The Virtual Avatar Lab (VAL): Tapping into Virtual Live Environments to Practice Classroom Feedback Conversations

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Abstract

Providing effective feedback is a skill preservice teachers develop through practice. According to Hattie (2012), feedback is essential in the learning process, is prevalent in effective teaching, and its purpose is to help students determine current level of performance, so adjustments can be made to enhance performance to desired level. This qualitative case study was developed to provide 16, K-12 preservice teacher candidates with an opportunity to practice providing feedback in a virtual live environment. Candidates participated in (e.g. interacted with avatar, observed interaction, and/or critiqued interaction) a 60-minute simulation to practice feedback, then completed oral reflection and a written reflective survey (questionnaire) consisting of rating scales and corresponding written response items. Qualitative data collected was coded and analyzed for themes, while quantitative data explored central tendencies, and variations for each survey indicator. Results indicate live simulated sessions in the Virtual Avatar Lab (VAL) were beneficial in developing feedback skills. Teacher candidates reported favorable perceptions with respect to preparation to facilitate feedback conversations, in most cases felt the student avatars were authentic, and felt better prepared to help their future students take ownership of their own areas of strength and room for growth.

Keywords: virtual live environments, avatars, feedback, teacher candidates

1. Introduction

1.1 Statement and Importance of the Problem

For preservice teachers, providing effective, appropriate feedback is an interpersonal skill that should be developed as part of becoming an effective educator throughout their teacher preparation program. It requires time and opportunity for practice, which can be challenging in courses without required or structured field experiences. Additionally, due to the nature of providing feedback, particularly corrective feedback, opportunities to practice providing authentic commentary to students is important. Anecdotally, the authors, noted preservice teacher candidates enrolled in a foundations of education course expressed frequent concerns about being able to provide effective feedback in the contexts of skill and efficacy, particularly as it pertained to addressing room for growth. Due to this concern, the authors collaborated to utilize the Virtual Avatar Lab (VAL), a virtual live environment, in which preservice teachers could practice providing feedback to student avatars.

1.2 Relevant Research and Theoretical Grounding

Virtual learning experiences are a developing trend within teacher preparation programs. While there are various virtual experiences, mixed reality experiences are those that incorporate elements of virtual and live teaching experiences, which include simulated classrooms coupled with an avatar played by a live actor (TeachLivE.org). Mixed reality experiences in virtual environments (VEs) can be effective in teacher preparation programs because they include four key elements related to simulated experiences: authenticity, targeted, personalized, and iterative opportunities for practice (Mursion, 2018; Falloon, 2010; Girvan & Savage, 2019). Furthermore, the mixed reality simulations take place in real-time, with avatar students who mirror human students in terms of academic, social, and emotional replication (Dieker, Hughes, Hynes, & Straub, 2017). VEs in the educational setting use "virtual reality simulations to improve key instructional skills" (Mursion, 2019, p. 5). A benefit of using VEs as opposed to traditional, human students is that they provide an opportunity to practice in an authentic scenario, but in a

low-stakes environment. According to Simmons, Padgett, and Shelley (2018) VEs provide "teacher candidates the opportunity to learn new skills and craft their practice without placing "real" student/parent relationships at risk during the learning process" (p. 114). Additionally, they iterate the lack of negative effects on human students and the ability to stop a simulation, reflect, and restart with zero consequence to live children (Simmons, et al., 2018; Dieker, et al., 2017). Finally, VEs demonstrate potential to expedite learning and construction of knowledge. Dieker et al. (2017) stated "10 minutes (of VE time) equates to between 30 and 60 minutes of real time" when completing a simulation because many factors extraneous to actual classroom situations can be excluded, allowing participants to focus solely on the developing skill (p. 64).

In the context of this study, the developing skill is preservice teachers' ability to provide effective and appropriate feedback. Effective feedback is defined as the ability to deliver timely, targeted, and tangible comments individuals can use (Arbaugh & Hornik, 2006). Feedback should take place throughout the instructional and learning process (Mertler, 2003; Tovani, 2016; Chappuis & Stiggins, 2020). Furthermore, Hattie, Fisher, and Frey (2016) identified three questions effective feedback should address: "Where am I going? How am I going? Where do I need to go next?" (p. 18). Additionally, effective feedback is beneficial for all students, not only students struggling with a particular concept (Hattie, 2012). Students need "honest, constructive feedback" as a tool for growth (Dweck, 2006, p. 182). According to Schimmer, Hillman, and Stalets (2018), effective feedback is "goal-referenced, actionable, personal, timely, user-friendly, ongoing, and manageable" (pp. 75-76). They asserted that any of the qualities in isolation are important, but together they are significantly more effective. White (2017) added to this by stating feedback is purposeful.

