was in the second year of the transition program. Carlitos had participated in mock interviews in his high school transition program. Elana was a 21-year-old female was in the second year of the transition program. Elena has both ID and multiple personality disorder. Elana's prior interview experience included informal mock interviews with her family and school programs. Finally, Belle was a 21 year old female was in the first year of the transition program. Belle was diagnosed with both ID and a language processing disorder. Belle had no prior formal interview experience.

Settings

This study took place in two locations. The first setting was TLE TeachLivE™ virtual classroom laboratory, on the campus of a large, urban University. The TLE TeachLivE™ lab served as the setting for participants to practice interview skills in a real-time mixed-reality setting. Participants took part in both baseline and intervention treatments in this setting. During baseline and treatment interviews, the participant was seated facing the television. This space is a windowless room with three beige colored walls and one green wall. A large projection screen was located slightly left of the center of the room, and was roughly 12 feet from the entryway. A 70-inch high-definition flat screen television suspended approximately three feet from the floor is placed in front of this screen for use in this study. A screened space adjoined the projection screen on the left-hand side and provided a divider for an on-site TLE TeachLivE™ technician to assist in program operations. A logistics webcam mounted on the top of the projection screen allowed the interactor to view the participant during sessions. Speakers behind the screen enabled the interactor to hear what the participant said during sessions. Real time communication between the interactor and the participants occurred via Skype. The professional interactor was in control of the behavior of the avatar from a remote setting. The interactor was trained as an improvisational actor with three years' experience working in the TeachLivE™ lab. The second setting was a small classroom (15'x 21' containing a round table and chairs) adjacent to the TeachLivE™ Lab where coaching sessions were conducted following treatment interview sessions.

Skills targeted for instruction

An interview performance rubric that measured overt behaviors, verbal communication style and content was created for use in this study in consultation with an employee expert panel. The employee expert panel consisted of both Career Service professionals from the Office of Career Services at a large southeastern university and local business experts. The five participants were individually assessed on their ability to display behaviors from three domains: overt behaviors, verbal communication, and answer content. Specifically, the researchers were looking for the participants to display overt behaviors, such as eye contact, posture and, hand gestures, along with proper communication skills (those that did not include slang words, inappropriate language or grammar), the lack of distracting communication habits (such as "umm's", and other verbal patterns) and a loud and clear voice.

Researchers also looked for the interviewee responses to contain appropriate content that was positive and highlighted the participant's abilities in response to the interview questions.

Participants were directed to the Office of Career Services where the Director of Career Services asked participants 11 randomly generated questions in a scripted, video-recorded mock interview. The responses and behaviors were noted and the researcher used the rubric to score the participants' responses. The interviewer gave no feedback or rewards during pre-baseline assessment. All pre-treatment interviews were video-archived for purposes of monitoring and documenting treatment integrity.

Second, a non-experimental pre/post assessment of interview performance was used by comparing interview performance as scored on the rubric between the pre- and post- treatment live interviews. The rubric was completed in real-time during the interview by a trained member of the research team hidden from view of the participant and the interviewer (see Appendix A). The pre- and post- treatment interviews had no impact on the skills targeted or the intensity of the coaching as the intervention and evaluative rubric had already been designed by an employee expert panel.

Baseline assessment

An eleven-question interview addressed and measured the three constructs (overt behaviors, verbal communication style, and content of answers). Participants could earn a total of nine points per question, three points for overt behaviors, three points for verbal communication style and three points for the content of answer (Appendix A). Behaviors were recorded as either Proficient (P) or Non-proficient (NP). Proficiency was determined based on the absence or presence of a verbal and physical response and resulted in a score of either P or NP. One point was awarded for a P and zero points were awarded for a NP score. The use of a P or NP scale was developed and piloted by the lead investigator and employment interview experts in order to promote consistency based on scoring procedures that were well-defined. First impressions are considered to be important so whether the student greeted with a smile and introductory statement was counted as one point. The rubric consisted of a total of 100 possible points.

