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Research Article

Supporting Pre-service Teachers' Understanding of Behaviour Management Using Chatbots

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Abstract: This study explores the potential of Artificial Intelligence (AI)-powered chatbots to support Pre-Service Teachers (PSTs) in developing behaviour management skills within a psychologically safe, simulated environment. Guided by Bandura's Social Cognitive Theory, the research examined how personal, behavioural, and environmental factors influenced PSTs' interactions with a chatbot named Jamie. Using a qualitative descriptive methodology, data were collected via pre-and post-placement surveys across three Australian universities, supplemented by tutorial discussions. Findings revealed that PSTs valued the chatbot for allowing risk-free experimentation, immediate feedback, and increased confidence in applying classroom strategies. However, post-placement responses indicated a decline in perceived effectiveness, with concerns about the chatbot's lack of realism, behavioural complexity, and responsiveness to non-verbal cues. These limitations suggest that while chatbots can enhance initial self-efficacy and strategy development, their training value may diminish without deeper contextual and emotional fidelity. The study concludes that chatbots hold promise as supplementary tools for behaviour management training, especially when embedded in broader, multifaceted teacher education programs.

***Keywords*:** Artificial Intelligence (AI), chatbots, social cognitive theory, Pre-Service Teachers (PSTs), behaviour management

1. Introduction

Pre-Service Teachers (PSTs) often face significant challenges in mastering behaviour management (De Nobile & Yeates, 2025). Despite the existence of professional experience requirements in all Initial Teacher Education (ITE) courses, there have been many reports of PSTs feeling underprepared for behaviour management issues by their ITE courses (Freeman et al., 2014). Recent research underscores this issue. A study by McGuire and Meadan (2023) explored PSTs' knowledge and experiences with behaviour management strategies. Findings indicated that these teachers had limited knowledge in this area and sought more opportunities to support students perceived as exhibiting

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challenging behaviour. In an era when schools are dealing with early career teacher attrition and teacher shortages (Teacher Education Expert Panel (TEEP), 2023) which can be attributed in part to challenges associated with behaviour management (Evans et al., 2019). This signifies the necessity for teacher education programs to develop strategies to more effectively prepare PSTs with demands of the teaching profession.

Innovative solutions employing technologies are being explored to address this challenge and develop skills to use in the classroom. For instance, a study investigated the efficacy of an Immersive Virtual Reality (IVR) system, ClassMaster, in enhancing PSTs' behaviour management skills (Li et al., 2024). The results suggest that such technology could offer a safe and controlled environment for teachers to practise and refine their behaviour management techniques before entering actual classrooms. Likewise, the use of Artificial Intelligence (AI) also provides opportunities for PSTs to develop behaviour management skills.

The project reported on here was developed and instigated by university lecturers who teach behaviour management subjects in Universities in New South Wales, Australia. The focus was on the PSTs use of a chatbot and how it supported their understanding of behaviour management using Social Cognitive Theory (SCT) as a theoretical framework to analyse the data. The framework emphasises the reciprocal interactions between personal, behavioural and environmental factors in explaining human motivation and performance.

The two research questions were:

• How do PSTs perceive the effectiveness of AI chatbot simulations in developing their behaviour management skills?

• What are the key design features of AI chatbot simulations that PSTs identify as essential for realistic and effective behaviour management training?

2. Literature review

The landscape of teacher preparation is evolving with the growing prevalence of AI-powered chatbots in education (Davar et al., 2025). For teacher education specifically, AI chatbots enable conversational, persona-based practice with challenging classroom scenarios without consequences to real students. This approach aligns with simulation in teacher preparation, which Fischetti et al. (2022) describe as providing "opportunity to implement, observe and capture the effectiveness of situated learning and reflective practice approaches, which are typically more difficult to measure within the variability of real-life contexts" (p.158).

Chiu (2024) notes that GenAI applications significantly impact educational approaches by acting as "teachers, tutors, clerks, and designers" (p.6187). GenAI applications can create simulation environments where PSTs can test strategies without real-world consequences, addressing the need for safe, easy and effective ways of increasing the amount of teaching practice that Cheong (2010) identifies as critical for developing teaching efficacy.

Current research demonstrates GenAI's potential benefits for PST preparation (e.g., Barbieri & Nguyen, 2025), yet significant gaps remain. The relationship between simulated practice and real classroom application continues to be under-explored, with limited research examining skill transfer. Additionally, while frameworks are applied to technology implementation generally, there is limited research specifically applying established learning theories to chatbot-based simulations for behaviour management training. Given SCT's emphasis on observational learning, self-efficacy development and environmental interactions-all crucial elements in teacher preparation-we utilise this framing to organise existing insights and applications in the literature.

