*Australasian Journal of Special and Inclusive Education* (2025), 1–12
doi:10.1017/jsi.2025.10005

CAMBRIDGE UNIVERSITY PRESS

ORIGINAL ARTICLE

# Using Mixed Reality Simulations to Prepare Preservice Teachers for Inclusive Classroom Management†

Therese M. Cumming[1,2], Hee Min Lee[1] and Jordana Hoenig[1]

[1]School of Education, Faculty of Arts, Design and Architecture, UNSW Sydney, Sydney, NSW, Australia, and [2]Disability Innovation Institute, UNSW Sydney, Sydney, NSW, Australia
**Corresponding author:** Therese M. Cumming; Email: t.cumming@unsw.edu.au

(Received 1 February 2025; revised 5 June 2025; accepted 11 July 2025)

**Abstract**
Mixed reality simulations such as TeachLivE and Mursion have been increasingly utilised to prepare teachers for inclusive classrooms. The use of mixed reality simulations, which combine elements of both virtual and augmented reality, offers immersive and interactive experiences that can enhance teacher training in various ways. These simulations provide preservice teachers with realistic and safe spaces to practise inclusive communication, pedagogy, and classroom management. Each scenario can be tailored to provide practice in specific skills and support preservice teachers in meeting the Australian Institute for Teaching and School Leadership standards. This is especially helpful in view of today's inclusive classes, as avatars in the simulations are neurodiverse, representing students of various abilities and personalities. The authors define mixed reality simulations, describe various ways that simulations have been used to support students in special and inclusive education, and describe a case study of simulations used for parent–teacher meetings and for inclusive classroom management in an Australian university. Lastly, they suggest directions for future research and practice.

**Keywords:** simulations; mixed reality environments; initial teacher education; inclusive education; classroom management

Mixed reality (MR) environments and simulations have been increasingly used in teacher education, including special education, over the past few decades (Dieker et al., 2023). MR environments are learning environments that incorporate various aspects of virtual or augmented reality with the actual world. The idea of MR environments is not new; Milgram and Kishino (1994) theorised that different types of realities exist on a continuum, starting with the real environment, followed by augmented reality, in which participants in the real environment also see virtual elements. This is followed by augmented virtuality, where people are in a virtual environment with some real elements. At the end of the continuum is virtual reality, which is a synthetic world in which people are completely immersed. Through the integration of computer-generated sensory input and real-world environments, MR technology enables learners to interact with both digital and physical aspects concurrently.

With differing degrees of augmentation in between, MR settings provide a range of experiences, from fully virtual reality to purely physical reality (Mikeska et al., 2021). According to Dieker et al. (2023), MR 'covers multiple ways to experience virtual environments. The choice of how a scene is displayed depends on the scenario and the goals of each user within the context of the study they are

†This manuscript was accepted under the Editorship of David Paterson.

conducting' (p. 2). Jones and Barrett (2017) defined simulation as 'an experiential instructional method that teachers create to imitate or replicate actual events, problems, procedures, or skills to achieve the desired instructional results' (p. 49). Although different types of simulations have been used in education since the 1970s, the use of MR in special education teacher education has emerged more recently, developing since the 2010s (Garland et al., 2012).

MR simulators provide a safe and reflective environment for teacher preparation, as they allow preservice teachers to practise their skills before applying them in real classrooms. These simulators can be used to prepare teachers for both inclusive and special education classrooms. In the field of special education, MR has been used to support future special education teachers to work with students with a variety of disabilities, communicate with parents, and hone their observational skills. The main objectives of the current study were to determine the effects of mixed reality simulations (MRSs) on preservice teacher self-efficacy and examine the experiences with and perceptions of preservice teachers with MRSs to determine whether using MRSs is a socially valid practice.

### *Inclusive and Special Education Mixed Reality Simulations*

Australian teachers often feel ill-prepared to support students with disability in both inclusive and special education classrooms (Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability, 2023). MRSs can present preservice teachers with a wide range of scenarios involving students with disability, covering various disabilities, age groups, and classroom settings. An added advantage is the ability to structure scenarios to include students with disability who may not otherwise be available in school placements (Walters et al., 2021), including children with mild, moderate, and severe intellectual disability (Hudson et al., 2019). This exposure helps teachers develop a comprehensive understanding of how to address the diverse needs of their students effectively. Landon-Hayes et al. (2020) found that MRSs allowed preservice teachers to increase their use of high-leverage practices to differentiate for individual students' needs and practise strategic teaching.

Incorporating MRSs in special and inclusive education teacher preparation courses can provide relevant and valuable practice for preservice teachers to implement high-leverage practices (Driver & Zimmer, 2022; Luke et al., 2021; McKown et al., 2022). In the simulated learning environment, preservice teachers specifically increased skills related to collaboration, providing feedback, differentiation for individual students' needs, and strategic teaching (Landon-Hays et al., 2020). Furthermore, preservice teachers applied the specific skills of specific praise, praise around, and error correction with an overall pattern of generalisation to the classroom (Dawson & Lignugaris/Kraft, 2017).