Research design

A multiple probe across days design (Gast & Ledford, 2010) was utilized to collect data in the TLE TeachLivE^{TM} lab. Data were collected across days in both the baseline and intervention phases of the study. Given the criteria established below for stable and predictable data, participants moved from the baseline to the intervention phase.

All five identified participants were brought into the baseline condition simultaneously. Treatment was staggered across participants based on the phase change criteria described below. If participants needed to wait before entering the lab, a lounge area with couches and desks was provided. Participants were instructed not to interact about the treatment or procedures during the research study. In order to ensure that participants did not interact between sessions about questions asked during the interview, an undergraduate research associate facilitated participant transitions between interviews and coaching sessions.

Baseline consisted of virtual interviews in the mixed-reality environment. Interviews consisted of 11 randomized questions. The participants did not receive coaching sessions during baseline. For each participant, a minimum of four data points were collected in order to establish stable and predictable data. A stable and predictable trend was defined as four data points which did not vary more than an average of 20 percent on the interview rubric (Gast & Ledford, 2010).

Prior to implementing coaching sessions, the lead investigator inspected the baseline trend of interview performance for all participants and determined that data were stable and predictable for Jane. When treatment was initiated for Jane, the remaining participants remained in baseline until Jane demonstrated a distinct pattern of data or six treatment sessions occurred. The second participant, Anne, entered treatment when visual inspections by the lead investigator demonstrated a change of slope and level in three data points for Jane. The slope trend forming a distinct pattern was used to transition a participant into the treatment phase. Visual analysis of baseline data for participants

two through five was repeated to determine if their data were stable and predictable, and, therefore, could serve as experimental controls for Jane. Kratchowill et al. (2010) state that evidence for causal relations can be established by visual analysis if the analysis can document the demonstrations of effect by measuring the consistency of level, trend, and variability within each phase. When a distinct pattern of data was demonstrated, Anne began intervention. Anne was chosen based on lowest level performance while demonstrating stable and predictable performance in her baseline interviews. Level, trend, and variability of all legs of the multiple probe design were considered in making decisions on phase changes (Gast & Ledford, 2010). When the participant reached criterion level of mastery (i.e., 80% for three data points in a row) or six sessions occurred, treatment for the participant could be terminated.

Training sessions

The treatment package comprised of a two-step intervention consisting of both virtual interviews within the TLE TeachLivE^{TM} environment and subsequent coaching sessions. This treatment was delivered as a package. No attempt was made to analyze the contribution of the separate components. Interviews in the TLE TeachLivE^{TM} lab began with a research associate leading the participant into the lab. Introduction to the treatment was scripted. Participants were introduced to Ms. Lowery, the avatar interviewer, and were seated at a small desk facing the screen. Ms. Lowery was seated at a desk in the virtual office and she was manipulated by the interactor who was located at a remote site. After the participant was seated, the interview began.

Interviews consisted of 11 scripted questions randomly selected via a random number generator from a bank of 27 questions. The interactor began the interview by stating "To begin, I would like you to give me a summary of your education and any work-related experiences you've had." After the participant responded to this prompt, the interactor continued to ask questions in the order they were presented on the script. The interactor was allowed to ask one follow-up probe per question if needed based on defined criteria. Follow-up probes were only allowed in order to (a) clarify a concept ("Could you explain what you mean by that?"), (b) elongate an answer (e.g., "Could you tell me more about that?"), or, (c) repeat the question for the participant. Interviews took between 5-15 minutes. After the interview was complete, participants were escorted out of the lab by the lead investigator and accompanied to the coaching room by a member of the research team.

The second part of the treatment package consisted of the coaching intervention that was conducted immediately following each TLE TeachLivE^{TM} interview. Coaching sessions were based on mentoring and reflection and guided by both analyzing participant performance in the treatment interview and focusing on strategies to improve participant responses. Each session began with a brief introduction of the coaching session procedures. The coach followed a coaching script that consisted of eight discussion prompts (Appendix B) based on Layng's (2007) study of successful communication during an interview. The coaching prompts were explained to the participants before the coaching sessions began so they were familiar with all the terminology used. Throughout the course of the coaching sessions, modeling behavior and participant rehearsal of correct behavior was allowed. Coaching included identifying correct and incorrect responses, probing errors made, and modeling responses as requested by the participant. Each coaching session lasted between 10-20 minutes depending on the participant.