Teachers' beliefs and knowledge about GenAI significantly impact implementation effectiveness. Zhai (2024) proposes a framework categorising teachers into roles-Observer, Adopter, Collaborator, and Innovator-representing different levels of GenAI engagement. Teacher self-efficacy regarding technology significantly shapes teachers' inclination to incorporate AI tools (Gado et al., 2022) and significantly reduces their anxiety towards technology use (Zhong et al., 2024). Additionally, Wang et al. (2024) draw together existing evidence to observe that teachers with higher levels of technology self-efficacy are more likely to perceive the usefulness of technology, which in turn positively impacts their performance expectancy. They are also more open to adopting innovative educational concepts and inclined to explore diverse teaching methods that incorporate new technologies. Critical factors in PST engagement may be perceived usefulness and ease of use, as a study of higher education students in the UAE suggests (Sallam et al., 2024).

Zhang et al. (2025) describes how structured practice with AI systems helps PSTs develop adaptive teaching approaches. However, a recent analysis conducted by Handa et al. (2025) on anonymised student conversations on Claude.ai found that nearly half (~ 47%) of student-AI conversations were Direct-seeking answers or content with minimal engagement, suggesting many users uncritically accept AI outputs rather than engaging in meaningful dialogue.

Son (2024) identified distinct 'classes' of noticing behaviours among PSTs using AI chatbots (high, medium and low-level noticing), finding that chatbot interactions enhanced their ability to notice and respond to specific student behaviours through 'simulated rehearsals' and quasi real-world experiences. This approach appears particularly valuable for developing behaviour management strategies. Yang and Chen (2023) observed empirically that PSTs prioritise responsiveness and adaptability over perfect replication of student behaviour, with perceived usefulness for specific teaching tasks being a stronger predictor of adoption than technical sophistication.

Effective implementation of chatbots for behaviour management training requires understanding complex interactions between personal factors (PST beliefs and knowledge), behavioural factors (practice strategies), and environmental factors (simulation design). This triadic relationship aligns with Bandura's SCT, particularly Triadic Reciprocal Determinism, providing a comprehensive framework for examining how PSTs engage with chatbot simulations.

3. Theoretical framework

The theoretical framework guiding the study is Bandura's SCT: (Bandura, 1997; 2001; 2006b). A central tenet of SCT is Triadic Reciprocal Determinism, which posits that human learning and performance are shaped by dynamic, bi-directional interactions among personal, behavioural and environmental factors. In SCT, personal factors such as students' beliefs about technology, behavioural factors such as technology use, and environmental factors, such as the realism of a simulation, interact dynamically. To illustrate, a high-fidelity simulation of a classroom setting (environment), may increase engagement (behavioural factor), which in turn may increase student confidence in instructional and behaviour management strategies.

In this study, triadic reciprocal determinism provides a potentially useful lens for investigating PSTs' experiences with a chatbot designed to simulate low-level student misbehaviour as part of their preparation for managing real classrooms. Each component of the triadic framework is likely to play a role in shaping how PSTs engage with the chatbot to develop confidence in their behaviour management skills and evaluate the effectiveness of the chatbot as a training tool.

Efficacy beliefs are considered among the most powerful personal factors in SCT, and they are particularly relevant when examining motivation, engagement and confidence in learning contexts (Schunk & DiBenedetto, 2020). These beliefs are domain and/or task-specific and include both self-efficacy and proxy efficacy. In this study, self-efficacy refers to PSTs' confidence in their ability to successfully enact effective behaviour management strategies. Proxy efficacy refers to their belief in the chatbot's ability in carrying out tasks to support the development of their behaviour management skills, for instance, through providing realistic misbehaviour scenarios.

Self-efficacy is well-established in educational research due to its association with motivational variables including effort, perseverance and student choice (Pajares & Usher, 2008). The inclusion of self-efficacy in this study is important given that managing a classroom depends heavily on confidence and motivation (Woolfolk et al., 2005). Bandura (2001) identified four main sources of efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological states. In the context of this study, mastery experiences relate to successful interactions with the chatbot; vicarious experiences relate to modelling provided by the chatbot such as providing PSTs with a range of behaviour management strategies they may apply if they are unsure what to do; social persuasion may involve feedback from peers or instructors, and emotional states include reduced anxiety for managing a classroom after engaging with the chatbot.

Proxy efficacy, though less commonly studied, is increasingly important in technology-mediated learning environments (Hanham et al., 2014). It reflects students' beliefs that a technological tool, in this instance, a chatbot, can act on their behalf to help them develop their behaviour management skills. In everyday life, tools such as google maps or Grammarly function as technological proxies that carry out tasks on behalf of the user that traditionally would have been carried by a person, for example: proofreader. Similarly, in this study, the chatbot functions as a proxy for real classroom practice, simulating behaviour management scenarios that would typically unfold in live teaching contexts. Understanding PSTs' proxy efficacy offers insight into their beliefs in the capabilities of the chatbot to serve as a credible and effective training tool.