Preservice teachers can practise managing a classroom with inclusive strategies, including collecting behavioural data (Hirsch et al., 2023) and positive behaviour support (Rosenberg et al., 2021), to address the needs of students with varied abilities and neurodiversity. Donehower et al. (2020) found that MRSs were effective in helping preservice teachers practise classroom management skills, such as (a) responding when students are not engaged or displaying inappropriate behaviour, (b) creating an environment of respect and rapport, (c) managing classroom procedures, (d) developing flexibility and responsiveness, and (e) giving positive feedback. Hudson et al. (2019) claimed that MRSs enabled preservice teachers to practise targeted skills to improve their ability to manage extreme behaviours that are often associated with special education and inclusive classrooms (Hudson et al., 2019).

The reality of the scenarios embedded in the MRSs allows preservice and in-service special education teachers to strengthen their empathy and understanding by experiencing the challenges faced by students with diverse needs (Fischetti et al., 2022; Johnston & Collum, 2020). Through these virtual experiences, teachers can better appreciate the importance of creating an inclusive and supportive learning environment. They can practise communicating empathy and understanding to parents in virtual meetings and students in classroom situations (Allen & Stecker, 2023). Repeated

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

opportunities to practise behaviour management prior to entering a real classroom has been shown to offset preservice teachers' anxiety in teaching real students (Dixon et al., 2019; Larson et al., 2020) and increase their self-efficacy (Fischetti et al., 2022; Landon-Hays et al., 2020; Ledger et al., 2019; Rosenberg et al., 2021; Samuelsson et al., 2022).

Driver and Zimmer (2022) pointed out that early career special education teachers often feel that they are not adequately prepared for the classroom and require more skills practice. This highlights the need to provide preservice teachers with as many opportunities to practise pedagogical and management skills as possible. Driver and Zimmer also provided guidance on how to integrate MRSs into teacher preparation coursework. They recommended designing a scenario, practising the scenario with the lab simulation specialist, preparing preservice teachers for the simulation, scheduling preservice teachers to participate in the scenario, and debriefing with preservice teachers after the scenario. All in all, the use of this interactive tool can ultimately refine preservice teachers' skills and better prepare them to teach in inclusive classrooms (Driver & Zimmer, 2022; Hudson et al., 2019).

## Case Study

MRSs were used in the preservice teaching programs at a large metropolitan university in Sydney, NSW, Australia. Preservice teachers who were enrolled in the Bachelor of Education (secondary) or the Master of Teaching (primary and secondary) participated in two simulations as part of their compulsory classroom management courses. The simulations were delivered through the SimLab platform (Murdoch University, n.d.). The first simulation was a parent–teacher meeting that involved a number of different scenarios, most of which dealt with some form of student bullying. The second simulation involved the preservice teacher delivering a lesson in an inclusive classroom setting consisting of students with varying behaviours and personalities. The university instructors worked with designers at SimLab to design a scenario for preservice teachers to practise implementing strategies to deal with student misbehaviour, according to their stages of behavioural escalation (Colvin & Scott, 2015). This specific scenario was chosen because it has long been known that novice special and inclusive education teachers have difficulty with managing the behaviour of their students (Aas et al., 2024; Kelly et al., 2014; Lukins et al., 2023). It is important to note that the SimLab simulations were designed to help prepare preservice teachers for their practicum placements, not to replace them (Murdoch University, n.d.).

It was important to the university instructors to determine the effectiveness of the MRSs on preservice teachers' sense of self-efficacy. They also wanted to know what the preservice teachers thought about participating in the simulations. The following case study describes an exploratory study conducted by the authors to determine how students felt about participating in the MRSs. It begins with research design and ethical considerations, then describes the SimLab platform, how students prepared for the MRSs, and how they perceived their MRS experiences, and concludes by offering some considerations for future research and practice.

### *Design and Ethical Considerations*

The researchers applied for and received ethical clearance (HC230003) from Research Ethics and Compliance Support, UNSW Sydney. The researchers used a mixed methods design to answer the following research questions:

1. How does practising communication skills in MR learning environments affect preservice teachers' parent–teacher communication self-efficacy?
2. How does practising classroom management skills in MR learning environments affect preservice teachers' classroom management self-efficacy?
3. Is the practice of using MR learning environments to support preservice teachers to develop their communication and classroom management skills socially valid?

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

The questions were answered via the Norwegian Teacher Self-Efficacy Scale (NTSES; Skaalvik & Skaalvik, 2007), which was administered before and after the simulation activities. The NTSES is a 24-item multidimensional scale designed to measure teachers' self-efficacy across six key areas: (a) Instruction: Confidence in delivering effective teaching, (b) Adapting Education to Individual Students' Needs: Ability to tailor teaching to diverse student needs, (c) Motivating Students: Skills in encouraging and engaging students, (d) Keeping Discipline: Maintaining classroom order and discipline, (e) Cooperating With Colleagues and Parents: Working effectively with colleagues and parents, and (f) Coping With Changes and Challenges: Managing changes and overcoming challenges in the educational environment. For the purposes of the present study, surveys were analysed on the first five areas.