Generalization

Fourteen to 21 days after completion of each participant's treatment phase, he or she engaged in a live interview with a member of the employee expert panel to check generalization in a live setting. While the pre-treatment interviews were conducted by the Director of Career Services, the post-treatment interviews were conducted by the university's Coordinator of Career Development. This was by research design to avoid participant familiarity with the interviewer from the pre-interview.

Treatment fidelity

Interactor training consisted of meeting with the lead investigator and other members of the research team to discuss the interview questions, the importance of fidelity regarding the order of those questions, and how to begin, conduct, and end an interview professionally. Training sessions followed an interactor script to make sure experimental

procedures were consistently employed. During the training, the interactor demonstrated 100% accuracy when asking questions in the correct order as evidenced through direct observation by the research team. During baseline and treatment sessions, accuracy of interview delivery was measured utilizing an interview checklist. A member of the research team observed and calculated fidelity on 30% of the interview sessions randomly selected throughout the study and all sessions were found to be 100% accurate.

Follow-up interview

The Office of Career Services personnel and authors provided a two-hour training session to the entire research team to address post interview coaching. In order to ensure the coaching sessions were administered correctly, the coaching prompts were provided to the research team and discussed. The coach performed a mock interview session by practicing the interview script with the research team in two practice sessions one week prior to the lesson.

Results

Evaluation of data included visual analysis of data points (via a line graph created in an Excel spreadsheet) collected for each participant throughout each phase (i.e., baseline, probes, treatment) of the research study. Results for each participant are listed in Figure 1 and explained below.

Jane

Jane's baseline mean rubric score was M = 26.8 with a range of 21 to 29. After implementing the independent variable (i.e., combination of treatment interviews and coaching), Jane's mean performance was M = 57 with a range of 37 to 68 over six treatment sessions and included a noticeable change in both level and slope from baseline to treatment. She finished with a high score of 68 out of 100 total points on the interview rubric. The rated scores on the rubric show an increase in Jane's performance of targeted interview behaviors in a mixed-reality interview setting.

Anne

Anne's baseline mean score was M = 25.2 with a range of 17 to 33 with a slightly increasing slope during the baseline phase. Visual analysis of Anne's data demonstrated a change in performance when compared to baseline conditions with treatment scores showing a consistent increase in the level of performance as depicted by the accelerating slope. Anne had a family emergency and missed one and a half weeks of school following her third treatment. Upon returning to school, Anne's performance stabilized at a much higher level during her last three treatment sessions. She ended with a mean score of 63.2 over the six treatment sessions.

Carlitos

Carlitos, the third participant taking part in the study, had a baseline mean of M = 58 with a consistently flat slope during baseline. His high score was a 63 during the baseline sessions while his low score was 49. After implementing the independent variable (i.e., combination of treatment interviews and coaching), Carlitos' mean performance was M = 78.7. His interview scores ranged between 75 to 83 over six treatment sessions and included an increasing slope. Carlitos finished with a high score of 83 during the treatment sessions. The visual data provided evidence of the ability of Carlitos to improve his performance in a mixed-reality interview setting.

Elana

Elana recorded the highest mean performance of all participants during baseline (M = 60.3) and treatment (M = 85.3) phases. She participated in seven baseline interviews and six treatment sessions. Visual analysis of Elana's baseline data demonstrated a stable and predictable trend with range of performance scores between 53 and 66. She recorded

a mean performance of 60.25 and a stable baseline increasing slope. After the phase change was implemented, a clear change in the level of performance from baseline to treatment was noted although the slope stayed the same between baseline and treatment phases. Her high score during treatment was 89 out of 100 possible points. Her final five interviews all scored in the 80's demonstrating consistent performance above 80th percentile.

