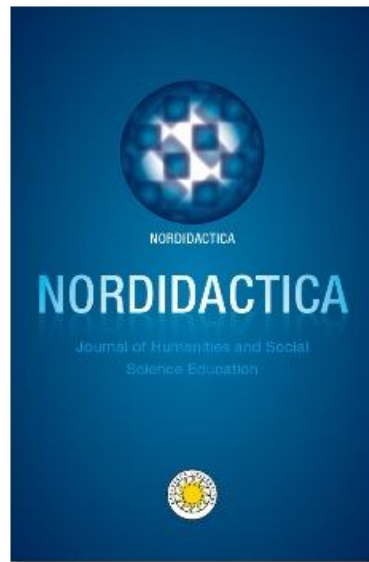


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Enhancing Student Teachers' Ability to teach Controversial Issues through Simulation Training

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Abstract: This study examines the reflections of 31 pairs of student teachers on their experiences with simulation training for teaching controversial issues. It explores how they perceived this training to enhance their professional learning beyond conventional teacher education methods. By participating in simulated role-play and observing five avatar pupils, the student teachers recognized the need to employ strategies for managing comments, questions, and responses effectively. They also emphasized the importance of thorough planning, particularly when adapting to diverse learner needs. Teaching controversial issues further underscored the significance of both subject knowledge and pedagogical content knowledge in facilitating meaningful classroom discussions. Alternating between acting and observing enabled the student teachers to gain insight into multiple instructional approaches to the same content. This dual perspective also helped them develop skills for handling unexpected situations in the classroom. According to the student teachers, simulation training provided a controlled yet realistic environment in which they could practice teaching complex and sensitive controversial topics, experiment with different strategies, and learn from mistakes without the immediate pressures of a real classroom. Moreover, the training offered a rare opportunity for practice-based learning within a university setting, addressing a gap in their teacher education.

KEYWORDS: AVATAR PUPILS, CONTROVERSIAL ISSUES, STUDENT TEACHERS, SIMULATION TRAINING, TEACHER EDUCATION

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Introduction

It is readily apparent that the demand for teachers equipped to teach controversial issues is both global and enduring (Claire & Holden, 2007; Cowan & Maitles, 2012; Hess, 2009; Stradling, 1984). This need has remained largely unchanged over time and continues to pose significant challenges (Flensner, 2019; Woolley 2011). Indeed, this demand may be greater now than ever due to political turmoil around the world (Council of Europe, 2015; European Union, 2022; Swedish School Inspectorate, 2022). In this context Stradling's (1984) arguments remain relevant today, both in terms of (a) factual considerations, namely that controversial issues are inherently significant, and (b) broader pedagogical reasons, as discussing these issues fosters critical thinking, balanced attitudes, and value-based judgements. Existing research concerning student teachers indicates an expressed need for more training on controversial issues to enhance both the breadth and depth of their subject knowledge (Borgerding & Dagistan, 2018; Pace, 2021). Nganga et al. (2020) identified several barriers to student teachers' ability to engage with controversial issues in the classroom, namely: (a) inadequate critical oversight, (b) insufficient training and experience, (c) lack of administrative support, and (d) limited critical awareness. For newly qualified teachers, discomfort in teaching controversial issues often stems from (a) insufficient subject knowledge and (b) difficulties in selecting and applying effective teaching methods (Borgerding & Dagistan, 2018; Nganga et al., 2020; Philpott et al., 2011). These difficulties are closely related to the complexity of controversial issues, which require higher-order thinking skills such as analysis, synthesis, and evaluation (Byford et al., 2009; Hofkens et al., 2023).

The Council of Europe (2015) outlined strategies for enhancing the teaching of controversial issues, including (a) encouraging reflection and self-awareness, (b) deepening subject expertise, (c) improving planning and emphasis, (d) equipping students with the skills to engage constructively in discussions, and (e) involving colleagues, students, and guardians in the learning process (cf. Crombie & Rowe, 2009; Bickmore & Parker, 2014; Hess, 2009). Pace (2019) argued for the importance of providing training in how to teach controversial issues, as such content requires an open classroom climate that may cause teachers to feel a loss of control or pose a risk of exposing gaps in their expertise. Similarly, the European Union (2022) outlined strategies for addressing controversial issues in schools. Beginning with an argument for the significance of engaging with such topics, the report offered several recommendations for teachers. These included: (a) reflecting on what constitutes a controversial issue in their own classroom context, (b) collaborating with colleagues, (c) adapting teaching to students' prior experiences, and (d) creating a safe and constructive classroom atmosphere conducive to productive discussions on controversial issues (European Union, 2022).

