

A Guide to Integrating Mixed-Reality Simulation in Initial and Advanced Special Education Programs

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Journal of Special
Education Preparation
2(1), 48-57
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DOI: 10.33043/JOSEP.2.1.48-57
openjournals.bsu.edu/JOSEP

ABSTRACT

Mixed-reality simulation (MRS) is an innovative and promising approach in teacher preparation programs. While the use of MRS as a practice-based learning opportunity (PLO) in special education teacher preparation and professional development continues to grow, integrating this novel technology can be daunting for faculty members and school leaders. The purpose of this practitioner guide is to further explain the utility of MRS, provide detailed explanation and resources for integrating this technology as a PLO in teacher preparation, and illustrate an example of how MRS can be used in special education coursework.

KEYWORDS

Mixed reality simulation, professional development, special education, technology, teacher preparation

Teacher preparation programs face limited time to address the full range of skills educators must master, a problem that is magnified in special education. Preservice special education teachers must learn how to teach culturally, linguistically, and academically diverse students while enrolled in their preparation programs. Once in the field, special education teachers are tasked with effectively supporting the academic and socio-emotional needs of students with disabilities (SWD). Such skills include the ability to monitor student progress, identify students needing intensified instruction and intervention, provide intensified instruction and intervention as appropriate, and collaborate with parents and/or guardians and school professionals (i.e., co-teachers, paraprofessionals, physical and occupational therapists, etc.) in addition to planning instruction for multiple content areas each day.

The level and range of content needed to effectively prepare preservice teachers to work with SWD is vast, especially considering the limited

time available in both traditional and alternative pathways to certification. One response to this challenge involves embedding high leverage practices (HLPs; McLeskey, et al., 2017) in teacher preparation. HLPs are a set of specific teacher practices that are likely to improve student outcomes. HLPs are defined as “tasks and activities that are essential for skillful beginning teachers to understand, take responsibility for, and be prepared to carry out in order to enact their core instructional responsibilities” (Ball & Forzani, 2009, p. 504). Specifically, HLPs are a common core of professional knowledge, classroom practices, skills, and behaviors that can be taught to preservice teachers using highly structured and well-supervised opportunities where feedback is essential to field experience (McCray et al., 2017). Integrating HLPs in teacher preparation programs can improve the instructional practices of teachers that lead to higher student academic achievement and social outcomes (Akalın & Sucuoglu, 2015; Ball & Forzani, 2009; Cohen, 2015; Grossman et al., 2009; McLeskey & Brownell, 2015).

It is critical for preservice teachers to

have opportunities to practice teaching through structured, scaffolded, and supervised experiences (Leko et al., 2015). High quality teacher preparation programs provide numerous opportunities for deliberate practice, performance feedback, and targeted coursework (Scheeler et al., 2016). The Collaboration for Effective Educator Development, Accountability and Reform (CEEDAR) Center and researchers in the field of teacher preparation (Ball & Forzani, 2011; Grossman et al., 2009; Lampert, 2010; McDonald et al., 2013; Windschitl et al., 2012) have urged teacher preparation programs to provide deliberate practice that is strategically sequenced and calibrated for preservice teachers to develop mastery of HLPs. McLeskey and colleagues (2017) suggest “HLPs can become the foundation of a cohesive, practice-based teacher education curriculum that incorporates repeated, scaffolded, effective opportunities for special education teacher candidates to practice” (p. 9). Integrating HLPs in teacher preparation programs includes planning for when and how knowledge, skills, and understandings will be introduced, practiced, and assessed. Teacher educators are increasingly focused on creating practice-based learning opportunities (PLOs) to provide meaningful practice on HLPs, particularly before preservice teachers apply their learning in the field.

Effective PLOs are scarce and often limited to inauthentic role-plays and scenarios that do not reflect the complexities and challenges of a classroom environment. One innovative and promising tool emerging in the field of education to provide such practice is the use of mixed-reality simulation (MRS). MRS is an innovative technology that merges human knowledge with artificial technology. Mursion™ is a MRS platform that evolved from tech-



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nology developed out of the University of Central Florida (e.g., TeachLivE™). Software like Mursion™ provide simulated environments to practice skills essential for classroom teaching (Dawson & Lignugaris-Kraft, 2017; Dieker et al., 2016; Pas et al., 2016; Peterson-Ahmad, 2018; Underwood et al., 2015; Vince Garland et al., 2016). These simulated environments are realistic settings where a trained human interactor digitally puppeteers a variety of avatars displayed on a screen visible to participants (Dieker et al., 2008).