Belle

Belle had a range of scores between 11 and 55 in baseline sessions. She ended baseline with a mean of M = 38.8. Visual analysis of Belle's data suggested a large change in both level and slope of performance throughout the baseline and intervention sections of the study. After her third treatment session, Belle missed one week of treatment as demonstrated in Figure 3. Belle completed treatment with a mean of M = 69 during her treatment sessions and a high score of 80. The rated scores on the rubric show an increase in Belle's performance of targeted interview behaviors in a mixed-reality interview setting.

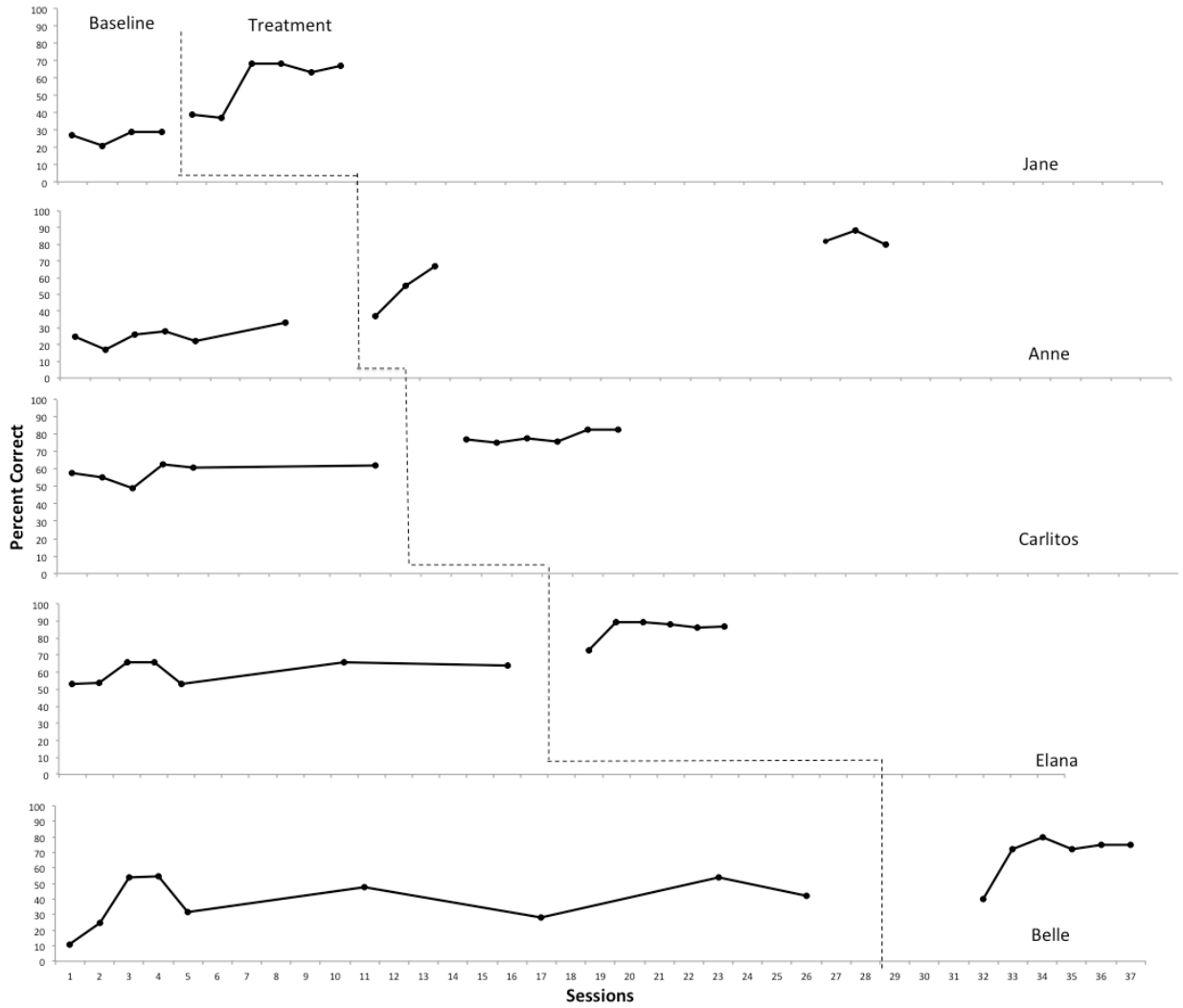

Figure 1. Interview scores recorded by participants

Pre-post scores in live settings

Non-experimental pre and post data were collected for participants who interviewed with a live representative from the University's Career Services to address the second research question. The setting was a simulated office used by