Given the plethora of research devoted specifically to effective feedback, teacher preparation programs should be providing teacher candidates with an opportunity to practice offering positively-framed feedback in a low-stakes setting. With practice in a simulated virtual environment, preservice teachers will have opportunity to refine and develop this essential skill. The purpose of this qualitative case study was to provide preservice teachers with an opportunity to use a live, virtual environment to provide positively-framed, specific, and relevant feedback to a student avatar based on purposefully-planned scenarios.

1.3 Research Question

This qualitative case study sought to obtain candidates' perceptions of using a VE to practice content and a specific skill of study within the course. Therefore, study sought to answer the research question, "What are students' perceptions of using the VAL to practice the facilitation of productive feedback conversations?"

2. Methodology

2.1 Research Design

A qualitative case study design was used in this research study. An element of quantitative data collection was also collected to provide supporting evidence of the qualitative data, as well as a snapshot of student perceptions of the experience. This study relied on a structured interview, administered via questionnaire (referred to as "survey"), for data collection (Bernard & Ryan, 2010). According to Jansen (2010), qualitative research surveys can be used to collect data which reflects diversity in thoughts and perspectives regarding a particular issue. In this study, the case study was developed to provide insight into teacher candidates' perceptions of the use of the innovative instructional technology tool, the VAL, to practice skills. Therefore, questions were developed to elicit feedback of purposefully planned questions to determine those perceptions (Bogdan & Biklen, 2007). Initially, researcher-generated, observational notes were planned as an additional line of sight (Berg & Lune, 2011), but that became impossible. Therefore, the two lines of sight were considered in the research design: qualitative responses to questions and the quantitative rating scale for supporting evidence.

In order to facilitate the project, four core content area scenarios were developed through a collaborative effort of the authors. Due to the content areas represented in the course context, scenarios for core subject areas (English Language Arts, Math, Science, and Social Studies) were developed. The scenarios were developed at an elementary level in an effort to prevent lack of content knowledge from influencing feedback. Though students completed a formative assignment on providing effective feedback in writing, similar in style to the scenarios in this simulation, they had not previously practiced providing oral feedback. In keeping with current VE practices, students were not provided with the scenarios prior to the class meeting and were only provided with the scenarios approximately five minutes before the simulation began. One scenario provided for the simulation was:

Scenario 3: Math

Student: _____

Background: Students have been learning about multiplication. In this example, students were asked to solve basic mulitplication combinations. The objective for this assignment is:

1. Students will correctly solve five given multiplication combinations.

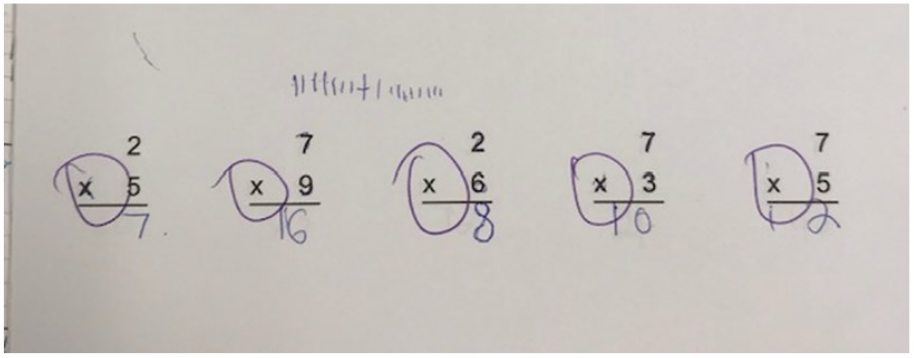

Figure 1. This figure provides an example of a feedback scenario teacher candidates used to facilitate feedback conversations with avatars regarding work sample.

Figure 1. Example of Feedback Scenario

Once the four scenarios for feedback conversations were developed, they were sent to the simulation specialist (the actor who played the role of the student avatars in the virtual environment) for review and feedback. The purpose of this was to provide the simulation specialist with context for acting as the elementary student who had submitted the work to the "teacher" (i.e. teacher candidates participating in the simulation). Upon review and feedback from the simulation specialist, the authors made suggested revisions. Afterward, a one-hour practice simulation was conducted in the VAL with the simulation specialist and the authors. The purpose of this pilot was to work through any potential problem areas the actor and preservice candidates might encounter due to construction, content, and clarity concerns.