Pace (2021) observed that while teaching controversial issues poses significant challenges for student teachers, it also offers considerable educational potential. Accordingly, Pace (2021) argued for the importance of providing student teachers with opportunities during their teacher training to experiment with creative approaches, such

as role-play and simulation, within a supportive environment that allows for gradual risk-taking. Kaka et al. (2021) similarly employed simulations to prepare student teachers to lead discussions on controversial issues. Their findings from a study with interactive narratives highlight the necessity for teachers to possess not only strong subject knowledge and classroom management skills but also social, psychological, and communicative expertise as controversial questions are sensitive and complex. Such skills are essential for creating a classroom environment where students feel encouraged to share their opinions constructively.

Being qualified to teach controversial issues in a constructive way is ideally learnt during teacher education. Most teacher education programs offer courses on campus and practical training in schools during practicum. Student teachers spend most of their time taking courses on campus and less time practicing teaching pupils in schools. Practicum offers student teachers a protected setting for growth and learning (Arnett & Freeburg, 2008; Darling-Hammond, 2006; Girod & Girod, 2008; Lundberg et al., 2024). However, practice is mostly spread over several semesters, which limits student teachers' opportunities to get to know pupils and create a positive classroom climate with a high participation format (Kounin, 1970). Due to how campus teaching is organized, this often means that student teachers are trained primarily in analytical aspects and receive less training in action-oriented aspects of teaching during their university studies (Jank & Meyer, 1997). To develop action-oriented teaching skills among student teachers, teacher education programmes need to provide multiple opportunities for practice aimed at fostering adaptive expertise (Anthony et al., 2015). A potential strategy to address the widely acknowledged challenge of student teachers having limited opportunities to authentically practice and refine skills and strategies (McDonald et al., 2013; Westbury et al., 2005) is through the utilization of simulation training (Chernikova, et al., 2020).

Although Hughes and Traill (1975) stated that simulation training was not commonly used in teacher education, this situation has changed (Ledger et al., 2024; Lindberg & Jönsson, 2023). Simulation training is now used as a means to prepare student teachers (Kaufman & Ireland, 2016), as a form of micro-teaching (Ledger & Fischetti, 2019), or as virtual practice (Samuelsson et al., 2022; Thorsten et al., 2023; Hansson et al., 2023) in digital approximations of real-life scenarios (Kaka et al., 2021). Simulation training for student teachers can provide guided practice for a variety of situations that they would not frequently encounter during teacher education, on campus or during internships, thereby helping them prepare for the realities of teaching (Mason et al., 2011; Samuelsson et al., 2021). Simulation training can also provide opportunities to repeat situations, and to make mistakes without risking harm to real students (Bradley & Kendall, 2014; Piro & O'Callaghan, 2018). These exercises take place in a safe environment under the supervision of university educators and allow student teachers to experience situations that are rare or risky in real classrooms (Kaufman & Ireland, 2019). Some of the challenges encountered in implementing simulation training appear to mirror those associated with role-play activities. These challenges relate to: (a) the substantial time and effort required for such activities to be effective; (b) the difficulty of developing a sufficiently diverse range of characters, perspectives, or sources of

engagement relevant to the topic under study; and (c) the inclusion of ethically, socially, politically, or economically controversial issues (Cherif & Somervill, 1995; Samuelsson et al., 2022).

Earlier research focusing on what student teachers have learnt from simulation training in teacher education has shown that teaching an avatar pupil provides them with opportunities for authentic practice, which student teachers find useful and valuable (Dalinger et al., 2020; Levin & Flavian, 2023). Experiences from simulation training also helped student teachers manage anxiety about teaching (Dalinger et al., 2022). Training teaching in a simulation has been shown to increase their self-awareness and self-confidence (Fischetti et al., 2022; Levin & Muchnik-Rozanov, 2023). In some cases, this was a result of simulation training experienced as a friendly, low-risk and low-stress situation (Gravett et al., 2023). Student teachers also appeared to develop greater acceptance of others through the feedback and debriefing they received after teaching avatar pupils (Levin & Muchnik-Rozanov, 2023; Gravett et al., 2023). Some studies also discuss transfer effects from simulation training based on firsthand experience in teaching avatar pupils and from second-hand experience from observing others teaching (Dalinger et al., 2020). Levin and Flavian (2023) reached a similar conclusion. Thus, transfer of learning has been observed both from teaching avatar pupils and from observing other student teachers' teaching, mostly as reflections of former or upcoming practice with real students. The opportunity for After Action Review with peers and instructors enriched their experience in simulation training (Levin & Flavian, 2023). Similarly, Fischetti et al., (2022) found that training in a mixed-reality learning environment (MRLE), as micro-teaching 2.0, improved teaching skills and helped build self-confidence among 92 % of the student teachers that took part in the training. Among the aspects highlighted it was the need for lesson planning to enhance engagement, as well as awareness of students in need of special support. The micro-teaching 2.0 approach fostered a more harmonious self-perception and, through debriefing increased both self-confidence and professional confidence. It also helped them shift from self-focus to openness to influences from a physical and discursive world around them. Finally, it supported a shift from emotional involvement to acceptance of others, mainly due to the debriefing process, which helped them reduce stress and tension.