The purpose of this practitioner guide is to further explain the utility of MRS, provide detailed explanation and resources for integrating this technology as a PLO in teacher preparation, and illustrate an example of how MRS can be used with HLPs in a capstone special education course. Throughout this guide, several terms will be used to explain and illustrate. A *facilitator* (e.g., faculty member, teacher educator, clinical or field supervisor, principal, instructional coach, or teacher leader) is the individual(s) who plans to implement MRS in their coursework or teacher preparation program. A *participant* (e.g., undergraduate/graduate student, preservice teacher, inservice teacher) is the individual(s) who engages in the simulation. The *lab* refers to the behind-the-scenes technology

including the mixed reality lab director, lab administrative support staff, and simulation specialist.

MIXED REALITY SIMULATION IN TEACHER PREPARATION

The use of simulation is a well-validated approach for students in numerous fields outside of education, such as military and medical training (McGaghie et al., 2010). Just like pilots use flight simulators before ever taking flight; the same concept is applied to MRS in education. This interactive technology merges artificial intelligence with human knowledge and interaction created by an actor referred to as a simulation specialist. Merging the two constructs of artificial intelligence and human interaction creates a “human in the loop” paradigm. The fields of computer science and engineering use this well-known term to describe how humans play an important role in influencing a simulation through integrating their own actions, thoughts, and words (Cranor, 2008). When using the Mursion™ platform, the simulation specialist, who is trained on the operating software, puppeteers the avatars to create a more realistic experience for the participant. These interactions capture the simulation specialist’s movements, speech, and thoughts; thus, allowing the avatars to interact and respond with the participant in real time, creating a more authentic and real experience.

Simulated practice is a PLO that allows participants to learn and master new skills in an environment that does not put others (e.g., K-12 students) or relationships at risk, by eliciting participant thinking and adjusting to real-time responses during interactive teaching (Dieker et al., 2014). This enables preservice teachers to practice decision-making and receive feedback on decisions through virtual respons-

es and peer observers (Zimmer et al., 2020). The facilitator and the lab work collaboratively to design a simulation scenario. Participants receive a participant-facing, shortened version of the scenario that includes the learning objective to help prepare and guide them during the simulation (see Figure 1). Key information is purposefully omitted from the version of the scenario participants receive, and the full scenario shared between the facilitator and lab.

The simulation specialist observes the participant(s) in real time through a webcam and can hear their speech through built-in microphones within the technology. From the participants' end, the simulated environment (e.g., avatars within a classroom or an adult within an office) are portrayed on a large television screen or a laptop. The classroom simulation appears like any other classroom with desks, chairs, a whiteboard, and students. The technology allows for a natural conversation that is personalized to the participants within the simulation. Participants are situated in authentic classroom scenarios, with a variety of experiences occurring (e.g., on or off task behavior) based on the participants behavior (e.g., engaging lesson, poor planning; Hudson et al., 2018; Nagendran et al., 2014).

LITERATURE REVIEW ON MRS IN TEACHER PREPARATION

Novice teachers often state that they do not feel they are adequately prepared to enter the classroom (DeMonte, 2015). Novice teachers require more practice with newly acquired pedagogical skills; thus the need to provide preservice teachers with deliberate opportunities to practice important skills (Leko et al., 2015). Given the limitation of teacher preparation programs (e.g., time, effective field placement, and

opportunities to practice effective pedagogy), paired with the fact that SWD are increasingly served in the general education classroom, well-designed simulation experiences that integrate purposeful practice of HLPs is one promising solution to prepare preservice teachers.