The post-simulation survey also included open-ended questions to measure the social validity of the simulation activities. The open-ended questions asked participants about how they felt using the MRSs and to be specific about what they liked and did not like about them. The researchers also had ethical clearance to collect qualitative data from each course's student evaluations, which were completed at the end of the course. Any student comments that mentioned the simulations were added to the open-ended survey responses for analysis.

### Participants

The researchers recruited preservice teachers from both the undergraduate and postgraduate classroom management courses. Out of a total enrolment of 301 preservice teachers (177 undergraduate, 124 postgraduate), 74 consented to be part of the study. Although the participants were from different levels of study, neither group had completed a practicum or had teaching experience. For this reason and to preserve anonymity, preservice teachers were not asked to provide demographic information or to identify which group they were in when completing the online survey.

### SimLab Platform

Preservice teachers accessed the SimLab platform via Zoom. They clicked on a link to enter the room, either a school office, where they engaged in a parent–teacher conference, or a classroom, where they taught a brief lesson to five student avatars. A professional actor, known as an interactor, controlled the avatars' movements and voices, using an Xbox controller and a special cap (see Figure 1). The avatars represented an angry parent in the parent–teacher meeting scenario and five students with differing abilities in the escalation cycle scenario. The interactor was able to respond in real time, representing a realistic classroom scenario. The interactors used for the simulations specialise in improvisation and are trained to simulate powerful behavioural and emotional responses from the parent and student avatars that they represent (Murdoch University, n.d.).

The parent–teacher meeting simulation consisted of one avatar, either a father (Max) or a mother (Linda). There are three levels of escalation possible and these are determined by the university teacher. For the preservice teachers in our case study, a medium level of escalation (agitation) was chosen as the maximum level of escalation. The classroom student escalation simulation employed five student avatars of varying abilities and personalities. Detailed information about the student avatars can be found in Table 1.

SimLab had some limitations in replicating student behaviour typical of a real classroom, especially when working on the escalation cycle. Student avatars had the ability to speak and raise/move their hands and arms; however, they were not able to throw things, touch, or hit each other, or get out of their chairs and leave the learning environment. To compensate for this, the interactors were instructed to verbally escalate, including being verbally aggressive and using profanity, as these behaviours may be encountered by teachers in today's inclusive classrooms.

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press


**Figure 1.** SimLab Virtual Classroom With Student Avatars.

### *Preparing Preservice Teachers to Engage in the Simulations*

The two courses included the simulation activity as a required (hurdle) activity that was not graded in order to provide preservice teachers with a safe space to practise evidence-based practices for positive behaviour support. These practices were taught during the weekly lectures and tutorial sessions. One of the topics covered was communicating and collaborating with parents. Preservice teachers were responsible for reading a journal article that introduced and described the implementation of the 'LAFF Don't CRY' strategy (McNaughton & Vostal, 2010), an active listening strategy. Preservice teachers discussed the strategy in their weekly tutorial session, where they also received more information about what to expect during the simulation.

Another weekly topic focused on de-escalating students when they are misbehaving and emotionally escalated. Preservice teachers studied the stages of the escalation cycle (Colvin & Scott, 2015) and how to respond to students based on where they were in the cycle (see Table 2). The simulation activity provided preservice teachers with a way to practise the strategies that they studied. In addition to teaching students about the escalation cycle, the course instructors provided preservice teachers with information and activities to support the provision of peer-to-peer feedback that they would be giving to one another during the simulation. Preservice teachers were asked to base their feedback on the escalation cycle (see Table 2), which was further elaborated on in their weekly tutorial session before they participated in the simulation.

### *Simulation Procedures*

#### *Parent–teacher simulation*

The procedures for each of the two simulations were slightly different. Preservice teachers participated in the parent–teacher conference simulation first. For the parent–teacher simulation, preservice teachers made individual bookings for 20-minute blocks. Each preservice teacher entered the

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

**Table 1.** Student Avatars

| Student | Characteristics |
|---|---|
| Savannah Boyd | She has a strong mind for details and excellent analytical ability. She is an introvert and doesn't always connect socially with peers. |
| Dev Kapoor | He is a self-driven rule follower and enthusiastic learner with high standards. |
| Nate Pittman | He is on the autism spectrum. He is very intelligent but has difficulty with abstract concepts and social rules, making it difficult for him to connect with his classmates. He sometimes displays repetitive behaviours when anxious or overstimulated. |
| Jasmine Walker | She is an intuitive learner and engages in topics based on her interests. She has difficulty with criticism or conflict. |
| Ethan Mullen-Hardy | He is an adventurous learner who responds best to short, direct instructions. He is an extrovert with a high level of energy who loves to make others laugh. |