Aim

Given this background the paper aims to investigate student teachers' experiences of simulation training on campus, by exploring the following research questions:

RQ1: According to student teachers, what have they learnt from the simulation training on controversial issues?

RQ2: From the perspective of student teachers, what distinguishes the added value of learning through simulation training in comparison to other forms of teacher training?

Theory

Dewey and McLellan (1889, p. 182) articulated the idea of “learning to do by doing, and to do by knowing,” recognizing the centrality of the student’s self-activity. Consequently, knowledge and skills are acquired through experiential learning and awareness, that manifest within specific events. It is through interpersonal communication that our experiences can extend beyond our individual encounters (Säljö, 2020). In the process of learning, Dewey’s concept of reflective experience empowers students to acquire information, to reflect within the context of the event (in this study, during simulation practice) to identify solutions and actions, and subsequently to engage in reflection, both individually and in collaboration with their peers. Dewey’s framework for reflective experience, as described by Garrison et al. (2012), comprises five phases. The initial phase involves generating suggestions to identify potential solutions. The second phase is characterized by intellectualization, wherein the problem is analysed. The third phase entails the construction of hypotheses or ideas. The fourth phase involves reasoning, and the fifth phase revisits the empirical data to assess the validity of the hypotheses, reasoning, and conclusions. Dewey underscores a clear distinction between the mere acquisition of facts and information and the genuine process of learning, implying that true understanding necessitates a grasp of the content (Säljö, 2020). Additionally, Kolb’s (1984) experiential learning theory states that learning is continually shaped and reshaped by experiences. In this theory, paramount importance is attributed to how learners perceive and process information. These fundamental components collectively define our learning experiences. According to Kolb (1984, p. 15), effective learning requires learners to possess four key abilities, which are depicted in Figure 1, and are referred to by Kolb as Lewin’s experiential learning model: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

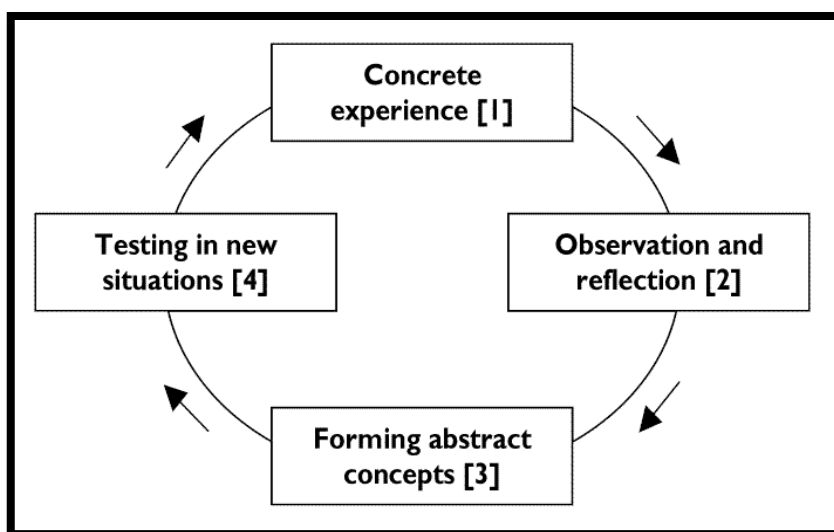


FIGURE 1

Kolb's (1984) four components of learning abilities.

Method

This section presents details on the implementation of simulation training in a teacher training course in Social Science. It introduces our approach to conducting simulation training, describes the characteristics of the avatar pupils that were instructed by the preservice student teachers and explains the data collection and analysis methods employed.

Simulation training

Simulation training can be performed in different ways: situational simulations, scenario/role-play simulations, simulations with standardized students or computer-based clinical simulations (Kaufman & Ireland, 2019; Levin & Muchnik-Rozanov, 2023). In this study, we used TeachLivE, a semi-virtual computer-based simulation which blends artificial and human elements (Dieker et al., 2023). A human-in-the-loop in the role of a puppeteer controls the avatar pupils in real time, thereby animating them (Chini et al., 2016). Utilizing simulations featuring avatar pupils resembling and behaving like students could offer a more immersive experience compared to envisioning one's peers or students during role-playing exercises (Cohen et al., 2020; Grossman et al., 2009; Samuelsson et al., 2022).

The avatar pupils in the simulation about controversial issues

The student teachers responsible for teaching controversial issues were required to teach a small group of five avatar pupils each with a distinct personality (Long, 1989; Hayes, et al., 2013).



FIGURE 2

A student teacher addresses the avatar pupil Ethan (far right) in the simulation training.