While efficacy beliefs are key personal factors, they operate alongside behavioural patterns and environmental features that also shape learning experiences. Behavioural factors may relate to how students engage with the chatbot such as experimenting with different behaviour management techniques including different approaches to de-escalation and motivational strategies such as positive reinforcement. Environmental factors include the design and functionality of the chatbot itself, particularly the extent to which it provides a realistic and responsive context that mirrors the types of classroom challenges PSTs are likely to face. The perceived authenticity of the simulation may play a critical role in determining engagement and learning outcomes.

This theoretical framing supports the study's exploration of both pre-and post-placement perspectives. Pre-placement perspectives reveal PSTs' expectations, assumptions and perceived readiness, while post-placement perspectives offer retrospective insights into whether and how the chatbot interactions supported real-world behaviour management. Examining both perspectives is valuable for understanding how expectations align with actual experiences and the extent to which chat-based training supports readiness for professional experience.

4. Research design

This study employed a qualitative descriptive approach to explore PSTs' experiences with a chatbot designed to simulate classroom management experiences. A qualitative design, supported by some quantitative survey data, was chosen to capture the depth and nuance of PST' reflections, particularly in relation to perceived benefits, limitations, and shifts in perception before and after professional experience placements. The use of qualitative data allowed for a rich understanding of how PSTs interpreted their engagement with the chatbot, in line with recommendations for exploratory studies involving educational technology in teacher preparation (Saldaña, 2021).

4.1 *Methods*

The PSTs completed two online surveys asking about their experiences interacting with the chatbot. Both surveys comprised 12 questions each with several questions in each aligned with key dimensions of Bandura's (1997) Social Cognitive Theory.

The first survey was administered after the students engaged with chatbot and prior to commencing their professional experience. This survey included items that captured students' enactive experiences with the chatbot, which is core mechanism of SCT (Bandura, 1997). Questions reflecting enactive experiences addressed students' immediate perceptions of the chatbot's perceived realism, psychological safety to experiment with classroom management strategies, and usefulness for building confidence in classroom management strategies. This survey also included a question asking students to rate their overall experience with the chatbot (1 = Not great; 10 = Awesome). The use of a 10-point scale provided a finer-grained response range, consistent with Bandura's (2006a) recommendation that self-report measures employ ten or eleven response points to capture nuanced variations in judgement.

Questions in the second post placement survey focused on the extent to which students' experiences with the chatbot translated to authentic classroom experiences. It included questions probing which aspects of classroom management were strengthened through engagement with the chatbot, and which areas the chatbot did not adequately prepare them for. The second survey also contained four questions regarding students' self-efficacy for classroom management (e.g., talking while the teacher is speaking, leaving one's seat without permission, disrupting classmates). The items were measured on a 10-point scale ranging from 1 'strongly disagree' to 10 'strongly agree'. Self-efficacy is key personal factor within the framework of Social Cognitive Theory (Bandura, 1997).

Face and content validity were established through expert review. Three academic experts with experience across educational psychology and digital learning, two with extensive experience in survey validation studies involving self-efficacy, reviewed surveys 1 and 2 for item clarity, coherence and theoretical alignment with Social Cognitive Theory. Minor wording revisions were made based on the feedback provided. Although the study employed a qualitative descriptive design and no inferential tests were conducted, internal consistency was assessed for the self-efficacy items measured in survey 2. The Cronbach's alpha was 0.93, indicating excellent internal reliability (Hair et al., 2019) and supporting the coherence of the self-efficacy for classroom management construct.

Discussion of the use of the chatbots during tutorials was also recorded and forms a small part of the data results and discussion section as does a chatbot interaction with one of the PSTs.

4.2 *Chatbot design*

The system used was Cogneti. The chatbot prompts were designed by the authors, who are all university lecturers, with the majority teaching PSTs. The name of the chatbot is Jamie, a year 9 student, who was designed to be gender neutral to allow the PSTs to decide the gender although the system referred to Jamie as a male. Jamie was designed to exhibit low level inappropriate behaviours congruent with the typology of classroom behaviours described in De Nobile and Yeates (2025), such as making unnecessary noise and intentional disobedience. The chatbot was designed to resolve an issue within three to five turns.

4.3 *Participants*

Three universities participated in the project. At University A there were 65 PSTs enrolled with 58 PSTs completing the first survey and 40 completing the second survey. For University B, 113 students were enrolled with 51 PSTs completing the first survey and 11 PSTs completing the second survey. For University C, 60 PSTs were enrolled in the subject with 12 PSTs completing the first survey with 0 PST completing the second survey. The uneven response rate does limit the generalizability and weight of the findings. The uneven response rate was due to students from university B being on break while students from university C had not completed their placement during collection of the data post placement. This was the first time students had access to a chatbot as part of their degree. Students were asked in tutorials if they had any experience using chatbots outside of university and the majority had none. Ethical clearances were approved by all universities for the PSTs to be involved in the research project.