**Table 2.** Stages of Escalation and Suggested Responses (Colvin & Scott, 2015)

| Stage | Student is ... | Teacher should focus on ... |
|---|---|---|
| Calm | relatively calm and cooperative. | maintaining a clear, consistent environment and building rapport with the student. |
| Trigger | experiencing unresolved conflicts that trigger behaviour to escalate, possibly displacing anger on a 'safe target'. | prevention and redirecting student's behaviour. |
| Agitation | increasingly unfocused/upset; may exhibit avoidance and/or challenge authority. | reducing student anxiety and increasing predictability in the student's environment. |
| Acceleration | solely focused on the unresolved conflict and may become irrational and noncompliant. | maintaining a safe environment for everyone, including self and the student. |
| Peak | out of control and displaying severe behaviour such as screaming, aggression, and self-injury. | crisis intervention procedures to maintain a safe environment for everyone. |
| De-escalation | experiencing a drop in severity of behaviour and energy level. | removing excess attention, using neutral requests to help student regain composure and cooperate. |

simulation by signing on via a designated Zoom link. An education professional also attended each session to provide the preservice teacher with feedback and support. The first few minutes of the session were used to set the scene, with the preservice teacher acting as an early career teacher about to meet with a parent of one of their students. The simulation then began, with the angry parent bringing a problem situation to the preservice teacher's attention and the preservice teacher responding using LAFF Don't CRY techniques (McNaughton & Vostal, 2010). This interaction lasted around 2–3 minutes, and although each scenario varied slightly by the parent (mother or father) and topic brought up by the parent (they all related to bullying), all scenarios followed the same routine. The first interaction was designed to ensure that if the preservice teacher handled the interaction poorly, they would experience the parent avatar departing the meeting with increased anger. The preservice teacher and the education professional then had about a 5-minute reflection/feedback conversation structured around LAFF Don't CRY techniques. Then, immediately after the reflection/feedback conversation, the preservice teacher participated in the same scenario as before, using the reflection and feedback to improve the communication process. Lastly, the preservice teacher and the education professional engaged in a final brief feedback conversation. This allowed the preservice teachers to become familiarised with the simulation and provided them with an opportunity to use feedback to shape their practice.

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

### Escalation cycle simulation

For the escalation cycle simulation, the preservice teachers made bookings for 30-minute sessions in pairs. They entered the simulation by signing on using a designated Zoom link. Before the simulation, the preservice teachers were tasked with creating a 10-minute lesson and read the student profiles to familiarise themselves with the avatars. When the preservice teachers started the simulation, the first 4 minutes of the session were used to set the scene (primary or secondary, subject of lesson, etc.) and provide the students with instructions. One of the preservice teachers then signalled to start the class and proceeded to teach a 10-minute lesson in their subject area while simultaneously de-escalating any misbehaviour that arose amongst the five avatars. During the lesson, the avatars gradually increased their misbehaviours from Stage 1: Calm to Stage 3: Agitation. The cycle of escalation only stopped when the preservice teacher responded appropriately to the current stage of escalation. Otherwise, the cycle continued until it reached Stage 3: Agitation. At the end of the lesson, the first preservice teacher debriefed with the second preservice teacher, with the second preservice teacher providing feedback based on the escalation cycle. This cycle repeated with the second preservice teacher teaching a lesson and the first preservice teacher providing feedback. The preservice teachers had a second debrief to end the session. Due to time and financial constraints, students did not get professional feedback or a second try at this simulation.

## Results

### Self-Efficacy Survey

Seventy-four university preservice teachers agreed to participate in the study. However, only 12 completed both pre- and post-tests. To investigate whether the simulations influenced self-efficacy from pre-test to post-test, *t*-tests were conducted on Instruction, Adapting Education to Individual Students' Needs, Motivating Students, Keeping Discipline, and Cooperating With Colleagues and Parents variables (see Table 3). A significant increase was found only in the Keeping Discipline variable, from the pre-test ($M = 14.10$, $SD = 4.04$) to the post-test ($M = 17.00$, $SD = 4.08$), $t(9) = -4.11$, $p = 0.00$, $d = -0.71$. These results indicated the simulation was effective in enhancing the self-efficacy of this small cohort in managing behaviour in the classroom.

### Open-Ended Survey and Course Evaluation Questions

The open-ended survey and course evaluation questions were analysed using inductive content analysis (Kyngäs, 2020). We began with the data collection through the survey and student evaluations, reading them over several times to familiarise ourselves with the data. Next, we performed open coding, which consisted of initial coding, followed by grouping the codes into similar codes to form broader categories. We then combined similar categories into higher order categories or themes. A total of 39 participants answered the open-ended questions.

The main theme that emerged was 'student perceptions of their SimLab experiences'. Further analysis resulted in four main categories: (a) benefits, (b) applications to future teaching practice, (c) challenges, and (d) suggestions to improve the simulation experiences. These will be discussed as follows.

#### Benefits

Slightly over half of the preservice teachers had positive comments about the benefits of the simulations, with 20 mentioning that they found the simulation experiences useful. One student commented, 'I felt like it was definitely a very helpful way to see how I can use the skills that I have learnt in a setting that reflects a real-life classroom.' Another student stated that 'the SimLab sessions were very helpful in providing experience in an area of teaching I have little experience with, both as a teacher and as a student'. Still another said that although the experience was daunting, they found SimLab useful.