For the evening of the simulation with preservice teaching candidates, the VAL was secured for one hour. Each simulation was designed to take approximately 10 minutes, followed by 5 minutes of oral, whole-group reflection and critique. The authors prompted and reminded students of characteristics of effective feedback: positively-framed, specific, and relevant to the objectives of the task. The teacher candidates were informed they would use a virtual classroom in which they could practice providing feedback through interaction with student avatars. At the request of the simulation specialist, candidates were not informed that a live actor was speaking through the avatar and that this actor could see and hear teacher candidates. Teacher candidates were encouraged to focus on the skill being practiced: providing effective feedback. The authors were encouraged to limit discussion regarding how the technology or avatars functioned. Teacher candidates were reminded that simulations were designed to help students develop as preservice teachers and were not meant to embarrass them in front of their peers. Every effort was made to help students feel safe in the learning environment, which included modeling by one of the authors of the first scenario. Additionally, the authors were trained explicitly in stopping or pausing simulations that moved into uncomfortable or counterproductive aspects of the simulation, if needed.

During the simulation, students were provided with a note-taking organizer to help direct and organize thoughts and reflections about the experience (see Appendix A). The authors completed Scenario 1 as a model for students, demonstrating what candidates could expect regarding interactions and experiences with the avatars. Teacher candidates were selected in advance to complete the scenarios, though this was, ultimately, not used in the simulation. Prior to each scenario in the simulation, authors requested volunteers and at least one person per scenario volunteered to interact with and offer feedback to an avatar.

2.2 Setting and Participants

A College of Education at a public, nonprofit university in the southeastern United States is proud to house the state's only Virtual Avatar Laboratory (VAL). The VAL allows for preservice teachers to practice with a live avatar in a safe environment. This study took place in a foundations of education course, "Measurement and Assessment in Classroom Teaching." The student population of the course consisted of 19 undergraduate preservice teacher candidates representing a variety of majors in education, including Childhood Education, Secondary English Language Arts, Secondary Math, Secondary Science, and Secondary Social Sciences (see Table 1). Students enrolled in the course were either African American or White, in either their junior or senior year of their professional education program. It is also worth noting that the University housing this study has a high population of nontraditional students. The National Center for Educational Statistics (2020) emphasized that several qualities distinguish nontraditional from traditional students, including age, financial responsibilities, and work-related obligations at or above part-time status, among other considerations. Nontraditional students represent approximately 21% of the undergraduate student body in the University where this study took place. In this course, at least 4 students were identified as nontraditional students (see Table 1) seeking a degree to pursue a first degree or second career opportunity, consistent with Pelletier's (2010) examples of potential students categorized as nontraditional. Of the 19 students enrolled in the course, 16 candidates (4 male and 12 female) participated in a direct interaction simulation with avatars, observation and critique of interactions with avatars, or in both aspects of the activity (interaction and critique). Most of the candidates had not participated in simulations previously, though one student indicated she had prior experience with a facilitated VAL experience in a different course.

Table 1. Demographics of Students Enrolled in Course

Major	Total Students in Major	African American Female	African American Male	White Female	White Male	Trad. Student	Nontrad. Student
Childhood Education	10	2	0	7	1	8	2
Secondary ELA	3	1	0	2	0	3	0
Secondary Math	1	0	0	1	0	1	0
Secondary Science	1	0	0	0	1	1	0
SecondarySocial Science	4	1	1	0	2	2	2

Note. This table represents demographic information of teacher candidates (study participants) enrolled in "Measurement and Assessment in Classroom Teaching" course.

2.3 Data Collection and Analysis

A reflective survey was developed for preservice teachers to complete following the simulation as an opportunity to elicit responses pertinent to perceptions of the experience as relative to the development of the skill of providing appropriate feedback to students. The survey included 10 items which addressed various aspects of the experience, including role in participation, perceptions of experience, perceptions of the development of the skill of providing feedback, perceptions related to content, identifying ideas related to content, and any additional feedback (see Appendix B). For items 2-8, preservice teachers were asked to rate the experience on a Likert, 1-5 rating scale (Strongly Disagree to Strongly Agree) to determine group means for the items. Candidates were asked to provide qualitative feedback for each item presented in the survey, which consisted of the main source of data collected (see Appendix B). Item 9 was a content-related item in which students were asked to describe effective feedback and Item 10 solicited any additional feedback candidates wished to provide that was not addressed in previous items.