When participants interact within the simulation, both the mind and body are immersed in a simulated experience where the authenticity and relevance are high while the cognitive load is appropriate (Calandra & Puvirajah, 2014). MRS offers the opportunity for preservice teachers to practice with the safety net of being able to make mistakes, reflect on what went wrong, and continue to practice without putting anyone at risk (Calandra & Puvirajah, 2014; Dieker et al., 2016). Preservice teachers are allowed the opportunity to hone their skills in a safe environment, to learn from their mistakes, and receive real time instructor feedback before ever entering the classroom setting (Dieker et al., 2016). The implementation of MRS in teacher preparation programs also provides the opportunity for preservice teachers to practice various HLPs such as opportunities to respond (OTR), which supports the learning of students with and without disabilities (Dawson & Lignugaris-Kraft, 2017).

In addition, the use of MRS also affords the opportunity for participants to receive individualized coaching. For example, there have been studies that focus on preservice teachers receiving coaching from their instructor and/or peers to improve their classroom management skills through the use of MRS scenarios (Dawson & Lignugaris-Kraft, 2017; Pas et al., 2016; Peterson-Ahmad, 2018; Zimmer et al., 2020).

Recent studies have focused on embedding HLPs in teacher preparation programs using MRS as the practice component, before or coinciding with,

students entering their field placements. For example, Driver et al. (2018) examined the effects of embedded MRS to prepare preservice teachers for collaborative environments. Preservice teachers learned specific communication skills within their coursework, then practiced in a variety of simulated collaborative settings (e.g., co-teaching, paraprofessional, parents, and administrator). Each setting had a scenario which created an environment in which the participants were able to practice the communication skills they learned. Results showed significant shifts in perceptions of readiness to work in a collaborative environment.

Zimmer and colleagues (2020) examined the effects of providing preservice teachers a PLO to embed several instructional and behavior HLPs within a lesson plan. Preservice teachers were given a scenario in which they were asked to create a lesson plan that embedded evidence-based strategies and teach the lesson three times over the period of the instructional course. Findings showed that the use of performance feedback and deliberate practice within a controlled environment resulted in positive shifts in preservice teachers' use of targeted HLPs.

Furthermore, Walters et al. (2021) conducted a randomized control design to investigate the effects of MRS within their special education program to prepare preservice teachers on how to implement a system of least prompts. Results suggested that preservice teachers in the group that had both MRS and coaching, significantly improved the implementation of the prompting sequence, compared to the control group. Overall, the use of MRS as a PLO is an innovative and effective educational tool to use with preservice teachers to develop the skills and expertise needed to create a successful and inclusive classroom.

TABLE 1: Lab Communication Hits and Misses

Target behaviors for simulation/role play: The below “hits” represents strategies that we would like to see the teachers display. The below “misses” refer non-preferred teacher behaviors.	
When teachers...	Classroom students will...
HIT	HIT
<p>Provide scaffolds and supports students can become more engaged and respond.</p> <ul style="list-style-type: none"> ▪ Explicitly teaching vocabulary ▪ Frequent questioning ▪ Provide scaffold supports ▪ Provide positive and constructive feedback to guide students’ learning and behavior ▪ Use strategies to promote active student engagement ▪ Embed and use students’ cultural, religious, family, intellectual, and personal experiences and resources during instruction ▪ Checking student understanding during and at the conclusion of lesson ▪ Building respectful relationships with students 	<p>You will be a typical upper elementary/middles school (3rd or 6th grade) classroom with typical behaviors (i.e., off task behaviors, calling out, yawns if lesson is not engaging, inattentive, etc.) One student has a disability.</p> <p>As teachers clearly introduce content and attempt to engage students meaningfully, student avatars will respond with interest.</p>
Miss	Miss
<p>If teacher candidate is not engaging and/or is not prepared, acting out and rude comments are appropriate. Play off the participant – as they develop their teaching strategies.</p>	<p>If the teacher candidate is creating a welcoming environment and engaging students in the lesson, the avatars can be on task with the occasional calling out, distractibility, and typical elementary school behaviors. If teacher candidate is not engaging and/or is not prepared, acting out and rude comments are appropriate. Play off the participant – as they develop their teaching strategies.</p>

HOW TO INTEGRATE MRS IN TEACHER PREPARATION COURSEWORK

While the use of MRS is a promising approach in teacher preparation (Driver et al., 2018; Walters et al., 2021; Zimmer et al., 2020), it can feel overwhelming for first time users. As with any new technology integration the more an individual engages in the process, the more comfortable and familiar they become with the tool. The following recommendations are intended as a starting point for faculty to begin to plan this immersive experience within teacher preparation program and coursework.