Photo: Peter Holgersson

All student teachers were informed about the avatar pupils' capabilities, including the types of verbal interactions, non-verbal gestures, and note-taking they could perform, as well as their ability to send and receive text messages on mobile phones and to communicate with each other. Additionally, they were informed about the limitations of the avatar pupils, namely their inability to leave the classroom or to change their positions in the classroom. They also learnt that the five avatar pupils acted more or less dependently or independently of one another. See Figure 2 and Table 1.

TABLE 1

Description of avatar pupils' personality traits and dependence on others

Avatar pupils	Dependent on others
Jasmine	Exhibits insecurity and has low self-confidence. Her sense of self-worth relies heavily on recognition from Ava or assistance from Dev. She rarely responds to inquiries posed by the student teachers. Jasmine requires an interactive and practical approach from her peers to comprehend the expectations placed upon her.
Savannah	Is a team-oriented individual who appreciates collaborative learning and welcomes intellectual challenges within the group. Frequently, she seeks clarification from her peers and the student teachers, striving for a deeper understanding of their perspectives. Generally, she maintains a diplomatic stance concerning the subject matter, yet occasionally, her fervent opinions become evident. This passion makes her susceptible to taking offense in the classroom.
Avatar pupils	Independent on others
Ava	Predominantly displays disinterest in the subject matter and often attempts to divert the discussion away from the planned topics, thereby misleading the student teachers. Motivational efforts are required to engage her actively in the lesson. Additionally, she presents challenges by resorting to sarcasm, particularly directed towards Ethan.
Dev	Exhibits a profound inclination towards facts and knowledge acquisition, often pursuing independent learning. He engages with the topic avidly and occasionally surpasses the understanding of his classmates and the student teachers. As a result, the student teacher frequently accords him considerable attention and room for dialogue.
Ethan	Exhibits intermittent engagement with the lesson content, often succumbing to distractions posed by his mobile device. However, when he actively participates and displays attentiveness, he tends to dominate the discussion. He challenges his peers, the student teachers, through sarcasm directed at Ava, adopting a provocative demeanour, and strategically guiding the discourse by emphasizing Dev's knowledge.

The avatar pupils mentioned above were puppeteered by a simulation specialist. The specialist used different sorts of pushbacks, mentioned in Table 1, aligned with the goals for the course and the core practices (Grossman et al., 2009) that the student teacher trained on during simulation teaching. This includes verbal and non-verbal expressions, reactions to other avatar pupils, the student teacher, or the material used during the teaching. This approach facilitated real-time interaction between the simulation

specialist and the student teacher, a methodology acknowledged in the works of Dieker et al. (2016) and Ersozulu et al. (2021). The avatar pupils' compliance and responsiveness allow for tailoring the training to accommodate the varying abilities of the student teachers, reducing complexity and fostering a sense of authenticity crucial to the simulation's quality, as noted by Bondie et al. (2021).

The research participants

The student teachers invited to participate in the study were in the ninth of ten semesters of their teacher education programme. Prior to the course, they had completed eleven weeks of school placement, during which they had the opportunity to plan and lead teaching in Social Science. At a meeting with the second author, they were informed about the research project and invited to participate voluntarily, in accordance with the ethical guidelines of the Swedish Research Council (2017). All student teachers provided individual oral consent to take part in the study. The student teachers were after that introduced to the controversial issues scenario that formed a part of a course in Social Science. Before the simulation training, they attended two lectures: the first focused on the concept of controversial issues, and the second on pedagogical strategies for teaching such topics. Subsequently, the student teachers read Hayward and Gronland (2021) and The Swedish Schools Inspectorate (2022) before participating in a literature seminar on controversial issues. The lectures and seminar served to re-establish group cohesion among the students, who had been enrolled in different subject courses for an extended period. This aimed to prepare the participants emotionally and pedagogically for the challenges of teaching contemporary controversial issues, such as the burning of the Koran in Sweden, which could be interpreted as freedom of speech or incitement against an ethnic group, as well as historical issues such as the moon landing or the assassination of former Swedish Prime Minister Olof Palme. They also aimed to familiarise them with methods for creating a classroom climate characterised by a high degree of engagement and participation (Kounin, 1970), in which all avatar pupils were actively involved (Hansson et al., 2023).

The student teachers were after that divided into pairs and one triad. Each pair and triad was instructed to plan a teaching sequence for a group of primary school year 9 or secondary school avatar pupils. They were instructed to focus on source criticism in media, conspiracy theories, fake news, and respect/tolerance. Before commencing their teaching sessions, all pairs were provided with specific instructions to consider during their planning:

Your lesson plan should involve an overview, addressing the didactic questions of what and how. Also required is a meticulous plan for the first lesson in the teaching sequence. The lesson's content will revolve around conspiracy theories, misinformation, fake news, the pandemic, vaccination, etc. Ground your planning in the syllabus, which you should clearly articulate, and utilize a teaching model (such as the practice model, the IPC individual work, paired work, and collective collaboration model etc.). Emphasize the importance of generating curiosity, a high-participation format, motivation, and interest among the avatar pupils. Divide the lesson

between yourselves and rehearse in preparation for the delivery. (Course guide, Social Science 4, advanced level).