Career Services to administer mock interviews. All five participants made marked improvements in their interview performance as measured by the rubric (see Table 2). All participants were exposed to the exact same number of treatment sessions (6) in the treatment phase and this conformity strengthens the internal consistency of the study.

Table 2. Non-Experimental pre-post test results

Participant	Pre-interview	Post-interview	Difference
Jane	37	58	19
Anne	41	59	18
Carlitos	44	90	46
Elana	53	83	30
Belle	28	67	39

Individually, Carlitos made the greatest gains (increase of 46%) in performance while Anne increased the least (increase of 18%). An analysis of the participants' scores as a whole indicated that the mean gain was 30.4, a large improvement over the six-week timeframe of the study. Live interview performance, as scored on the same rubric used during the intervention, indicated improved performance for each participant, with a range of 18 to 46 points.

Discussion

The purpose of this study was to investigate if individual practice interviews with avatars in a mixed-reality environment combined with individual coaching impact interview performance of five young adults with intellectual disability (ID). The participants were five young adults with intellectual disability who attended a transition program for 18-22 year old students with ID on a college campus in a large, urban city in the southeastern United States. The participants were assessed on generalization and maintenance in a live, mock job interview. The intervention was demonstrated to be effective in improving the individual interview skills and behaviors within the mixed-reality environment, as well as generalization to the post-intervention follow-up interview.

There were many factors that impacted the results of this study. For example, Anne missed 1.5 weeks of school due to a death in her family. This incident delayed her participation within the treatment sessions and resulted in a slight loss of experimental control due to the absence. Given the delay in Anne's participation, we implemented treatment with Carlitos immediately afterwards. Due to TLE TeachLivE^{TM} lab time constraints, the assumptions of the research design were violated by not allowing the participants to stagger the baseline sessions. However, sufficient replication exists to suggest that the violation was not large enough to impact the overall results of the study. In addition, after Belle's third treatment, she missed the school bus and, combined with spring break, had to miss one week of treatment. These events also resulted in a slight loss of experimental control and the missed treatment is demonstrated by the break in treatment scoring.

While it is important to note that interview performance increased significantly, it is also important to note that there is no validated score that insures employment or employability. However, we believe that the TLE TeachLivE^{TM} and other virtual learning environments may be valuable for student instruction for multiple reasons. First, a trained interactor can represent a single individual (as used in this research study) or multiple people (as in a group interview or an audience of teachers) at one time. Having a student practice interviews with different "people" every day is valuable for practicing social skills. For teachers, this can be a seamless and efficient way to offer instruction with various people. Second, the ability to offer instruction in multiple environments (a classroom, the community, a workplace office) provides teachers the ability to "take" their students into new environments without ever leaving the classroom lab. Third, there is research to suggest that a virtual learning environment like TLE TeachLivE^{TM} has multiple applications for schools from training staff to individual student instruction (Dieker et al., 2014; Dieker, Grillo, & Ramlakan, 2011; Vince Garland, Vasquez, & Pearl, 2012).

Our findings suggest interview performance in both live and virtual settings improved after the innovative treatment package consisting of virtual interviews and coaching. Smith and Matson (2010) report on the difficulties of recognizing social cues when in job interview settings while Bouck (2010) encourages educators to explore creative ways of reaching individuals with ID. Similarly, this package has shown that the use of avatars, virtual supports, and coaching can provide a relevant intervention for young adults transitioning into employment. In addition, the use of

mixed–reality can help individuals with ID to self-identify their own communication subtleties and overt behaviors that may impact their performance.