Design a Scenario

The facilitator is the person that will plan and lead the simulation session. It is their job to ensure that

the simulation runs smoothly from the instructional side and answer any questions that the participants may have. Many participants will have questions about what they will experience and typically feel uneasy about their first MRS session. The facilitator can reassure these feelings are normal and encourage participants to prepare as they would for a real educational environment. Facilitators are encouraged to support the suspension of disbelief by calling the avatars by their names, referring to their interest and likes, and by limiting information shared about the behind-the-scenes technology with the lab. This helps keep “the magic alive”; the more the facilitator buys into the realism of the simulation, so will the participants. In addition, the facilitator works collaboratively with the lab to establish the

FIGURE 1: Sample MRS Scenario

HLP #16:
Use Explicit Instruction

Synopsis

3rd or 6th Grade Classroom

Learner Challenge

You are either a 3rd or 6th grade teacher preparing to teach a reading comprehension lesson to a diverse group of students in an inclusion classroom. Several of your students have high-incidence disabilities. The lesson will focus on a literacy standard. See attachment for additional details and instruction.

Objective

Participants will integrate HLP #16 (explicit instruction) in a lesson they create. Then they will teach an explicit instruction lesson that incorporates evidence-based strategies.

To hit this objective teacher candidate will:

- Make content, skills, and concepts explicit by showing and telling students what to do or think while solving problems, enacting strategies, completing tasks, and classifying concepts.
- Choose examples and non-examples and language to facilitate student understanding, anticipate common misconceptions, highlight essential content, and remove distracting information.
- Model and scaffold steps and/or processes needed to understand content and concepts, apply skills, and complete tasks successfully and independently.

Materials to Submit to Lab and/or Facilitator

- Teacher created lesson plans & accompanying documents (i.e., graphic organizers, PowerPoint, etc.)

Scenario Guide

Scenario Overview

Teacher candidate will teach an explicit reading comprehension lesson.

Ideal Simulation Configuration: Classroom

Elementary -OR- Middle School Avatars

Learner Audience

- Pre-service Teachers/ Teacher candidates
- Non-credentialed Teachers
- Novice Teachers

Note. Scenario for HLP #16 Explicit Instruction Simulation.

TABLE 2: Sample MRS Session Schedule

Less Than 10 Participants in a Session		10 - 18 Participants in a Session You can use the <10 schedule and assign co-participant to teach each lesson together (or engage in simulation).	
0 - 10 min	Participant A	0 - 10 min	Participant A & Participant J
12 - 22 min	Participant B	12 - 22 min	Participant B & Participant K
24 - 34 min	Participant C	24 - 34 min	Participant C & Participant L
36 - 46 min	Participant D	36 - 46 min	Participant D & Participant M
48 - 58 min	Participant E	48 - 58 min	Participant E & Participant N
58 - 1:10 min	Break/Debrief	58 - 1:10 min	Break/Debrief
1:12 - 1:22 min	Participant F	1:12 - 1:22 min	Participant F & Participant O
1:24 - 1:34 min	Participant G	1:24 - 1:34 min	Participant G & Participant P
1:36 - 1:46 min	Participant H	1:36 - 1:46 min	Participant H & Participant Q
1:48 - 1:58 min	Participant I	1:48 - 1:58 min	Participant I & Participant R

Note: TRTP Mixed Reality Simulation (MRS) Guidance Document (Zimmer & Driver, 2021)

MRS session outcomes and objectives and the specific skills or actions participants should practice (Figure 1).