Following the simulation and collection of reflective surveys, the data was analyzed. First, the quantitative data from the survey was manually entered into Excel to determine the mean, median, range, and standard deviation of each item in order to examine the central tendency and variation of the data (Gravetter & Wallnau, 2013). Additionally, qualitative commentary was typed into the same Excel spreadsheet and identified by teacher candidate number (1-16) and major. Following this, the qualitative comments were uploaded into the qualitative coding software, Atlas.ti, as a tool to help organize the data in a coherent and practical manner (Bogden & Biklen, 2007). The unit of analysis was each individual comment made by students for each item on the reflective survey. Miles and Huberman (1994)

recommended a selective coding approach with respect to narrowing focus of analysis solely to research question(s). Therefore, items 2-10 were selectively coded to develop and support themes related to the research question.

3. Results

Preservice teachers, largely, responded favorably to the simulation experience in the VAL in which student practiced and developed oral feedback skills through working with a student avatar. Using the "Word Cruncher" analysis tool in Atlas.ti., in an examination of qualitative Items 2-8 and 10, the words "good (11)," "great (10)," and "positive (4)" were used to describe the experience a total of 25 times. Both qualitative and quantitative results support that students broadly perceived the VAL experience as valuable.

3.1 Qualitative Results

Students provided a wealth of reflective commentary and feedback regarding their perceptions of the experiences. Qualitative data collected indicated an overwhelmingly positive perception of experiences in using the VAL related to increased content knowledge and increased confidence in facilitating feedback conversations. Through analysis, four themes emerged: authenticity of simulation, benefits in development of skills, requests for more practice, anxiety about experience.

3.1.1 Authenticity of Simulation

Authenticity of simulation addressed perceptions of both authenticity and inauthenticity of the VAL experience. Avatars were created by Mursion (www.Mursion.com) to reflect authentic students in an elementary classroom setting. Throughout the simulation, the avatar "students" were situated at a small group table so teacher candidates could easily stand or sit to simulate a teacher in his or her actual classroom, facilitating dialog and interactions with real students. The authenticity component addressed the feelings or perceptions to the "realness," or lack thereof, as relative to the simulation. Specifically, Item 5 on the reflective survey elicited feedback on this by asking, "*In interacting with the avatars, I felt like I was either interacting, or observing an interaction, with actual students. Why do you feel this way?*" Broadly, teacher candidates felt that the simulation was real; in fact, the word "real" was used 18 times to describe the experience. Comments such as, "*Yes, the avatar felt real! The avatar was a real student and could hear and understand you."* were recorded in the reflective survey. In one situation, at the beginning of the second simulation, a teacher candidate whispered to a peer that the female avatar which appeared on the screen was "cute." One student reflected upon that in the survey by stating *"It felt real (when) University student whispered to us that the avatar was cute and she actually heard her and said, "Thank you." We found it funny."* Another student stated, "*Yes! They definitely acted and reacted like normal students.*" while another said, "*The responses from the avatars sounded like real students.*" Additionally, another student responded, "*They are actually communicating and responding to every single thing you say in the same way a child would.*" However, one comment was made that indicated the opposite, representing the negative case. One candidate of the 16 reported, "*I feel that talking and interacting face to face is a completely different experience."*

3.1.2 Benefits in Development of Skills

Most candidates' perception of the experience was that it benefitted them in the development of skills, particularly feedback. Items 4 (*As a result of this simulation, I feel like I have learned more about the "dos" and "don'ts" of providing appropriate feedback*."), 6 ("*As a result of this simulation, I feel like I am better able to help students engage in conversations about their work*."), 7 ("*As a result of this simulation, I feel better prepared to help students take ownership of their learning through recognizing patterns of strength and areas for improvement."*), and 8 ("*As a result of this simulation, I feel better prepared to help students take ownership of their learning through setting goals for future learning as it relates to their work samples*.") were used to determine candidates' perceptions regarding the development of skills associated with providing oral feedback and the facilitation of the conversations.

With respect to Item 4, students not only reflected that they felt better prepared, overall, they offered reflective commentary on what they learned during the experience. For example, one candidate reported, "*(Yes) Because I learned different methods such as positive framing question even while dealing with a student that did the assignment completely wrong."* Another candidate indicated, "*I saw this happen in their activity. I learned more dos and don'ts. I think this activity or experience will help me in the future*." which indicates a positive outlook on the experience. One candidate, the same student who felt that the experience was relatively inauthentic, offered a different perspective. She stated, "*I feel that it is a good practice but real world experience will be the best teacher*." This indicates that she is looking for a human interaction.