4.4 *Analysis*

Semi-structured survey responses were analysed thematically, following Braun and Clarke's (2006) six-phase framework for thematic analysis. This approach facilitated an inductive exploration of emerging patterns in the data while remaining grounded in the participants' own language and perspectives. The codes were developed using Bandura's Social Cognitive Theory (Bandura, 1986; 1997; 2001) as a guiding framework to identify key constructs such as self-efficacy, proxy efficacy, mastery, vicarious learning, observational learning, and self-regulation, thereby ensuring that the thematic analysis was conceptually anchored in established theory.

4.5 *Limitations*

The study relied heavily on self-reported survey responses, which may be subject to social desirability bias, recall inaccuracies, or misinterpretation of questions. Limited observational or performance-based data were drawn upon. Participation in the surveys was voluntary, with variable response rates across universities and between pre-and post-placement stages. This introduces potential bias, particularly as those who had more positive or negative experiences may have been more likely to respond.

5. Results and discussion

The PSTs were surveyed before they went on their professional experience placement and asked to rate their experience of interacting with this chatbot. The mean score for the whole sample was 7.48 indicating students generally had positive perceptions of chatbot use. Overall, the data pointed to a strong level of satisfaction with the chatbot among the PSTs.

The open-ended responses in surveys one and two were analysed thematically using a deductive-inductive approach informed by Bandura's (1997) Triadic Reciprocal Determinism. Three primary coding categories were established, personal, behavioural and environmental factors which align with the factors outlined in Triadic Reciprocal Determinism model. Within these, sub-factors emerged inductively from participants reflections (see Table 1). Two researchers coded the data independently and resolved discrepancies until consensus was reached.

Table 1. Coding framework based on Triadic Reciprocal Determinism (TRD)

Survey and TRD code	Example of initial codes	Final theme
Survey 1: Behavioural	Trying alternative strategies; Learning through trial and error	Safe to experiment
Survey 1: Personal	Increased confidence; Greater sense of preparedness and confidence through practice and feedback	Confidence in using the chatbot
Survey 1: Personal	Improved understanding; Analysing relationships between strategies and behavioural outcomes	Supporting understanding of behaviour management strategies
Survey 1: Environmental	Simplified behaviours; Limited behaviour range	Overcompliance and predictability
Survey 1: Environmental	Fast conflict resolution, Immediate compliance	Unrealistic speed of resolution
Survey 2: Environmental	Simplified behaviours; Limited behavioural range; Lack of unpredictability; Missing behavioural severity	Perceived lack of realism and behavioural complexity
Survey 2: Environmental/personal	Overreliance on textual dialogue; limited engagement or perceived relevance of non-verbal cues	Lack of emotional, non-verbal and relational cues
Survey 2: Behavioural/personal	Inability to multitask; Absence of interruptions	Did not simulate timing, disruptions or multitasking demands

In analysing the data, there were three main positive aspects that the PSTs commented on in their interactions, which include feeling safe to experiment, having confidence in using the chatbot, and that it supported their understanding of behaviour management strategies. There were aspects of the chatbot the PSTs felt were limiting and these included overcompliance and predictability.

5.1 *Safe to experiment*

The great majority of PSTs (n = 88, 74%) reported that they felt safe while interacting with Jamie to trial different behaviour management strategies. A breakdown by university is presented in Table 2. Without the pressure of real-world consequences, PSTs felt more confident experimenting with a range of responses. As PST1 (University B) explained: "Because the chatbot is not a real person, I don't need to be afraid of hurting it". This sense of psychological safety aligns with Bandura's (1986) Social Cognitive Theory, which highlights the importance of environmental factors in shaping human behaviour and personal beliefs, including the development of self-efficacy. By interacting with a non-human, judgment-free platform, PSTs were able to engage in enactive learning experiences that contribute to mastery experiences, where they could test strategies, see simulated consequences, and improve their responses. As PST2 (University A) noted: "The bot isn't a real student with real consequences if I messed up anything".

Table 2. PST reported safety with interactions by university

Cohort	n	%
University A	42	72
University B	37	73
University C	9	75

Such enactive learning experiences are critical for the development of mastery experiences, which is generally considered the most influential source of self-efficacy (Bandura, 1997). They provide students with opportunities to act, receive feedback, and interpret the outcome as success or failure. PST3 (University A) echoed this benefit, sharing that: "As Jamie isn't human, I felt pretty safe trying out whatever strategy I wanted". The PSTs in University A echoed these comments and discussed they could try ideas they did feel confident about trying out in the classroom. These safe, low-stakes practice opportunities enabled PSTs to develop and refine skills in a way that felt supportive rather than evaluative. PST4 (University A) similarly noted: "Good-Example of de-escalating and practicing responses without consequence", highlighting how the simulation allowed for active skill development without the pressure of real-world repercussions.