Practice the Session with the Simulation Specialist

Before participants engage in the simulation, the facilitator first schedules a practice session with the lab to review the objective of the session, the “hits and misses” (i.e., how the avatars should react to certain behaviors shown by the participant; Table 1), and the level of behavior (low, medium, or high) you want your avatars to display. It is recommended to start all sessions on a low behavior. This will help ease participants into the scenario and create a safe and welcoming environment. As the session progresses, you can contact the simulation specialist to change the behavior level of the scenario if you so desire. Practicing the simulation not only allows the facilitator to have a greater understanding of what to expect

from the experience, but also helps the lab ensure the experience reflects the desired outcomes and environment needed to elicit the behaviors participants should practice.

Have Participants Engage in an Introductory Session

It is recommended that if this is the participant’s first time using MRS, the facilitator provides an introductory session. An introductory session has three primary purposes: 1) to get the participants familiar with how the simulation operates, 2) to boost participants’ comfort levels, and 3) allow participants to get to know the avatars’ personalities. The last purpose is valuable for participants that are creating and teaching a lesson plan. Participants can integrate what they have learned about the avatar students into creating engaging lessons. For online courses, it can also be helpful for the facilitator to record a brief video interacting with the

avatars so participants have a point of reference.

Create a Participant Schedule

Once the scenario is designed, the facilitator works with the lab to schedule MRS sessions. MRS sessions can be scheduled as an entire group, where participants take turns engaged in simulated practice while peers watch, or as individual sessions within a block of time (see Table 2). It is helpful for the facilitator and/or participants to decide the participant order prior to the session time. This helps to avoid the awkward waiting for volunteers, helps nervous participants mentally prepare for when they will be called on, and makes for more efficient use of lab time.

For large groups, a fishbowl strategy approach works best. During the MRS session, the facilitator would select five to ten participants (depending on time) to engage in the scenario, while the rest of the group listens, watches, and takes

TABLE 3: Capstone Course Syllabus Snapshot

Module 2: High Leverage Practices	
<p>Module Objectives</p> <p>2.1 Provide baseline data on your understanding of high leverage practices</p> <p>2.2 Identify the alignment between the special education and general education HLPs with the SEPO and TKES observation tools</p> <p>2.3 Select one HLP from each of the four areas: collaboration, assessment, instruction, and social/emotional/ behavior for targeted growth</p> <p>2.4 Prepare for upcoming Mixed-Reality Simulation (MRS) Session</p>	<p>Module Assignments</p> <ul style="list-style-type: none"> · M2 A1: HLP Pretest (2.1) · M2 A1: HLP Alignment Matrix Part II (2.2) · M2 A2: HLP Professional Growth Plan Part II (2.3) · M2 A3: Submit 3-5 questions you will ask the student avatars (2.4) · M2 A4: Schedule your “meet the students” MRS simulation (2.4)
Module 3: Preparing for Practice	
<p>3.1 Establish an evidence base for selected HLPs</p> <p>3.2 Engage in MRS Session</p> <p>3.3 Reflect on the MRS Experience</p>	<ul style="list-style-type: none"> · M3 A1: Locate at least one evidence-based journal articles for each of your four selected HLPs (3.1) · M3 A2: Introduce yourself in the MRS setting via Zoom and collect information on your “students” (3.2) · M3 A3: Submit an initial reflection on the MRS experience, what you have learned and what you will integrate into future lessons (3.3)
Module 4: Explicit Instruction	
<p>4.1 Engage in Explicit Instruction Webinar</p> <p>4.2 Analyze Explicit Instruction Video Resource</p> <p>4.3 Prepare for upcoming MRS Session</p>	<ul style="list-style-type: none"> · M4 A1: Complete Explicit Instruction Webinar (4.1) · M4 A2: Explicit Instruction Video Analysis (4.2) · M4 A2: Submit Explicit Instruction Lesson Plan I (4.3)
Module 5: Purposeful Practice I	
<p>5.1 Engage in MRS Session</p> <p>5.2 Reflect on the MRS Experience</p>	<ul style="list-style-type: none"> · M5 A1: Teach Explicit Instruction Lesson Plan I in the MRS setting via Zoom (5.1) · M5 A2: Watch recorded video and score yourself using the SEPO (5.2) · M5 A3: Reflect on the experience, what you did well, and what you would like to improve on. Comment on your specific HLPs of focus (5.2)
Module 6: Collaboration	
<p>6.1 Analyze the evidence base and implementation of the Collaboration HLPs</p> <p>6.2 Debrief and reflect on the MRS Experience</p> <p>6.3 Prepare for upcoming MRS Session</p>	<ul style="list-style-type: none"> · M6 A1: Engage in Collaboration Discussion board and comment on two peer posts (6.1) · M6 A2: Watch partner video and provide constructive feedback (6.2) · M6 A3: Review instructor SEPO and peer feedback and submit plan of action (6.2) · M6 A4: Revise Explicit Instruction Lesson Plan I based on feedback (6.3)