Responses to Item 6 yielded similar results, supporting the overall perspective of benefits for using the VAL to

develop the skill of feedback. One candidate reported benefits from observing peers offer feedback to avatars by stating, "*Even though I didn't actually practice this, it helped prepare me seeing other students engage them.*" Another candidate indicated, "*The avatar's reactions to certain statements gave me an idea.*" Finally, one candidate simply reported, "*Yes, strongly*." In this scenario, two candidates reported either reinforcement of benefits to facilitating dialog with student avatars or a mixed perception. Their comments were, "*To me it's' a good exercise in practicing, but face to face interaction is completely different*." and "*The simulation reinforced practices but ability to correct and interact is already present*." The first candidate acknowledge that the simulation served the purpose, but struggled with the VE, while the second candidate felt that they had already mastered the skill, so it was good practice.

Items 7 and 8 worked together in addressing two concepts: teacher candidates' confidence in facilitating dialog with avatars regarding student identification of own areas of strength and opportunity for growth, as well as goal-setting for future learning. With respect to Item 7, one candidate said, "*I saw this ownership happen in the simulation. I feel like I could direct my attention and the students to their strength and areas for improvement. I feel like I could help them pinpoint it.*" Additionally, another comment by a teacher candidate was, "*Yes! I understand now that students have to see for themselves their mistakes and accomplishments in order to take ownership*." For Item 8, responses were inconsistent, and, in some cases, did not address the question. For example, one candidate expressed confidence in helping the student avatars set goals for future learning by stating, "*I think I could help them set goals in their future learning. We could work on goals together*." Whereas another indicated, "*We didn't have this option*."

The comments provided by preservice teacher candidates demonstrated a positive experience in the development of skills and benefits gained from the mode of practice, using VEs, to develop and practice feedback skills.

3.1.3 Request for Additional Practice

Item 10 on the survey inquired, "*Please indicate any other information related to this experience you would like to share with the course professor*." In examining and analyzing the responses to this item, it was evident that students enjoyed the simulation and desired additional practice of skills through VAL simulations. Finally, consistent requests for more practice were found in the results. Candidates shared comments such as,

I learned a lot through observation, but I think actually participating would get me better prepared for this.

I think the VAL lab should be incorporated more often in all education courses to help aid in learning how to respond to students.

I think I need more than just the one time (in the VAL) but I definitely feel more prepared and able after the one.

It was great! But I wish it wasn't just a one-time thing.

The comments above clearly indicate a desire for more use of the VAL.

3.1.4 Anxiety Associated with Experience

Though students reported perceptions of confidence related to knowledge and providing feedback, a few reported anxiety about working with the avatars in the lab. In response to Item 2, a candidate indicated, "*Even though it was scary for me to do that in front of peers, it was a valuable experience for me."* To Item 3, another student mused, "*As awkward as it is, it's the next best thing to actually interacting with a student, but without the weight."* In response to Item 10, one student reported, "*I really liked the experience although it is a little intimidating. It is good practice although the face to face meeting would be slightly different. Face to face you are able to do more and physically see examples*." Another candidate stated, *"It gets you out of your comfort zone. Allows for feedback from professor/peers."* To address Item 10, a student who actively engaged in the simulation with an avatar stated, "*I felt a little spooked that the avatars could see and hear us, even a whisper. This doesn't mean I won't try it if the opportunity arose again, I just have never seen anything like this before."* Even though feelings of nervousness and anxiety existed throughout the simulation, preservice teachers reported finding value in the assignment and even enjoyment.

Overall, teacher candidates perceived the feedback simulation to be a positive experience, felt better prepared to offer effective feedback, overcame anxiety to participate, and wanted more opportunity for practice in the VAL. It is worth noting that the student who had previously engaged in VAL simulations reported a more negative perception than peers, while the student who reported a great deal of anxiety in the simulation, also was the candidate to report the greatest commentary on lack of perceived authenticity.

3.2 Quantitative Results

Quantitative data was collected to provide supporting evidence of commentary reported in the qualitative component of the survey. Data for responses to items 2-8 indicate positive candidates perceptions of the VAL (see Table 1). Based on the survey results, candidates would, largely, recommend this simulation for future sections of the course, and candidates reported increased knowledge of the "dos and don'ts" of providing feedback. However, the preservice teachers reported relatively neutral perceptions of how the VAL assisted them in facilitating goal-setting conversations related to the scenarios.