Limitations

This particular intervention requires trained personnel, dedicated space, and certain technical components as detailed in the methodology. Personnel include trained career service personnel, educators with experience in transition, and an interactor trained in improvisation, education, and psychology. Dedicated space included two separate classrooms within the same building. One room was the TLE TeachLivE™ lab and the other was used for coaching sessions. The technical components required included specific software, namely, the TLE TeachLivE™ system and Skype. The hardware included cameras, speakers, and microphones. Technology can falter from time to time and there were two days when the sessions had to be delayed by approximately 30 minutes so that the TLE TeachLivE™ system could be rebooted and tweaked by study personnel. There were also four interviews that were not recorded due to camera failure. However, all interviews were scored in real-time and the technical issues did not impact the study in any way.

Non-technical limitations to the present study should also be taken into consideration. First, results may not be generalizable based on program and geographic location. The participants in this study were volunteer, mature-age university students who had a specific interest in improving their interview performance or gaining employment and may not be representative of the general population and persons with ID. Additionally, all participants were part of the same class in the same transition program. This homogeneity limits the variability of the participants and enhances experimental control by having participants that are "functionally independent but also functionally similar" (Gast & Ledford, 2010, p. 281). However, this homogeneity may also limit generalization to individuals labeled as ID but with different skill sets due to various educational backgrounds.

Second, social skills and self-advocacy, in particular, are important for individuals with disabilities so they become involved in stating their workplace needs and "selling themselves." These skills are vital in a live interview setting and in the workplace. However, social skills are only one of several barriers that limit individuals with ID from securing successful employment. While individuals with disabilities who possess strong social skills may have more success in securing and maintaining employment, social skills alone may not compensate for less than adequate academic preparation or other's perceptions and treatment of individuals with ID in the workplace. Other factors such as dress, personal grooming, hygiene and punctuality that may be judged in determining interview success (e.g., Allen, 1994; Brown, 2000; Kissane, 1997; Stewart & Cash, 1997) also were not addressed in this study.

Third, two participants missed their scheduled time in the lab due to a family emergency or transportation issue. The sessions were made up when the participants returned to school, however, there was a gap in treatment for each participant. In addition, the post-interviews were held on-campus in a formal, quiet setting with a professional in professional dress. This may not be consistent with the conditions of an entry-level interview.

Conclusions and future research

The use of mixed-reality environments and coaching to provide instruction for individuals with disabilities is innovative and has many possibilities for further research. Mixed-reality environments can be seen as a medium for instruction and practicing behaviors while the coaching can be seen as the instruction itself. The particular type of instruction that a teacher uses (e.g., direct instruction, constructivism) could be used in any setting. What makes mixed-reality unique is the opportunity for individuals to practice these skills in a setting that is realistic but does not result in harm to the participant or the "practice partner" since they are not real (Dieker et al., 2008).

In regards to this study, it will be interesting to investigate if interview practice in a mixed-reality environment is the most significant factor in altering interview performance or if the utilization of coaching adds a dimension that allows participants to increase or decrease their performance. The effect of each variable could be analyzed by comparing interview performance after practice interviews with no coaching to interview performance after coaching sessions with no practice. The combination of variables was successful in this study but to what degree each component was responsible for increased performance would need to be identified by further research.

Future research may also be conducted to test the reliability and compare the validity of other evidence based models of instruction (e.g., direct instruction, video modeling). For example, would results improve if we added a video modeling component to instruction? Would results occur sooner or generalize differently if a different type of instruction is used? Research may also be useful on the combination of video modeling and coaching before practicing in the mixed-reality environments. Leishman (2004) encourages us to be proactive when considering the use of new media in education. This research proves to be an important first step in exploring the viability of mixed-reality environments in training individuals with ID for employment interviews. However, it is also important that more refined research be conducted to explore the impact of individual factors on interview performance and the feasibility of combining those with training in mixed reality environments.