notes. After the scenario is complete, everyone debriefs, creating an engaging and participant-centered experience for the entire group. Please note we recommend keeping the number of participants in a session to 30 or less to maximize engagement and create a sense of community when possible.

Debrief the Session

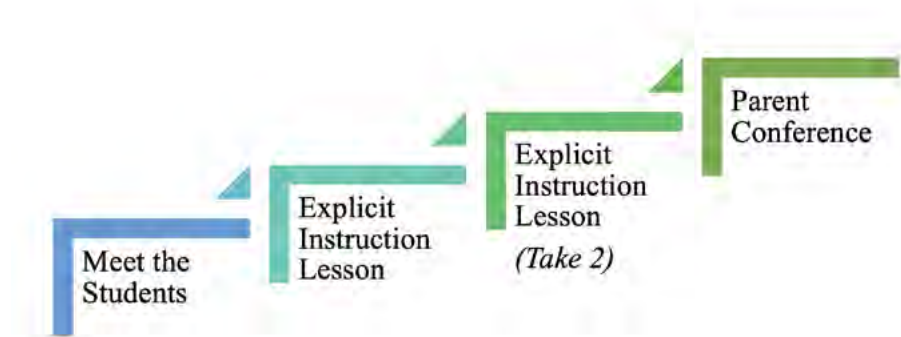
It is important to provide time and space for meaningful feedback and discussion on the simulation session. This allows participants to discuss what went well, areas of strengths, improvement, and how they may improve. A key aspect of any PLO is the ability for participants to reflect and learn from experience. Sample debrief questions might include: *a) What went well? Name three specific examples; b) What is an area to improve upon? List one specific example and explain why. Provide a suggestion for next steps to grow in this area; c) What was your overall take-away from watching this video/live session? Identify something that stood out to you and will influence your practice.*

EXAMPLE OF MRS AND HLPs IN SPECIAL EDUCATION TEACHER PREPARATION

The next section will illustrate an example of how MRS can be used to address numerous HLPs in a preservice special education course. The following example demonstrates how MRS was embedded in a culminating capstone course at the end of a two-year, fully online Master's in Education special education program. This example is relevant for both initial and advanced certification programs in special education.

In the capstone course, participants were asked to apply and synthesize their learning and demonstrate a com-

FIGURE 2: Capstone Course MRS Simulation Sequence



prehensive understanding of how HLPs should be integrated into their teaching practice. At the start of the semester, participants created an alignment matrix between HLPs, the statewide teacher observation rubric, and program key assessment observation rubric (e.g., SEPO). Next, participants used their alignment matrix to identify individual areas of strength and growth to focus on throughout the course (see Table 3). All participants were prompted to focus on HLP #16 Explicit Instruction, and to identify one additional growth HLP from each of the four domains of collaboration, assessment, instruction, and social/emotional/behavior. Throughout the remainder of the semester, participants sought out and shared research on their focus HLPs through discussion forums and reflective assignments.

Simulated Capstone Practice

Simultaneously, participants engaged in four 10-minute MRS sessions across the semester (Figure 2). The first MRS session was a “Meet the Students” scenario, where participants asked questions to either the elementary or middle school avatar students to learn about their unique personalities. The purpose of this first introductory session is two-fold. As noted in the “how-to” section, this allows participants to become comfortable interacting with the technology and avatars without the pressure of delivering content. The fa-

facilitator communicated instructions for how to log in to the Zoom sessions, and assured participants the avatar behavior would be set at a “low”. Second, this introductory session allows participants to practice logging in via Zoom and trouble shoot video and sound issues early in the semester. These sessions were not recorded or used for course assignments, which also helped to alleviate participant nerves.