3.2.1 Central Tendency

To examine central tendencies, both mean and median were analyzed. On a Likert scale of 1-5, with 1 being "Strongly Disagree" and 5 representing "Strongly Agree," overall mean results ranged from 3.875 – 4.5625, whereas median results were either a 4 or 5. The highest mean for a given item (Items 2-8) was 4.5625, Item 3, regarding recommendation of this experience to others taking the class. The lowest mean was 3.875, Item 8, regarding confidence in facilitating conversations with students regarding goal-setting for future learning. Overall, most means were in the "Agree" to "Strongly Agree" categories, ranging from 4.0-4.6. One item, Item 8, fell below the mean of 4.0. Medians were either 4 or 5. Items 3 and 4 reported a median of 5, whereas items 2, 5, 6, 7, and 8 reported a median of 4.

3.2.2 Variations

Variations were also considered in the supportive quantitative data. The range of responses for all items (2-8) indicated the entire Likert scale of 1-5. A rating of "Strongly Disagree" was reported for Item 5, with respect to authenticity of avatars and simulation, by one student. All items had at least one, generally multiple, students who "Strongly Agreed" with the prompt. The standard deviation for each item was also calculated. Item 7, helping avatars identify their own areas of strength and opportunity for growth, had the lowest standard deviation (0.750), whereas Item 5, authenticity of interaction, had the highest (1.181).

Quantitative results support the qualitative findings by confirming students' perceptions of the VAL experience were beneficial. Additionally, the results confirm at least some variance in perception of authenticity of avatars and simulation.

Table 2. Feedback and the VAL: Results from Reflective Survey

Item	Response Mean (n=16)	Response Median	Response Range	Standard Deviation
1. Better prepared to engage in constructive feedback conversations	4.0625	4	2 – 5	0.928
2. Recommend this experience to others taking this class	4.5625	5	3 – 5	0.814
3. Learned more about "dos" and "don'ts" of providing feedback	4.375	5	3 – 5	0.806
4. Interaction with avatars was authentic	4.0625	4	1 – 5	1.181
5. Better prepared to engage students in conversations about their work	4.0625	4	2 – 5	0.998
6. Better prepared to help students take ownership of their work through assisting them in finding areas of strength and room for growth	4.1875	4	2 – 5	0.750
7. Better prepared to help students set goals for further learning based on work samples	3.875	4	2 – 5	0.957

Note. Likert scale of 1-5, Strongly Disagree, Disagree, Neither Agree or Disagree, Agree, Strongly Agree.

4. Discussion

4.1 Connection to Literature

The results of the study revealed two priori themes and two emergent themes as a result of the qualitative analysis. First, based on the literature and previous research, it was expected that candidates would speak to the authenticity of the simulation and the development of new skills during the simulation. As noted by Dieker, Hughes, Hynes and Straub (2017), teacher candidates who participated in the VAL simulation (either as an active participant or as an observer) spoke to the authenticity of the experience. While the majority of candidates noted that the experience felt authentic, a few dissented, as noted in the qualitative comments and the quantitative ratings. Secondly, teacher candidates spoke to the development of skills in the VE. They stressed that the simulation in the VAL helped them to develop the skill of providing effective feedback and facilitating feedback dialogue with the avatars. Comments were supportive of existing research (Author, Padgett, & Shelley, 2018; Mursion, 2018; Falloon, 2010; Girvan & Savage, 2019). While there was one teacher candidate who consistently reported that face-to-face interaction was best and could not be replicated by use of the VE in a live setting and a few "negative" comments and ratings, most candidates found value in the experience, as indicated in both qualitative and quantitative data, which is affirming of the existing literature.

Two themes emerged from the data that were unanticipated. First, candidates requested additional practice in the VAL and, second, there was some anxiety associated with the experience. Candidates requesting additional practice in the VAL was unexpected. While one question on the survey asked students if they would recommend the experience to others, it was surprising how many candidates reported the desire for more time in the VAL in the existing course and other courses or for a longer interaction time with the avatars. Additionally, candidates who were unable to participate actively with the avatars expressed interest in doing so. This indicates the perception of value of the VAL and for the skill of practice in terms of candidates' own learning of concepts. It is reasonable that students in other courses at a variety of universities and institutions could find value in a VE. In terms of anxiety associated with the VAL experience, a few candidates indicated nervousness. While it is certainly conceivable that candidates would be nervous about interacting with avatars for the first time – and in front of their peers and course instructor – it was unanticipated that this theme would emerge. Care should be taken to teach candidates about the VE without revealing the "how" of the live actor controlling the avatar (TeachLivE.org). Additionally, providing a model experience, such as when the instructor modeled a scenario, would be beneficial for candidates to observe to help create a safe learning environment.