By reducing emotional risk and offering consistent, scenario-based feedback, the chatbot provided a psychologically safe environment for PSTs to grow in confidence and competence in behaviour management. This finding is supported by recent literature on the use of AI chatbots in education. For instance, Labadze et al. (2023) found that AI-powered chatbots offer students personalised learning experiences and skill development opportunities. Similarly, Okonkwo and Ade-Ibijola (2021) highlighted that chatbots provide immediate assistance and quick access to information, enhancing student learning outcomes. Wollny et al. (2021) also noted that chatbots serve as valuable educational tools, capable of improving student learning outcomes across various domains.

5.2 *Confidence in using the chatbot*

Engaging with the chatbot through trial and error, receiving immediate feedback, and practising in a risk-free environment was found to enhance PSTs' confidence in behaviour management strategies. More than half of the participating PSTs (n = 75, 61%) reported increased confidence in the survey. A breakdown of PST confidence by university is presented in Table 3.

Table 3. PST increased confidence by university

Cohort	*n*	%
University A	36	62
University B	32	63
University C	7	58

As PST4 (University A) stated: "Practice builds confidence". These low stakes practice opportunities allowed PSTs to test strategies, observe simulated consequences, and refine their responses. These experiential learning experiences reflected the interplay of behavioural, environmental and personal factors described by SCT, in which repeated, low stakes engagement in simulated tasks can foster self-efficacy when outcomes are perceived as successful (i.e., mastery experiences). During tutorials, the PSTs were able to work in pairs and discuss strategies which helped build their confidence.

Immediate feedback was another critical component contributing to increased confidence. PST5 (University B) noted: "Getting responses made me more confident as I was able to reflect on my reactions". This comment highlights how environmental affordances, such as timely feedback, can influence personal beliefs such as self-efficacy, consistent with Bandura's model of Triadic Reciprocal Determinism. PST5's reflection may also signal emerging proxy efficacy, as it suggests that they attributed their learning to the nature of chatbot's responses, which effectively supported their reflection. This indicates that the tool was perceived capable of providing feedback that contributed to their preparedness for behaviour management. These insights from the participants align with previous research. For example, Hanshaw et al. (2024) found that AI chatbots' immediate feedback and personalised assistance reduced students' anxiety and uncertainty, thereby enhancing self-efficacy. Furthermore, Yin et al. (2021), emphasised that the way chatbots handle errors and provide feedback significantly influences learner emotions, with effective error handling fostering positive feelings and confidence.

While the chatbot's impact on confidence varied among individuals, with some experiencing modest gains, it nonetheless contributed to a sense of preparedness. As PST6 (University C) mentioned: "Although it didn't dramatically increase my confidence, it helped me feel more prepared for behaviour management". This reflects the dynamic interplay between behavioural experimentation, environmental design, and personal beliefs, which are core to SCT. Importantly, the insight provided by PST6 suggests that even modest gains in confidence can contribute to a sense of classroom readiness from engagement with simulation tools, highlighting their value.

The interactive nature of the chatbot, offering immediate feedback and dialogue, was highlighted as a unique and beneficial feature. PST8 (University A) remarked: "It was a pretty unique experience… having immediate feedback and dialogue is quite interesting". This aligns with findings from Zagami (2024), who investigated the role of AI chatbots in assisting PSTs and found that such tools can enhance understanding and preparedness.

5.3 *Supporting understanding of behaviour management strategies*

Sixty-six percent of the PSTs (n = 79) reported that the chatbot helped them to develop their behaviour management strategies. Table 4 shows that the proportions of students indicating increased confidence were very similar.

Table 4. PST increased confidence by university

Cohort	n	%
University A	38	65
University B	33	65
University C	8	67

The experience provided the PSTs with practical strategies applicable in real classroom settings. PST7 (University C) noted: "It gave me ideas to use in the real-life classroom setting". This process aligns with triadic reciprocal determinism, which emphasises the bi-directional interaction between personal, behavioural factors in shaping learning. In this context, PSTs engaged in behavioural experimentation with the chatbot, while the environment provided timely feedback and generally realistic responses, which are factors that contributed to enhanced personal confidence. During tutorials, the PSTs were able to discuss strategies with the tutor and consider which ones might be most effective. These discussions linked to content that has been discussed in the tutorials. While the chatbot did not model behaviours in the traditional sense, it presented learners with simulated responses to their inputs, allowing them to infer the consequences of specific strategies. This process blends enactive learning (through direct engagement) and elements of observational learning.

The opportunity to experiment with new strategies in a simulated, risk-free environment allowed the PSTs to explore and refine their approaches. PST9 (University A) reflected: "It gave me an opportunity to say things and try strategies that I've never used before". This reflection highlights how environmental factors, specifically the design of the chatbot, contributed to the students' personal beliefs by creating opportunities to experiment, which in turn influenced their behaviour as they tried strategies they had never used before. This example demonstrates the reciprocal nature of Social Cognitive Theory, wherein the environment, behaviour, and personal beliefs continuously influence and are influenced by one another.