For the second MRS session, participants planned an explicit instruction lesson plan in any content area and taught their lesson in individual Zoom sessions. The session was recorded using Zoom software and shared with the participant and facilitator following the session. Participants watched their recording, scored themselves on the program key assessment observation tool, and reflected on their strengths and areas of growth in relation to the HLPs. Participants shared their video link with a peer for additional feedback and received facilitator feedback from the recorded session. Participants used the feedback to revise their explicit instruction lesson plans and re-teach the same lesson with modifications for the third MRS session. The same recording and reflective process occurred after the third session. Participants shared their video links with the same peer and the facilitator for additional feedback after implementing changes.

A unique aspect of MRS is the

TABLE 4: Capstone Course Syllabus Snapshot

Name of Scenario	Parent Conference: COVID-19
<i>Synopsis</i>	A parent of a student in your class has requested a meeting to discuss how the change in instructional format (virtual) has impacted their child's learning. This parent had concerns with their child's academic performance prior to schools moving virtual due to the COVID-19 pandemic.
<i>Learner Objective</i>	You have scheduled a 10-minute meeting with a student/avatar's parent to check in on overall well-being, emotional and social concerns, identify any technology concerns or needs, share specifics on their plan for instruction, and answer any questions the parent might have.

ability to adjust and adapt based on participant needs. In this capstone course, the fourth MRS session was originally planned as a parent conference to discuss hypothetical student data. However, in March 2020 the final parent conference scenario was altered due to the onset of the COVID-19 pandemic. The facilitator recognized the immediate needs of participants, and the K-12 students they taught, and shifted to navigating remote learning for the first time. The facilitator and lab worked together to adapt the fourth MRS scenario to be a meeting with a student's (i.e., avatar) parent/guardian who was concerned with their child's academic performance prior to schools moving virtual due to the COVID-19 pandemic. Participants were told the parent/guardian requested a meeting to discuss what this change in instructional format will mean for their child and to share concern about the impact of the loss of instructional time on their child, and what that might mean for their educational progress and individualized education plan (IEP). In the scenario the parent/guardian was overwhelmed with navigating remote instruction for their child with limited technological devices at home (Table 4).

After engaging in the conversation,

participants watched the recording of their session and scored themselves on a communication rubric and reflected on the interaction. Then, participants called their actual students' parents/guardians to engage in a similar conversation at the start of the pandemic. Participants reflected, "I enjoyed my conversation with [avatar's] mother via Zoom. I am so thankful of the MRS experience this semester; it was so coincidentally timely and applicable to my practice. Without having knowledge of Zoom and feeling comfortable enough having Zoom meetings, I would have had a lot of ground to cover regarding my own students, parents, and colleagues..." The communication rubric and additional resources for integrating a parent conference MRS scenario in teacher preparation are available at <https://cedar.education.ufl.edu/portfolio/using-simulation-environments-for-hlp-3/>

CONCLUSION

Simulated practice is an innovative and impactful resource available to teacher educators and leaders supporting novice special educators as they develop skill and expertise. The depth and breadth of scenario potential is expansive. Novice learners can practice

a single scenario more than once, with a focus on feedback and improving targeted skills, or engage in a series of scaffolded scenarios building in complexity each time. Critical aspects of implementing MRS in teacher preparation include not only planning for the scenario and technical integration, but also designing meaningful opportunities for feedback, reflection, and debrief. Simulated environments provide an opportunity for purposeful practice of novel skills, allowing the instructor a degree of control and manipulation of the experience. The ongoing interaction between the facilitator and the lab allows for modification and enhancement of the scenario in between each session (e.g., feedback on avatar responses and behavior, clarity on lesson plans).

MRS is not intended to replace traditional field experiences, but instead supplement coursework and learning to refine preservice teacher skills prior to working with students in the field. Simulations can also be used as a professional learning tool to provide additional practice on targeted areas once teachers are in the field (e.g., introducing and implementing consistent classroom procedures, providing opportunities to respond, engaging in difficult conversations with a parent). Research on MRS

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as a means to provide purposeful practice is promising and continues to advance how the field prepares and supports special education teachers' development of expertise.

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