Preservice teachers felt that the realism of the simulation's MR environment was a main benefit, with several ($n = 3$) using the word 'vivid' to describe the environment. Others ($n = 5$) commented

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

**Table 3.** Descriptive Statistics of Pre- and Post-Norwegian Teacher Self-Efficacy Scale

| Time point | Instruction | Adapt | Motivate | Discipline* | Parents |
|---|---|---|---|---|---|
| Pre | 19.58 (3.45) | 18.18 (3.22) | 16.08 (3.21) | 14.10 (4.04) | 20.00 (3.98) |
| Post | 20.17 (3.27) | 18.73 (2.94) | 17.50 (2.97) | 17.00 (4.08) | 19.83 (3.51) |

*$p < .05$.

that the behaviour and personalities of the parent and student avatars were very authentic and were 'a very helpful way to see how I can use the skills that I have learnt in a setting that reflects a real-life classroom'. Importantly, preservice teachers recognised the value of the diversity of the student avatars; for example, one preservice teacher commented, 'I liked how there were a range of students, from gifted students to academically challenged students; different genders; students with learning difficulties, loud and quiet students, etc.', while another said, 'It helped grasp the diverse nature of a real life classroom, where it's most likely to be mixed ability.' This authenticity of the experience contributed to student learning about what teaching in an inclusive classroom could be like.

Preservice teachers appreciated receiving feedback from the education professional and their peers. They especially liked the opportunity that they were afforded during the parent–teacher meeting simulation, where they received feedback from the professional, then repeated the simulation, taking the feedback on board. The peer-to-peer feedback during the escalation cycle simulation was also considered valuable, but not as much as the feedback from the professional. As one student put it, 'Partner feedback was also good, but not nearly as valuable as that from the professional.'

The idea that the simulations were mandatory but as attendance requirements and not graded was important to the preservice teachers. Many of them ($n = 12$) mentioned the importance of being able to practise their communication and classroom management skills in a safe space. A student said, 'It was awesome to be able to try these out without the stress of it being a live classroom. My teaching was really affected by the disruptions and the behaviour could have easily escalated.' Preservice teachers really appreciated the opportunity to try different strategies without having to worry about the impact of their actions on actual students.

### *Applications to future teaching practice*

The preservice teachers provided details about how they thought the simulation experiences could be applied to and would benefit their future teaching practice. One of the preservice teachers explained, 'I will respond with wisdom, experience, and strategy when I face different types of students.' Besides feeling a bit better prepared, some ($n = 4$) of the preservice teachers also commented that it would help them to teach a diverse student population and manage an inclusive classroom, with one expressing, 'I will use it to consider individual students' needs.' Two of the preservice teachers found teaching the diverse students in the simulation confronting, suggesting that the student avatars could have been 'less rude' and that it was not fair to put them (the students) in a 'worse-case scenario'. This was interesting, as the difficulty level for the classroom simulation was set at 3/5.

### *Challenges*

Preservice teachers mentioned some challenges they experienced during the simulations. The first was the limitations of the technology. One preservice teacher who was studying to be a music teacher felt that they were limited in what they could teach in the classroom scenario, as it depicted the students sitting at a table. Others ($n = 3$) mentioned the limitations of the movements of the simulated students, making it impossible to ask students to change their seats. Two preservice teachers mentioned their inability to use a range of strategies that they would use in a real classroom: 'I was unable to effectively use a range of strategies that I would in the classroom that I find effective with low-level behaviour management, such as eye contact, proximity supervision, etc.'

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

A few preservice teachers ($n = 4$) were challenged by the simulations, claiming that the activity caused them excessive amounts of anxiety. One preservice teacher responded, 'I was very overwhelmed when I completed the escalation cycle SimLab and found myself very frustrated that the example video that we were provided did not even compare to what I experienced.' Another expressed, 'I felt the SimLab to be a cruel example of getting us to experience a "worst case" scenario without even giving us the opportunity to receive helpful feedback like in the first session and the ability to try again.' In a similar vein, one preservice teacher felt the parent–teacher meeting unfairly gave the participant the idea that all parents were exceedingly difficult. Lastly, one preservice teacher did not agree with the simulations being mandatory but not assessed, as they felt participation caused them more stress and anxiety than benefit.

### *Suggestions to improve the simulation experiences*

A few preservice teachers thought that it would have been beneficial to receive feedback from an education professional in both scenarios and having the opportunity to repeat the classroom management scenario after receiving feedback. There were conflicting opinions about the level of misbehaviour in the scenarios, with one student suggesting that the student avatars should be 'less rude' and another saying they would have appreciated the opportunity to experience a higher level of challenging behaviour. One preservice teacher suggested that it would be good to try several scenarios with progressively increasing levels of agitation and misbehaviour. Several preservice teachers did not feel that they were adequately prepared for the simulations ahead of time. The preservice teachers also suggested that more simulations be added to their program.