References

TLE TeachLivE. (2014). *About TeachLivE.* Retrieved from http://teachlive.org/about/about-teachlive/

Allen, J. G. (1994). *Successful job search strategies for the disabled: Understanding the ADA*. New York, NY: J. Wiley & Sons.

Andreasen, J. B., & Haciomeroglu, E. S. (2009). Teacher training in virtual environments. In S. L. Swars, D. W. Stinson, & S. Lemons-Smith (Eds.), *Proceedings of the 31st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1317-1324). Atlanta, GA: Georgia State University.

Bouck, E. C. (2010). Reports of life skills training for students with intellectual disability in and out of school. *Journal of Intellectual Disability Research, 54*, 1093-1103. doi:10.1111/j.1365-2788.2010.01339.x

Brooks, B. M., Rose, F. D., Attree, E. A., & Elliot-Square, A. (2002). An Evaluation of the efficacy of training people with learning disabilities in a virtual environment. *Disability & Rehabilitation, 24*, 622-626. doi:10.1080/09638280110111397

Brown, D. S. (2000). *Learning a living: A Guide to planning your career and finding a job for people with learning disabilities, attention deficit disorder, and dyslexia.* Bethesda, Maryland: Woodbine House Incorporated.

Bureau of Labor Statistics. (2015). *Table A-6. Employment status of the civilian population by sex, age, and disability status, not seasonally adjusted*. Retrieved from http://www.bls.gov/news.release/empsit.t06.htm

Cobb, S. V. G., & Sharkey, P. M. (2007). A Decade of research and development in disability, virtual reality and associated technologies: Review of ICDVRAT 1996−2006. *The International Journal of Virtual Reality, 6*(2), 51-68.

Crites, S. A., & Dunn, C. (2004). Teaching social problem solving to individuals with mental retardation. *Education and Training in Developmental Disabilities, 39*, 301–309.

Dieker, L. A., Rodriguez, J., Lingnugaris-Kraft, B., Hynes, M., & Hughes, C. E. (2014). The Future of simulated environments in teacher education: Current potential and future possibilities. *Journal of the Teacher Education and Special Education 37*(1), 21-33.

Dieker, L., Grillo, K., & Ramlakan, N. (2011). New technology and virtual environments: The Impact of a summer camp on gifted students interested in STEM careers. *Gifted Education International, 28*(1), 96-106.

Dieker, L., Hynes, M., Hughes, C., & Smith, E. (2008). Implications of mixed reality and simulation technologies on special education and teacher preparation. *Focus on Exceptional Children, 40*(6), 1-20.

Florida Department of Education. (2015, November). Intellectual disabilities (IND). Retrieved from http://www.fldoe.org/academics/exceptional-student-edu/ese-eligibility/intellectual-disabilities-ind.stml

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

Gonca, T. Y., & Karaman, F. (2011). Education 2.0. *On the Horizon, 19*(2), 109-117. doi:10.1108/10748121111138308

Harrington, T. F. (1997). *Handbook of career planning for students with special needs*. Austin, TX: PRO-ED.

Hawkins, G. (2004). *How to find work that works for people with Asperger Syndrome.* London, UK: Jessica Kingsley Publishers.

Kandalaft, M. R., Didehbani, N., Krawczyk, D. C., Allen, T. T., & Chapman, S. B. (2013). Virtual reality social cognition training for young adults with high-functioning autism. *Journal of Autism and Developmental Disorders, 43*(1), 34-44. doi:10.1007/s10803-012-1544-6

Kassenboehmer, S. C., & Haisken-DeNew, J. P. (2009). You're fired! The Causal negative effect of entry unemployment on life satisfaction. *The Economic Journal, 119*, 448-462. doi:10.1111/j.1468-0297.2008.02246.x

Kissane, S. F. (1997). *Career success for people with physical disabilities*. Chicago, IL: VGM Career Horizons.

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2010). *Single-case designs technical documentation*. Princeton, NJ: What Works Clearinghouse.