4.2 Implications

VEs have the potential to provide meaningful experiences in teacher preparation programs. VEs allow teacher candidates to move beyond what they know in book knowledge, to applying what they learn. Though the scenarios candidates completed in the simulation were related to feedback, there are many other options and possibilities for development, including classroom management, diffusing difficult situations, facilitating difficult conversations with parents, assessment-related contexts, and many more. Most targeted skill can be practiced in VEs. The VAL has the potential to provide opportunity for more realistic practice and development of skills necessary to become an effective educator in a safe and controlled environment which can take place before a student ever enters a classroom. The opportunities and potential benefits for use in the VE for teacher candidates are enormous.

4.3 Limitations

Though this case study yielded positive results and does not seek to generalize results (Bogden & Biklen, 2007), there were limitations. First, the sample size was small and limited to one course. Due to the small sample size, quantitative data was significantly impacted by the two students who reported ambivalence or lack of stimulation in the experience or increased levels of anxiety. Next, only 4/16, or 25%, of students in this study were able to actively participate in providing feedback through interaction with the avatars. For this simulation, the university only had elementary-aged avatars available. One Secondary Social Sciences teacher candidate commented, "*I'd like at least one secondary work sample for student to try. These are the only thing that I would add. Great job!"* It would be optimal to have middle-or-upper level students for secondary majors. Additionally, it is possible that students would benefit from more front-loading related to the actual VAL experience. This could address the authenticity concern reported by a small portion of the participants. This rationale is based upon one response to Item 10, "*I think the people (avatar actors) did a great job of acting like real children, but since some people have not spent much time teaching, they thought some of the commentary was funny. I think you should maybe brief them more on how real and relatable it actually is."* It is worth noting that candidates who actively participated in the simulation through interacting with the avatar rated the experience higher than those who observed and critiqued others' interactions.

Additionally, the student who had already engaged in the experience reported a lower-quality experience, as did one student who reported significant anxiety associated with the experience. Finally, Item 8 on the survey could be revised to better elicit feedback on perceptions related to assisting avatars in setting goals for future learning. Given the novelty of this new technology, more research is warranted and in a variety of learning contexts.

4.4 Conclusion

In conclusion, the VAL is an innovative, cutting-edge piece of instructional technology which can be used in many contexts to simulate real-world teaching scenarios, but without the high stakes of interacting with a real, human student. Using scripted VEs allowed students to practice a new skill in a compressed amount of time without other extraneous distractions, such as overall novelty of the virtual avatar experience. Although VEs are a relatively new and novel research field within education, it demonstrates a promising outlook for teacher preparation programs to facilitate "student-teacher" interactions in a low-risk environment. In one course experience, preservice teacher candidates reported value in using the VAL to practice providing feedback to "students" (avatars) through interactive teaching.

References

Berg, B. L, & Lune, H. (2011). *Qualitative research methods for the social sciences* (8th ed). Boston, MA: Pearson Education, Inc.

Bernard, H. R., & Ryan, G. W. (2010). *Analyzing qualitative data: Systematic approaches*. Thousand Oaks, CA: SAGE Publications, Inc.

Bogden, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods.* Boston, MA: Pearson Education, Inc.

Chappuis, J., & Stiggins, R. (2020). *Classroom assessment for student learning: Doing it right using it well.* Hoboken, NJ: Pearson Education, Inc.

Dieker, L., Hughes, C., Hynes, M., & Straub, C. (2017). Using simulated virtual environments to improve teacher performance. *School-University Partnerships, 10*(3), 62-81.

Dweck, C. (2006). *Mindset: The new psychology of success.* New York, NY: Random House Publishing.

Falloon, G. (2013). Using avatars and virtual environments in learning: What do they have to offer? *British Journal of Educational Technology, 411*(1), 108-122. https://doi.org/10.1111/j.1467-8535.2009.00991.x

Girvan, C., & Savage, T. (2019). Virtual worlds: A new environment for constructionist learning. *Computers in Human Behavior, 99*, 396-414. https://doi.org/10.1016/j.chb.2019.03.017

Gravetter, F. J., & Wallnau, L. B. (2013). *Statistics for the behavioral sciences* (9th ed.). Belmont, CA: Wadsworth.