## Case Study Summary

The self-efficacy survey showed a statistically significant improvement in the Keeping Discipline category, suggesting that the simulation effectively enhanced preservice teachers' confidence in classroom behaviour management. Although this finding suggests that the simulation provided practical experience that improved preservice teachers' confidence in handling discipline-related challenges, only 12 of the 74 preservice teacher participants completed both the pre- and post-simulation surveys, limiting the generalisability of the findings and increasing the likelihood of Type II errors, failing to detect a real effect. The reason for the low number of participants completing both surveys is unknown; it may have been due to course and degree program workloads at the two points in time. No significant differences were found in the other areas, including cooperating with parents and colleagues. This may have been due to the lapse in time between when the parent–teacher meeting simulation occurred and the post-test, which happened a few weeks later, after the second simulation. The lack of significance in the other areas may have been due to the short duration of the intervention not being enough to influence broader teaching competencies.

The qualitative data analysis indicated that, overall, preservice teachers felt the simulations were helpful, with several mentioning that they would use what they had learned to inform their future practice. This is in line with previous literature, which found MRSs for teacher preparation to be a socially valid practice (Hirsch et al., 2023). Others wanted more opportunities to practise in MRS environments. We learned that some preservice teachers require more preparation, especially around the level of severity of parent agitation and student misbehaviour. The theme that was mentioned again and again was the ability to practise in a safe space before they are faced with the realities of an angry parent and misbehaving students. This aligns with research conducted by Dawson and Lignugaris/Kraft (2017) and Rosenberg et al. (2021), which showed that simulations provided a safe environment for teaching and management skills, as well as more complex instructional routines.

We, as instructors, also found that there were a few difficulties in making the MRSs available to our classes. First, the simulations were expensive. Our university faculty funded this trial of the simulations; however, a long-term solution needs to be found, as this is not sustainable. Preservice teachers asked for more opportunities for feedback from an education professional. This was part of the

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

recommendations set out by Driver and Zimmer (2022); however, this is another expense on top of the simulations themselves, making it difficult to implement. In time, advances in artificial intelligence (AI) may allow for targeted AI-generated feedback for a minimal to no expense. Preservice teachers in future classes may have to pay a lab fee to experience the simulations. Another challenge was making the simulations as true to life as possible. The preservice teachers' experience would have been enhanced if students had a greater range of movement, could get up, throw things, etc. This limitation will likely be corrected over time with the advancement of technology.

The results of this case study underscore the fact that although the MRSs are a realistic and safe way for preservice teachers to practise pedagogical and classroom management skills, they are not a replacement for practice in a real classroom. There are some skills and strategies that require teachers and students to be present in a real classroom together, such as eye contact, proximity, and general human warmth. This was recognised by the participants in the current study as well as scholars (Dawson & Lignugaris/Kraft, 2017). MRSs should be considered a tool on the continuum of teacher preparation experiences, meant to prepare preservice teachers for their ultimate goal: successfully teaching in today's diverse classroom environments (Driver & Zimmer, 2022; Luke et al., 2021; McKown et al., 2022).

### *Implications for Future Research and Practice*

The future of MRSs in teacher education is expected to further evolve with the use of AI agents and multimodal data collection, including biometric signals (Dieker et al., 2023). This will provide deeper insights into simulation in teacher education (Ledger et al., 2019). As the technology advances, so will our ability to harness it to support the skill development of both pre- and in-service special education teachers (Dieker et al., 2023). Simulations can be tailored to support the learning of specific high-leverage practices, such as increasing student opportunities to respond, the good behaviour game, delivering specific praise, and error corrections. MRSs could also be used to teach preservice teachers how to use different forms of assistive technology.

Advances in AI will likely dictate how simulations are used in the future (Qualls et al., 2024). Teachers are already embracing the usefulness of AI in performing many of their daily administrative tasks. AI has the potential to enhance the effectiveness of MRSs by providing personalised feedback to pre- and in-service teachers on their teaching approaches in special and inclusive classroom simulations (Driver & Zimmer, 2022). AI also has the potential to dynamically adjust simulation scenarios, targeting specific strategies or situations and individualised to each student's needs (Qualls et al., 2024). These are definite advantages but should not be considered without also addressing ethical considerations such as data privacy, bias, and transparency.

Providing MRSs to preservice special education teachers will increase their familiarity with the technology, thus making it more likely that they will use such technology to support the skill development of their future students. AI-enabled MRSs could potentially be used to teach a variety of academic and social-emotional skills to students with disability (Driver & Zimmer, 2022). For example, students could improve their interpersonal skills by practising social skills, anger management, and mediation/compromise.

## Conclusion

The challenges of providing consistent, accessible, and safe practice-based experiences in live/actual classrooms were further emphasised in a synthesis of research on special education (Qualls et al., 2024). Fortunately, MRSs can remedy many of these issues and enable requisite experiences in a way that is efficient, effective, and consistent (Walters et al., 2021). The current case study highlighted the advantages of MRSs in providing preservice teachers with safe spaces to practise their skills to prepare them for their teaching practicum and careers. It also described some of the challenges for both preservice teachers and instructors when using MRSs. The advancement of AI and other technologies will undoubtedly only serve to improve the quality and scope of MRSs.