Furthermore, the chatbot encouraged reflective practice, enabling PSTs to analyse the outcomes of their interactions. PST10 (University B) observed: "It lets you see how much more positive the interaction is if you actually think it out and respond logically". This comment encapsulates key aspects of self-regulation in SCT. The student is observing the consequences of their behaviour, recognising that thoughtful, logical responses lead to more constructive interactions. This reflects self-observation and evaluation, key aspects of self-regulation. (Panadero, 2017; Schunk & Greene, 2018).

These findings are supported by recent research on the integration of AI chatbots in education. For instance, Yin et al. (2024) conducted a systematic review and found that interactions with educational chatbots can induce positive emotions and enhance students' learning motivation. Similarly, Al-Abdullatif (2023) explored the effectiveness of AI course assistants and observed that they provide immediate feedback and personalised assistance, which are crucial for effective learning experiences. Additionally, Zagami (2024) investigated the role of AI chatbots in assisting PSTs and found that such tools can enhance understanding and preparedness.

PSTs found Jamie's dialogue and the scenario context to be realistic and reflective of student behaviour, enhancing the authenticity of the simulation. PST2 (University A) shared: "Jamie's responses were very realistic, and it was cool how well my input was understood". This realism is crucial, as authentic interactions in simulations can significantly enhance the learning experience by providing PSTs with scenarios that closely mirror actual classroom situations. PST11 (University A) remarked: "The scenarios reminded me of real experiences from placement", highlighting the relevance of the chatbot's scenarios to real-world teaching experiences.

The perceived authenticity of the chatbot aligns with Bandura's concept of observational learning. While the simulation does not offer traditional observational learning, wherein individuals passively observe a model's behaviours and its consequences, it does provide opportunities for PSTs to engage in dynamic interactions with simulated student responses. These exchanges enable PSTs to observe and internalise effective teaching strategies, which informs their future behaviour in actual classroom settings. PST12 (University B) noted: "The responses from Jamie are very realistic and something that I do expect from very disruptive students in class" indicating that the chatbot effectively emulates challenging student behaviours, allowing PSTs to practise appropriate responses.

This alignment with SCT is further supported by research indicating that AI-based chatbots can be effective tools for developing responsive teaching practices in PSTs, as they provide controlled, emotionally safe, and feedback-rich simulated environments. These environments allow PSTs to repeatedly practise and reflect on strategies in realistic classroom scenarios without the risk of real-world consequences, an essential condition for observational learning, enactive mastery, and self-regulation (Son, 2024). Additionally, studies have shown that teaching simulations using student chatbots with different attitudes can impact PSTs' efficacy, providing them with opportunities to refine their teaching strategies in a controlled environment (Bhowmik et al., 2022). By providing a realistic and dynamic platform for practising behaviour management techniques, the chatbot served as an effective tool for dynamic interaction and enactive learning, supporting skill development through practice, feedback and reflection. As PST6 (University C) noted: "It is a good simulation of how students can behave", underscoring the value of such tools in teacher education.

5.4 *Overcompliance and predictability*

A small proportion of the PSTs reported that Jamie's behaviour was overly compliant and predictable, lacking the resistance and unpredictability of real students (n = 21, 17.3%). The university focused results in Table 5 again show little difference among PSTs from the different programs PST3 (University A) commented: "It was somewhat helpful, but I think that a real student wouldn't give in so easily", while PST 13 (University A) said: "Jamie was a bit too compliant to be realistic". According to SCT, the development of self-efficacy relies heavily on mastery experiences, particularly those involving the successful navigation of complex and/or challenging tasks. When chatbots respond too agreeably, they limit the complexity of the learning scenario and reduce the opportunities for PSTs to practise managing escalated or ambiguous situations. Bhowmik et al. (2022) noted AI chatbots used in teacher education often lack behavioural variation, which can diminish their effectiveness as training tools.

Table 5. Perceived chatbot overcompliance by university

Cohort	*n*	%
University A	10	17
University B	9	18
University C	2	17

5.5 *Unrealistic speed of resolution*

An even smaller group (n = 10, 8%) noted that the chatbot resolved behavioural scenarios too quickly to feel realistic. The breakdown by institution in Table 6 revealed no proportional differences. PST13 (University B) noted, "Jamie de-escalated too fast. It didn't feel real", and PST14 (University A) added: "Everything wrapped up in just a few lines of text, which is not what happens in the classroom". The PSTS also commented on this aspect when using the chatbot during tutorials. These comments point to a design limitation, as the chatbot was intentionally scripted to resolve scenarios within 3-5 turns.

Table 6. Perceived unrealistic speed of resolution by university

Cohort	n	%
University A	5	8
University B	4	8
University C	1	8

Below we share one interaction a PST had with Jamie which illustrates the typical path of resolution. Note that there are five turns:

(Setting: Classroom, Jamie is sitting at a desk, arms crossed, staring at the teacher with a defiant expression).

Jamie: Why do I have to follow these rules? They're so pointless.