Thus, the course is limited to aspects of political science, therefore psychological factors of controversial issues were not considered in the research project.

In the simulation studio, one pair of student teachers at a time acted in the room alongside an instructor, teaching the five avatar pupils. The student teachers who were not participating in the room observed their peers' performances via Zoom from separate rooms. This meant that all student teachers taught the avatar pupils once and observed others teaching the same content nine or ten times, depending on which year they took the course. It also meant that one pair had not seen other ways of teaching, while others had seen versions of the lessons as many as nine times.

The pair that had taught was invited to an After Action Review (Dieker et al., 2013; Scoresby & Shelton, 2014) after their simulation sessions with either the Social Science specialist or the Classroom Management specialist.

Collecting and analysing data

Data were collected from three student cohorts, encompassing student teachers enrolled between 2021 and 2023, comprising a total of 64 student teachers majoring in Social Sciences. See Table 2.

TABLE 2

Participating student teachers between the years 2021, 2022 and 2023

Student cohort	Number of students	Observations and Zoom recordings	Interviews
2021	20	10	10
2022	23	11	11
2023	21	10	10

The researchers, identified as Authors One and Two, had two roles during the simulation training, as instructors and interviewers. The student teachers were informed of this arrangement when they received information about the project. Firstly, as instructors, Author One and Two actively observed during the 15+15-minute sessions with pairs or triads of student teachers. After the sessions, the instructor who had attended each group or triad's 30-minute simulation session conducted a follow-up interview. During the follow-up, the student teachers were interviewed about their performance, guided by four overarching questions: (a) what went well?, (b) what could have been done differently?, (c) what did you learn?, and (d) how did this learning compare with other teaching experiences and/or practical training? The arrangement in which the same individual acted as both instructor and interviewer was intended to minimise student teachers' anxiety and fear of being judged. It was also emphasised that the simulation training constituted a learning opportunity rather than an assessment. The interviews lasted between 30 to 45 minutes. The interviews were conducted

alternately by Authors One or Two, audio recorded and later transcribed verbatim. The interviews as well as the transcripts were safely stored on external hard drives (Swedish Research Council, 2017).

The analysis process followed Braun and Clarke's (2021) six-phase guide for thematic analysis. Initially, the researchers individually familiarized themselves with the interview transcripts, searching for patterns and meanings. From repeated readings, a list of codes about the simulation training was generated leading to the formulation of initial codes. These codes were then organized into potential themes. These potential themes were subsequently compared, reviewed, and refined in collaboration between Author One and Two. Finally, two main themes with sub-themes were considered to illustrate what the student teachers had learnt from simulation training. Relevant extracts from the transcripts were then gathered for each sub-theme. The two themes were defined, named, and the results were constructed based on this analysis process. The findings were presented to the simulation specialist (Author Three), who conducted a thorough and constructive review, providing valuable feedback on the results.

Results

The results based on the analysis were divided into two themes, (a) the learning experience from simulation training, and (b) the added value derived from simulation training, which addressed our research questions.

Learning experience from simulation training

The first theme that emerged from the student teachers' narratives pertained to their experiences with simulation training, highlighting how it facilitated their ability to engage with and harness input from the avatar pupils. This encompassed unexpected input in the form of questions and comments, which required evaluation for relevance. One pair of student teachers articulated this theme as follows:

The importance of assessing the relevance of the questions and linking them back to the current subject. (Pair C)

In addition, this theme encompassed student teachers gaining awareness of topics for which immediate answers were not readily available. It also underscored the necessity for strategies to effectively leverage and manage the input provided by avatar pupils in the form of questions and reflections. One pair of student teachers expressed this aspect as follows:

I learned to take in more of what the avatar pupils are saying and build on that. Since many had good thoughts and ideas, it greatly facilitated the teaching when they contributed their thoughts and opinions. (Pair S)

Another prominent theme in the student teachers accounts revolved around the importance of meticulous planning and adaptability during the teaching process. They elucidated how, through simulation training, they acquired practical insights into the significance of flexibility, which extended to both the pre-teaching planning phase and

the actual execution of their teaching. Concerning planning, student teachers realized the value of better preparation, enabling them to be receptive and prepared for unforeseen situations or inquiries that may arise during instruction. One pair articulated this concept as follows:

I learned the importance of flexibility and the ability to quickly react to strong opinions. At the same time, maintaining a flexible and varied teaching approach at a level that keeps the avatar pupils engaged. (Pair B)

Furthermore, more comprehensive planning would have instilled a sense of confidence regarding the direction and objectives of the teaching, thus enhancing focus and adherence to the prescribed course of instruction. This could be characterized as a form of under-planned teaching. Conversely, the opposite approach, over-planned teaching, was also examined, highlighting the need for adaptability during execution due to the recognition that an excessive amount of content had been scheduled relative to the available time. One pair of student teachers elaborated on this aspect as follows:

I learned that things don't always turn out as expected. Our planning took twice as long as what we were able to accomplish. (Pair T)

Making decisions about what to include and exclude in real-time proved to be crucial, as well as the capacity to adapt to and address the avatar pupils' requirements, ideas, and thoughts concerning the teaching material.