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

### Limitations

There were limitations to this study. First, the quantitative analysis was limited by a small sample size of 12. A larger sample would provide a more representative understanding of the simulation on teacher self-efficacy. Second, the self-efficacy post-measurement was conducted after the escalation cycle simulation, approximately 1 month after the parent–teacher interview simulation. This delay introduces the possibility that the students' responses to the parent–teacher variables of the self-efficacy scale could have influenced their responses. Future studies could address this limitation by implementing self-efficacy measurements at different time points to better capture changes in self-efficacy.

In conclusion, the utilisation of MRSs is a promising solution to many of the challenges faced by preservice special education teachers in acquiring targeted pedagogical and classroom management skills. Teacher preparation programs can use MRSs to provide preservice teachers with safe and immersive environments to practise and refine their teaching skills, preparing them for their teaching practicum and future careers. The advancements in AI technologies will only further enhance MRS, making it an invaluable tool for teacher preparation programs.

**Acknowledgements.** We would like to acknowledge the support and participation of our students and the wonderful professional team at SimLab.

**Funding statement.** This project was funded through a faculty research grant from the UNSW Sydney Faculty of Arts, Design and Architecture.

**Competing interests.** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## References

Aas, H. K., Uthus, M., & Løhre, A. (2024). Inclusive education for students with challenging behaviour: Development of teachers' beliefs and ideas for adaptations through Lesson Study. *European Journal of Special Needs Education*, *39*(1), 64–78. https://doi.org/10.1080/08856257.2023.2191107

Allen, A. A., & Stecker, P. M. (2023). Using mixed-reality simulation in teacher preparation in reading. *Intervention in School and Clinic*, *59*(1), 59–65. https://doi.org/10.1177/10534512221130077

Colvin, G., & Scott, T. M. (2015). *Managing the cycle of acting-out behavior in the classroom* (2nd ed.). Corwin.

Dawson, M. R., & Lignugaris/Kraft, B. (2017). Meaningful practice: Generalizing foundation teaching skills from TLE TeachLivE™ to the classroom. *Teacher Education and Special Education*, *40*(1), 26–50. https://doi.org/10.1177/0888406416664184

Dieker, L., Hughes, C., & Hynes, M. (2023). The past, the present, and the future of the evolution of mixed reality in teacher education. *Education Sciences*, *13*(11), Article 1070. https://doi.org/10.3390/educsci13111070

Dixon, R. A., Hall, C., & Shawon, F. (2019). Using virtual reality and web conferencing technologies: Exploring alternatives for microteaching in a rural region. *Northwest Journal of Teacher Education*, *14*(1), Article 4. https://doi.org/10.15760/nwjte.2019.14.1.4

Donehower Paul, C., Bukaty, C. A., & Dieker, L. (2020). Teacher professional learning using simulation: A Delphi study. *Teacher Development*, *24*(1), 21–32. https://doi.org/10.1080/13664530.2019.1694574

Driver, M. K., & Zimmer, K. (2022). A guide to integrating mixed-reality simulation in initial and advanced special education programs. *Journal of Special Education Preparation*, *2*(1), 48–57. https://doi.org/10.33043/JOSEP.2.1.48-57

Fischetti, J., Ledger, S., Lynch, D., & Donnelly, D. (2022). Practice before practicum: Simulation in initial teacher education. *The Teacher Educator*, *57*(2), 155–174. https://doi.org/10.1080/08878730.2021.1973167

Garland, K. V., Vasquez, E., III, & Pearl, C. (2012). Efficacy of individualized clinical coaching in a virtual reality classroom for increasing teachers' fidelity of implementation of discrete trial teaching. *Education and Training in Autism and Developmental Disabilities*, *47*(4), 502–515.

Hirsch, S. E., Griffith, C. A., Kelley, M. H., Carlson, A., & McKown, G. (2023). Increasing preservice teachers' knowledge and skills using a mixed-reality simulator: The tale of two studies. *Teacher Education and Special Education*, *46*(3), 204–222. https://doi.org/10.1177/08884064231154028

Hudson, M. E., Voytecki, K. S., Owens, T. L., & Zhang, G. (2019). Preservice teacher experiences implementing classroom management practices through mixed-reality simulations. *Rural Special Education Quarterly*, *38*(2), 79–94. https://doi.org/10.1177/8756870519841421

https://doi.org/10.1017/jsi.2025.10005 Published online by Cambridge University Press

Johnston, V., & Collum, D. (2020). Understanding diversity and the educational needs of students with exceptionalities: A case study of simSchool. *International Journal of Smart Technology and Learning*, *2*(2/3), 198–216. https://doi.org/10.1504/IJSMARTTL.2020.112159

Jones, J. D., & Barrett, C. E. (2017). Simulation as a classroom teaching method. *i-manager's Journal on School Educational Technology*, *12*(4), 49–53. https://files.eric.ed.gov/fulltext/EJ1269378.pdf