Layng, J. M. (2007). You're hired! Successful communication makes all the difference. *Communication Teacher, 21*(2), 54-57. doi:10.1080/17404620701529472

Leishman, D. (2004). Visual literacy and learning: finding some online territories for the slow learner. *On the horizon, 12*(1), p. 26. doi:10.1108/10748120410540472

Newman, L., Wagner, M., Cameto, R., & Knokey, A. M. (2009). *The Post-high school outcomes of youth with disabilities up to 4 years after high school. A Report from the national longitudinal transition study-2 (NLTS2) (NCSER 2009-3017).* Menlo Park, CA: SRI International.

Rose, F. D., Attree, E. A., Brooks, B. M., Parslow, D. M., & Penn, P. R. (2000). Training in virtual environments: Transfer to real world tasks and equivalence to real task training. *Ergonomics, 43*, 494-511. doi:10.1080/001401300184378

Shipley, K. G., & Wood, J. M. (1996). *The elements of interviewing*. San Diego, CA: Singular Publishing Group.

Smith, K. R. M., & Matson, J. L. (2010). Social skills: Differences among adults with intellectual disability, co-morbid autism spectrum disorders and epilepsy. *Research in Developmental Disabilities, 31*, 1366–1372. doi:10.1016/j.ridd.2010.07.002

Smith, M. J., Ginger, E. J., Wright, K., Wright, M. A., Taylor, J. L., Humm, L. B., Olsen, D. E., Bell, M. D., & Fleming, M. F. (2014). Virtual reality job interview training in adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 44*(10), 2450-2463. doi:10.1007/s10803-014-2113-y

Stewart, C. J., & Cash, W. B. (1997). *Interviewing principles and practices* (8th ed.). Boston, MA: McGraw-Hill.

Vasquez, E., Straub, C., Nagendran, A., Walsh, G., Marino, M., Hughes, C., Schaffer, K., Koch, A., Delisio, L., & Russel, M. (In Press). A Comparison of simulated and traditional environments on the social responses for children with autism. *Journal of Special Education Technology.*

Vince-Garland, K., Vasquez, E., & Pearl, C. (2012). Efficacy of individualized clinical coaching in a virtual reality classroom for increasing teachers fidelity of implementation of discrete trial training. *Education and Training in Autism and Developmental Disabilities, 47*, 502-515.

Wehmeyer, M. L., & Schalock, R. L. (2001). Self-determination and quality of life: Implications for special education services and supports. *Focus on Exceptional Children, 33*(8), 1-16.

Wehmeyer, M. L., & Schwartz, M. (1998). The Relationship between self-determination and quality of life for adults with mental retardation. *Education & Training In Mental Retardation & Developmental Disabilities, 33*(1), 3-12.

Appendix A

Interview Rubric

Interview Rubric

Student Name _____ Scored By:_____ Date:_____

P=Proficient/NP=Non-Proficient

Overt Behaviors	Greeting	Int. Q	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Closing Q
Eye Contact												
Posture												
Hand Gestures												
Verbal Communication		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Closing Q
Avoidance of slang/inappropriate language												
Lack of distracting communication habits (“um’s”)												
Clear volume and clarity of voice (repeat question?)												
Content of Answers		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Closing Q
Answer question asked												
Highlights qualities of interviewee												
Positive in nature (enthusiasm, energy, excitement)												
Total Score												

Appendix B

Investigator Script for Coaching Session

This coaching session is intended to improve interview performance. You are not being graded on how you answer these questions so please feel free to answer them honestly and completely. You can also ask any questions if you do not understand a concept. Thank you again for your participation. Do you have any questions before we begin?

Okay, I am going to ask you a few questions about your performance in the practice interview today.

1. On what parts of interview did you perform well?
2. What mistakes did you make during the interview?
3. What questions surprised you?
4. How did you handle questions that surprised you?
5. What distracting physical characteristics might you have used during the interview?
6. What verbal ticks or patterns did you use that could have been distracting for the interviewer?
7. Do you feel that the content of your answers was appropriate?
8. What did you learn about interviewing today that can help you improve?

Thank you for participating today. You did a great job.