Goodwin, B., & Miller, K. (2012). Research says good feedback is targeted, specific, timely. *Educational Leadership, 70*(1), 82-83.

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning.* New York, NY: Routledge. https://doi.org/10.4324/9780203181522

Hattie, J., Fisher, D., & Frey, N. (2016). Do they hear you? *Education Leadership, 73*(7), 16-21.

Jansen, H. (2010). The logic of qualitative survey research and its position in the field of social research methods. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, *11*(2). Retrieved from http://nbn-resolving.de/urn:nbn:de:0114-fqs1002110

Mertler, C. A. (2003). *Classroom assessment: A practical guide for educators.* Los Angeles, CA: Pyrczak Publishing.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Mursion, Inc. (2018). Retrieved from https://www.mursion.com/

Mursion. (2019). *Virtual reality simulations for elevating educator performance.* Mursion: Reinventing the Way Professionals Master Their Craft. Retrieved from https://scheduling.mursion.com/download/14017-education-brochure-r2.pdf

National Center for Educational Statistics. (2020). *Definitions and data: Who is nontraditional?* Retrieved from https://nces.ed.gov/pubs/web/97578e.asp

Pelletier, S. G. (2010). Success for adult students. *Public Purpose,* 1-6.

TeachLive.org. (2019). *About CREST/TeachLivE*. Retrieved from http://teachlive.org/about/about-teachlive/

Schimmer, T., Hillman, G., & Stalets, M. (2018). *Standards-based learning in action: Moving from theory to practice.* Bloomington, IN: Solution Tree Press.

Simmons, K., Padgett, A., & Shelley, T. (2018). Lessons from a first year lab: Constructing a successful virtual environment in an institute of higher education. *Education Research Highlights in Mathematics, Science, and Technology*, 113-121.

Tovani, C. (2016). How I learned to be strategic about writing comments. *Education Leadership, 73*(7), 56-60.

White, K. (2017). *Softening the edges: Assessment practices that honor K-12 teachers and learners.* Bloomington, IN: Solution Tree Press.

Appendices

Appendix A: Note-taking Organizer

VAL Feedback Scenarios

Directions: As you observe the oral feedback interactions, make note of observations with respect to my interactions or your classmates' interactive conversations. Note if the feedback was positively framed, specific, and meaningful/relevant. Note specific language used by the University "teacher" and the Avatar "student." We will use this as a springboard for reflective discussion.

Scenario 1: _____

Category	Yes	No	Comments
Positively Framed			
Specific			
Relevant to prompt/objective			
What you would keep the same	N/A	N/A	
What you would do differently	N/A	N/A	

Appendix B: Reflective Survey

Oral Feedback Using VAL Simulation

The purpose of this activity was to provide you with an opportunity to practice engaging students in a constructive conversation regarding a work sample. In this simulation, you actively participated by either engaging in dialogue with an avatar or through critiquing a dialogue you observed. Based on this, please rate and offer commentary related to the experience. Use the following scale for rating:

1 = Strongly Disagree

2 = Disagree

3 = Neither Agree or Disagree

4 = Agree

5 = Strongly Agree

1. My role in the simulation was:

1. Interaction with avatar 2. Critiquing interaction with avatar 3. Both

2. As a result of this simulation, I feel better prepared to engage in a constructive conversation with students regarding work samples.

1 2 3 4 5

Why do you feel this way?

_____

_____

3. For future sections of FNDS XXXX, I would recommend this experience to others.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

4. As a result of this simulation, I feel like I have learned more about "dos" and "don'ts" of providing appropriate feedback.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

5. In interacting with the avatars, I felt like I was either interacting, or observing an interaction, with actual students.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

6. As a result of this simulation, I feel like I am better able to help students engage in conversations about their work.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

7. As a result of this simulation, I feel better prepared to help students take ownership of their learning through recognizing patterns of strength and areas for improvement.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

8. As a result of this simulation, I feel better prepared to help students take ownership of their learning through setting goals for future learning as it relates to their work samples.

1 2 3 4 5

Why do you feel this way?

_____

_____

_____

9. Describe appropriate feedback.

_____

_____

_____

_____

_____

10. Please indicate any other information related to this experience you'd like to share with Dr. Klash.
_____
_____
_____
_____