Kelly, A., Devitt, C., O'Keeffe, D., & Donovan, A. M. (2014). Challenges in implementing inclusive education in Ireland: Principal's views of the reasons students aged 12+ are seeking enrollment to special schools. *Journal of Policy and Practice in Intellectual Disabilities*, *11*(1), 68–81. https://doi.org/10.1111/jppi.12073

Kyngäs, H. (2020). Inductive content analysis. In H. Kyngäs, K. Mikkonen, & M. Kääriäinen (Eds.), *The application of content analysis in nursing science research* (pp. 13–21). Springer. https://doi.org/10.1007/978-3-030-30199-6_2

Landon-Hays, M., Peterson-Ahmad, M. B., & Frazier, A. D. (2020). Learning to teach: How a simulated learning environment can connect theory to practice in general and special education educator preparation programs. *Education Sciences*, *10*(7), Article 184. https://doi.org/10.3390/educsci10070184

Larson, K. E., Hirsch, S. E., McGraw, J. P., & Bradshaw, C. P. (2020). Preparing preservice teachers to manage behavior problems in the classroom: The feasibility and acceptability of using a mixed-reality simulator. *Journal of Special Education Technology*, *35*(2), 63–75. https://doi.org/10.1177/0162643419836415

Ledger, S., Ersozlu, Z., & Fischetti, J. (2019). Preservice teachers' confidence and preferred teaching strategies using TeachLivE™ virtual learning environment: A two-step cluster analysis. *EURASIA Journal of Mathematics, Science and Technology Education*, *15*(3), Article em1674. https://doi.org/10.29333/ejmste/102621

Luke, S. E., Ford, D., Vaughn, M., & Fulchini-Scruggs, A. (2021). Using mixed reality simulation and roleplay to develop preservice teachers' metacognitive awareness. *Journal of Technology and Teacher Education*, *29*(3), 389–413. https://doi.org/10.70725/164279zjkiny

Lukins, J. M., Able, H., & Hume, K. (2023). Novice teachers' implementation of evidence-based practices in autism education: Examining the roles of preparation and perception. *Focus on Autism and Other Developmental Disabilities*, *38*(1), 5–16. https://doi.org/10.1177/10883576221144734

McKown, G., Hirsch, S. E., Carlson, A., Allen, A. A., & Walters, S. (2022). Preservice special education teachers' perceptions of mixed-reality simulation experiences. *Journal of Digital Learning in Teacher Education*, *38*(1), 4–19. https://doi.org/10.1080/21532974.2021.1995796

McNaughton, D., & Vostal, B. R. (2010). Using active listening to improve collaboration with parents: The LAFF Don't CRY strategy. *Intervention in School and Clinic*, *45*(4), 251–256. https://doi.org/10.1177/1053451209353443

Mikeska, J. N., Howell, H., Dieker, L., & Hynes, M. (2021). Understanding the role of simulations in K-12 mathematics and science teacher education: Outcomes from a teacher education simulation conference. *Contemporary Issues in Technology and Teacher Education*, *21*(3), 781–812.

Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEICE Transactions on Information Systems*, *E77-D*(12), 1321–1329.

Murdoch University. (n.d.). *SimLab*. https://www.murdoch.edu.au/collaborate/education/simlab

Qualls, L. W., Carlson, A., Scott, S. N., Cunningham, J. E. M., & Hirsch, S. E. (2024). Special education teachers' preservice experiences with mixed-reality simulation: A systematic review. *Teacher Education and Special Education*, *47*(2), 124–141. https://doi.org/10.1177/08884064231226255

Rosenberg, M. S., Duerr, S. R., Ingraham, K., Bell, K. N., & Gould, A. (2021). Enhancing classroom management skills: Efficacy of a supplemental multi-platform intervention for preservice teachers. *Excelsior: Leadership in Teaching and Learning*, *14*(1), 4–19. https://doi.org/10.14305/jn.19440413.2021.14.1.01

Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability. (2023). *Final report – Volume 7: Inclusive education, employment and housing – Part A*. Australian Government. https://disability.royalcommission.gov.au/publications/final-report-volume-7-inclusive-education-employment-and-housing

Samuelsson, M., Samuelsson, J., & Thorsten, A. (2022). Simulation training-A boost for pre-service teachers' efficacy beliefs. *Computers and Education Open*, *3*, Article 100074. https://doi.org/10.1016/j.caeo.2022.100074

Skaalvik, E. M., & Skaalvik, S. (2007). *Norwegian Teacher Self-Efficacy Scale (NTSES)* [Database record]. APA PsycTests. https://doi.org/10.1037/t29448-000

Walters, S. M., Hirsch, S. E., McKown, G., Carlson, A., & Allen, A. A. (2021). Mixed-reality simulation with preservice teacher candidates: A conceptual replication. *Teacher Education and Special Education*, *44*(4), 340–355. https://doi.org/10.1177/08884064211001453

**Cite this article:** Cumming, T. M., Lee, H. M., & Hoenig, J. (2025). Using mixed reality simulations to prepare preservice teachers for inclusive classroom management. *Australasian Journal of Special and Inclusive Education*, 1–12. https://doi.org/10.1017/jsi.2025.10005