Teacher: The rules are to protect you and other students. They are also there to help keep you involved in learning?

Jamie: (Leans back in the chair, rolling eyes) I guess, but they still feel like a waste of time. Why can't we just do things our own way?

Teacher: People.

Jamie: (Starts tapping fingers on the desk, not really paying attention).

Yeah, but who really cares? It's not like anything bad happens if we don't follow them.

Teacher: People's own way of doing things can conflict with each other. We want a consistent process to ensure everyone is treated fairly. I hope you understand.

Jamie: (Sighs, stops tapping fingers and looks at the teacher).

Fine, I get it. I'll try to follow the rules. But it's still kinda annoying, you know?

Teacher: Well, practice following the rules. I am sure after you do so, they won't be so annoying.

Jamie: (Nods slowly, relaxing a bit).

Alright, I'll try. Maybe it won't be so bad if I just get used to it.

Such a rapid resolution as illustrated may undercut self-regulated learning, which involves managing ongoing, uncertain, or emotionally charged situations (Bandura, 2001). Lee (2005) found that realistic timing and behavioural progression are essential for building effective questioning and reflection skills in PSTs. A main reason this aspect occurred was the way the chatbot had been programmed by us. The instruction was to resolve the issue in three to five turns. In future iterations of this is one aspect we will need to carefully consider.

6. Results post professional experience placement

The post-placement survey results showed a shift in perceptions of chatbot use, even though the tool was not actively used during placement. The mean to 5.47, compared to the pre-placement scores (mean of 7.48). This suggests that after experiencing the realities of classroom teaching, PSTs became more cautious or uncertain about the potential value or practicality of the chatbot. This section of the article focuses on why the PSTs felt the chatbot was not as effective as they believed it to be before going on their placement. Breakdowns of those who responded to each question by institution have been collated in Table 7 which suggests that there were no notable differences between the two university cohorts that completed the second (post-professional experience) survey.

Table 7. PST responses by question and university

Chatbot experiences	*n*	%
Perceived lack of realism and behaviour complexity		
University A	28	70
University B	8	73
Lack of emotive, non-verbal, relational cues		
University A	7	12
University B	6	12
Did not simulate timing etc…		
University A	4	10
University B	1	9

6.1 *Perceived lack of realism and behavioural complexity*

The PSTs overwhelmingly felt that the chatbot was too simplistic to reflect the range, severity, and unpredictability of actual student inappropriate behaviour (n = 36, 72%). PST15 (University A) commented: "Jamie provides 'perfect world' feedback. It's easy to act like the right thing is working, but in real life the students wouldn't react that way". Similarly, PST16 (University B) remarked: "Some students have no respect or care about how you want them to behave… Jamie doesn't emulate that properly". These perceptions reflect a gap between the simulated environment and the real-life stressors and variability of classroom settings.

An example of an interaction a PST had with Jamie that lacked this realism is set out below: The setting is a classroom. Jamie has been making unnecessary noise by yelling and shouting during a group activity.

Jamie: (yelling) Why do I have to follow these rules? It's so boring!

Teacher: Jamie, our rules are strict in this classroom, you are not to disrupt others.

Jamie: (rolls eyes) Whatever. It's still boring. Why can't we do something fun for once (kicks chair)?

Teacher: why is it boring is it something I'm doing?

Jamie: (shrugs) I don't know, it's just boring. And no one else cares about these rules.

Teacher: everyone else is acting according to the rules. its just you who isn't.

Jamie: (sighs) Fine, I'll be quiet. But this better not take forever.

Social cognitive perspectives (Zee & Koomen, 2016), as well as scholarship on teaching practice (Grossman et al., 2009) suggest that effective learning and preparation for the teaching profession occurs when individuals experience authentic, emotionally engaging challenges that mirror the complexity of actual teaching. When these are absent, the learning experience may fail to produce the vicarious and enactive mastery experiences required to develop robust self-efficacy. Research by Freeman and Lee (2024) supports this, noting that teacher training simulations must reflect the unpredictable, emotionally charged reality of classrooms to fully prepare PSTs.

Future design iterations should focus on increasing behavioural complexity and emotional realism within the chatbot to better simulate authentic classroom challenges. This could be achieved by integrating forced failure scenarios where the PST's chosen strategy does not immediately succeed, prompting adaptive problem-solving and persistence. Longer de-escalation cycles should also be introduced, requiring sustained engagement and multiple interventions before the simulated student calms down, thus mirroring the emotional fatigue and patience needed in real classrooms.

Additionally, concurrent demands such as managing multiple disruptive students or balancing instructional delivery with behaviour management could be embedded to recreate the cognitive load teachers face in dynamic environments. Finally, incorporating emotionally varied and unpredictable student responses, informed by real classroom data, would enhance the authenticity of interactions and provide richer opportunities for PSTs to develop self-efficacy and reflective practice.