A third theme revolved around the significance of possessing subject expertise and the capability to apply it. The student teachers outlined how simulation training underscored the necessity for comprehensive and in-depth subject knowledge to effectively teach a specific content. One pair articulated this perspective as follows:

Furthermore, it can be beneficial to have better subject knowledge and understanding than I had to handle various situations in a professional manner. (Pair D)

The student teachers also acknowledged the necessity of being more thoroughly acquainted with the subject matter. They also explained how possessing a broader and deeper subject expertise would have instilled a heightened level of confidence in their teaching.

A fourth theme centred on how the student teachers acquired the ability to consider alternative perspectives through simulation training. They delineated how the simulation training facilitated their introspection and enhanced their understanding of their teaching and leadership. One pair of student teachers articulated this aspect as follows:

I learned to self-reflect constructively in situations that could become delicate. I also learned more about myself and how I handle situations in the classroom. (Pair A)

Although some encountered difficulties in presenting themselves before their peers, they underscored the significance of the opportunity to observe others. This was especially apparent when it came to how to deal with classroom climate and discipline

issues. On the one hand the student teachers' pairs expressed following initially in the simulation:

First, we will explain rules in the classroom. After that we will discuss conspiracy theories. (Pair V)

Other pairs of student teachers dealt with indiscipline, such as not raising their hands and being allowed to speak, when it occurred. Neither strategy was particularly successful. Rather, those student teachers who kept the avatar pupils on topic, praised them with feedback and feed-forward, and adjusted the tempo were more effective.

A fifth theme revolved around the student teachers acquiring the ability to differentiate among and effectively engage the avatar pupils. The student teachers delineated how simulation training aided them in recognizing the diversity among the avatar pupils and how they needed to strategize and adapt their approach to maintain the engagement of all avatar pupils. One pair articulated this perspective as follows:

I also got to practice handling different types of students, such as those who are very quiet and those who need to be interrupted to stay on track. (Pair N)

A sixth theme centred on the student teachers' acquisition of skills in managing and leading when unforeseen circumstances emerged. The student teachers described how simulation training provided them with opportunities to practice handling the unexpected, which could manifest as varying viewpoints on content as well as emotional responses among the avatar pupils. One pair articulated this aspect as follows:

I learned how to handle various conspiracy theories that avatar pupils might bring up and how challenging it can be. Training to manage unpredictable opinions and positions. (Pair O)

Furthermore, simulation training played a role in enhancing the student teachers' capacity to effectively lead teaching with confidence in various ways. One pair articulated this aspect as follows:

I learned (got to practice) handling difficult student situations, such as when avatar pupils went off on tangents or when avatar pupils made personal attacks on each other. It was challenging at times but very educational! I intervened or stopped the avatar pupils, but I could have done it earlier and more clearly. (Pair P)

Added value from simulation training

According to the student teachers' perspectives, simulation training primarily provided them with the opportunity to practice scenarios that they might not have encountered otherwise. The training exposed them to specific, challenging, and at times even extreme situations, thereby helping them prepare for potential occurrences in real teaching settings.

The student teachers also expressed that simulation training created a sense of reality within a controlled environment. They believed that, on the one hand, it induced

nervousness, but on the other hand, it alleviated their fear of teaching. One pair articulated this dichotomy as follows:

The added value lies in the fact that it's 'pretend,' so as teachers, we don't need to be afraid of making 'mistakes' but can try and experiment. (Pair D)

Furthermore, the simulation training centered on distinct, well-defined scenarios wherein student teachers experimented with various approaches to understand their effectiveness. One pair of student teachers described this aspect as follows:

It was good to be put in uncomfortable situations to learn how to handle them. (Pair I)

The student teachers also conveyed that simulation training afforded them the chance to experiment and conduct post-training evaluations. They highlighted the significant added value of engaging in teaching practice and observing peers teach within a university course, independent of regular practice contexts. One pair of student teachers articulated this perspective as follows:

That we get to practice teaching at the university that isn't tied to practice. That we receive immediate feedback that strengthens us as future teachers. (Pair K)

Furthermore, the student teachers perceived the instructional approach as a valuable component. It pertained to the structured nature of the training, as organized and implemented in the course, which offered them an opportunity to practice teaching within an otherwise theory-centric segment of their campus-based education. One pair conveyed this viewpoint as follows:

It provides an opportunity to reflect on and process one's teaching and leadership in a teaching situation. (Pair M)

A third theme revolved around the concept of practicing within a secure environment. Safety was partially linked to the scenarios themselves and, in part, to the chance to co-teach alongside another student teacher under the guidance of experienced and knowledgeable teacher educators. Additionally, simulation training assessed students teachers' subject expertise and pedagogical skills within a secure setting. One pair of student teachers expressed this aspect as follows:

A safe environment and getting to handle the slightly uncomfortable questions, as well as seeing how I react in a classroom situation. (Pair Q)

Moreover, it pertained to the opportunities for experimentation that the training afforded. As one student teacher in the triad articulated:

The fact that you can be a bit more daring since it's not real; I didn't do it this time, but if we were to do it again, I might have dared. (Pair U)

Discussion

This study explored what student teachers reported that they had learned from conducting and observing simulation training on controversial issues and how this form

of training adds value beyond other methods of teacher education. The findings from 31 pairs of student teachers in Social Science suggest that they gained significant insights into teaching as a broad concept through simulation training focused on content knowledge, general pedagogical knowledge and pedagogical content knowledge (Shulman, 1987; Hansson et al., 2023) thereby aligning with previous research (cf. Dalinger et al., 2020; Levin & Flavian, 2023). The student teachers engaged with content and conspiracy theories that were fluid, sensitive, complex, and inherently challenging to approach neutrally. Such content has rarely been addressed in simulation training, despite repeated calls in the literature for increased preparation in teaching controversial issues (Nganga et al., 2020; Kaka et al., 2021; Pace, 2021). In this regard, our research extends previous knowledge.

Pace (2021) emphasized the importance of offering student teachers' opportunities to experiment with creative pedagogies, such as role-play and simulation, within a supportive environment that encourages gradual risk-taking. The instructor's capacity to establish a psychologically safe learning environment, combined with constructive positive reinforcement regarding successful elements of teaching and clear guidance on areas requiring improvement, supported the development of professional competencies essential for effective teaching. Previous research has demonstrated that students acquired even deeper learning outcomes from simulation training compared with traditional role-play (Samuelsson et al., 2021)., This effect could reasonably be expected to apply equally to complex and sensitive subjects such as controversial issues and conspiracy theories. One explanation for this may be that it is challenging for a student teacher to remain fully in character while interacting with another student teacher and simultaneously addressing conceptual misunderstandings. This difficulty does not arise in simulation environments, where avatar pupils consistently maintain their roles and provide appropriately adapted challenges for the student teacher (Samuelsson et al., 2021; Samuelsson et al., 2022).

Our findings further support the effectiveness of simulation training as a means to address the well-documented challenges of student teachers having limited opportunities to practice and refine their teaching strategies in authentic settings (cf. McDonald et al., 2013; Westbury et al., 2005). The student teachers valued the additional practice within a structured yet low-risk environment, which enabled them to explore diverse teaching approaches to sensitive and complex content. The simulation training provided an added dimension to traditional teacher education and school-based internships, corroborating previous studies (Samuelsson et al., 2021; Pace, 2021). Specifically, it supported both the analytical and action-oriented aspects of teaching (Jank & Meyer, 1997), as student teachers engaged in teaching, peer observation, and reflection on challenges. This experience enhanced their self-awareness and confidence in addressing controversial issues (cf. Fischetti et al., 2022; Levin & Muchnik-Rozanov, 2023). At the same time, many student teachers realized the difficulty of maintaining pedagogical control and a positive climate, often being led by the avatar pupils rather than guiding the lesson themselves. They also recognized that general content knowledge (Shulman, 1987) was insufficient. To establish credibility with avatar pupils and facilitate meaningful discussions, teachers must possess up-to-date and detailed

subject knowledge. The simulation training thus reinforced the need for both breadth and depth in subject expertise (Borgerding & Dagistan, 2018; Pace, 2021; Hansson et al., 2023). Additionally, effectively addressing avatar pupils and students' misconceptions, biases, and inaccuracies requires strong subject knowledge. This was a challenge student teachers encountered when teaching and observing lessons on controversial issues (Woolley, 2011; Flensner, 2020), as well as a matter of general pedagogical knowledge and pedagogical content knowledge (Shulman, 1987; Hansson et al., 2023). Finally, the simulation training developed student teachers' professional judgement and preparedness for action (Samuelsson et al., 2022; Hansson et al., 2023). By immersing them in complex teaching scenarios, where they taught and observed teaching, it provided a valuable platform for refining their decision-making skills, thereby reinforcing the potential of simulation as a powerful tool in teacher education.

Dewey and McLellan (1889) argued that learning through experience fosters problem-solving skills and meaningful engagement. In line with Dewey's concept of reflective experience, this study created first-hand learning opportunities through teaching avatar pupils in a simulation. Although each student teacher led the avatar pupils for only 15 minutes (30 minutes per pair), the session was highly intensive. As noted earlier, the simulation, viewed through Kolb's experiential learning framework, constituted a concrete and demanding experience. Student teachers quickly realized that a well-prepared lesson plan alone was insufficient for effective teaching; a deep and broad understanding of the subject matter was also essential. Without this, they risked losing control of the classroom and struggling to guide the lesson (Pace, 2019). This insight was evident not only to those actively teaching but also to those observing the session. Reflective observation, therefore, played a crucial role for all participants. The student teacher's responsiveness and reactions to the avatar pupils' questions and inquiries were closely examined and analysed. In Kolb's third phase, abstract conceptualization, student teachers engaged in a thorough discussion with the teacher educator immediately after their simulation session. They demonstrated higher-order thinking by reflecting on key concepts—both those effectively conveyed in their teaching and those that were either unclear or insufficiently addressed. These discussions, combined with peer observations, provided valuable feedback on their instructional approaches, highlighting both effective strategies and areas for improvement. Ultimately, by planning lessons, teaching in a simulated environment, observing peers, and engaging in reflective discussions, student teachers developed a deeper understanding of their teaching practice. This process contributed significantly to their professional growth and preparedness for future teaching careers.

Limitations and future research

Despite its contributions, this study has several limitations. First, the participants were student teachers from a single subject area at one university. Future research could include a broader sample across different subjects and institutions to enhance generalizability and facilitate comparative analysis. Additionally, replicating this study with other groups of student teachers could yield further insights into the effectiveness

of simulation training. The second limitation concerns the subject matter. In this study, student teachers focused on teaching controversial issues, specifically conspiracy theories, within Social Science. This makes the findings less applicable to other disciplines, except, perhaps, for Religious Studies and History. The third limitation is the duration of the simulation teaching sessions. With only 30 minutes per student pair, the limited time frame poses challenges for assessing the full impact and effectiveness of the training. The fourth limitation concerns the fact that it was not yet possible to compare different forms of practice-based training beyond simulation. A fifth and final limitation relates to the qualitative research design. Given the complexity of teaching, the need for subject knowledge, pedagogical content knowledge, and classroom leadership, future studies could adopt a mixed methods approach to provide a more comprehensive analysis. A comparative study incorporating a control group could offer deeper insights into student teachers' knowledge construction, knowledge sharing, and reflective thinking within simulation training. Ultimately, this study highlights an innovative approach to teacher training. While its findings alone may not justify immediate changes in teacher education, future research should explore the long-term effects of simulation training, particularly during student teachers' final practicum. This would allow for the completion of Kolb's experiential learning cycle by testing newly acquired skills in real classroom settings.

Conclusion

This study aimed to offer a perspective for teacher education, demonstrating how simulation-based teaching can significantly enhance student teachers' ability to address controversial issues. This was achieved through active participation in simulated teaching, peer observation, the sharing experiences, and the construction of learning opportunities. The findings revealed that student engagement, subject knowledge, decision-making, problem-solving, and reflective thinking had a profound impact on student teachers' professional development and their future capacity to teach real pupils. However, the findings also highlight the unpredictable nature of teaching. To deliver efficient instruction and foster high levels of student participation (Kounin, 1970), and to ensure that all pupils have opportunities to engage (Swedish School Inspectorate, 2022), student teachers require more practice-based training. This need extends beyond increased training opportunities; it also necessitates high-quality training, such as simulation exercises incorporating research-based challenges from avatar pupils. Such structured experiences are crucial for developing the professional competencies necessary for efficient teaching. Opportunities to practice teaching in a safe environment, without the risk of harming real pupils and under the guidance of experienced instructors who provide immediate feedback, address an essential need identified by student teachers. The findings contribute to a deeper understanding of how simulation-based teaching in higher education can provide valuable insights for teacher education. In particular, it offers student teachers meaningful learning experiences when

teaching sensitive topics that might evoke strong feelings and responses, thereby enhancing their preparedness for the complexities of the classroom.

The first author planned the study with the second and third authors. During the study, the first author participated as one of two instructors in the simulation training alongside the second author, conducted half of the interviews after the simulation training, carried out the initial analysis of the interviews with the student teachers and led the writing of the paper in collaboration with the second and third authors.

The second author planned the study with the first and third authors and participated as one of two instructors in the simulation training alongside the first author, conducted half of the interviews with the student teachers, took primary responsibility for the theoretical framework, and co-wrote the paper with the first and third authors.

The third author planned the study with the other authors, served as the simulation specialist during the entire training, prepared the pushbacks and avatar pupils that the student teachers interacted with, and contributed to the writing of the article together with the first and second authors.

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