6.2 *Lack of emotional, non-verbal and relational cues*

Twelve percent (*n* = 13) of PSTs reported that the chatbot lacked emotional, non-verbal, and relational cues, noting that Jamie did not adequately simulate tone, body language, or relational dynamics essential for realistic classroom interactions. PST17 (University A) explained: "Whilst I know Jamie has features for non-verbal strategies built in, this didn't feel like the strong point… I didn't have the opportunity to make mistakes of non-verbal nature". Perhaps referring to how a student like Jamie would sound in the real world, PST18 (University A) added: "Jamie doesn't include the tonal component of behaviour management".

As illustrated in the example interaction provided earlier, there were non-verbal cues provided to the PSTs. Here are the non-verbal cues that were provided:

Jamie is sitting at a desk, arms crossed, staring at the teacher with a defiant expression.

Jamie: (Leans back in the chair, rolling eyes).

Jamie: (Starts tapping fingers on the desk, not really paying attention).

Jamie: (Sighs, stops tapping fingers and looks at the teacher).

In analysing the data, there were very few PSTs who responded to the non-verbal cues or used their own non-verbal cues. Non-verbal cues had been covered during tutorials and forms part of the Australian Institute for Teaching and School Leadership (AITSL) standards. The standard is-3.5 Use effective classroom communication. At the graduate level the descriptor is: Demonstrate a range of verbal and non-verbal communication strategies to support student engagement. PSTs not engaging with the cues weakened the chatbot's value as a relational model, which is critical in SCT for observational learning-especially in emotionally nuanced classroom interactions (Bandura, 2001). As Picard (1997) argues, effective tutoring systems must not only provide verbal exchanges but also reflect affective and social cues to develop deeper teacher-learner engagement and empathy.

This finding that PSTs largely ignored non-verbal cues despite their inclusion in the simulation is significant as it highlights a gap between theoretical understanding and applied classroom practice. A lack of response suggests limited transfer of this knowledge into simulated teaching contexts. This may indicate that PSTs are overly focused on verbal and cognitive aspects of interaction, neglecting the affective and relational dimensions that underpin classroom engagement. It also suggests that current simulation designs may not sufficiently prompt PSTs to attend to or reflect on embodied communication. For future PST training, tutorials should explicitly scaffold non-verbal responsiveness within simulations such as through post-simulation debriefs, replay analysis, or guided reflection tasks that draw attention to tone, posture, and facial expression.

6.3 *Did not simulate timing, disruptions or multi-tasking demands*

Almost ten percent of PSTs (*n* = 5, 9.5%) reported that the chatbot did not adequately simulate the timing, disruptions, or multi-tasking demands of real classroom environments. PST19 (University B) explained: "The chatbot is too linear. In real life, you're juggling noise, time, space, and emotion all at once". This concern was reinforced by numerous PSTs who described the chatbot experience as overly simplistic, predictable, and detached from the chaotic reality of actual classrooms.

As PST20 (University A) noted: "The chatbot was not nearly as defiant as the kids typically are. Jamie seemed to give up their issue after a brief conversation, whereas real kids can be extremely stubborn". PST21 (University A) pointed to the lack of parallel demands: "Jamie is easier to deal with as I don't have 25 other kids to manage at the same time". These limitations are critical, as real-world teaching demands rapid decision-making, emotional regulation, and the ability to address simultaneous, often conflicting, student needs. Importantly, these observations point to limitations in the current design of the chatbot, rather than chatbot technology itself.

Moreover, several students highlighted the chatbot's failure to replicate environmental factors and social cues, with PST22 (University B) observing: "Jamie didn't provide the opportunity to read emotional cues such as body language, facial expressions, or tone. In a real classroom, you rely on these constantly". PST17 (University A) shared, "The sheer noise and sensory overload in a classroom-keeping tabs on multiple things-is impossible to simulate with the chatbot". These missing elements further limited the realism of the simulation and may have constrained the transferability of learning to real-world teaching environments.

Such feedback suggests that while the chatbot may offer a low-risk space to trial de-escalation techniques or rehearse dialogue, it falls short in fostering the situational awareness and cognitive flexibility demanded by actual classroom settings. These capabilities are not only essential to authentic teaching practice, but also central to Bandura's SCT (1997), which emphasises how adaptive personal beliefs and behaviours emerge through continuous interaction with complex learning environments. The absence of true classroom dynamics also undermines the development of adaptive expertise. For instance, the chatbot rarely presented group-based misbehaviour or peer-influenced disruption. PST22 (University A) reflected: "Kids are rarely disruptive on their own-it's usually a group dynamic. Jamie's scenarios didn't capture that at all". PST 17 (University A) noted that the simulation didn't challenge them to assess which behaviours to prioritise: "It didn't help me figure out what to do when multiple students were being rude or off-task, it was always just one student at a time".

In response to these critiques, it is clear that while the chatbot can play a formative role in introducing behavioural strategies, it must be integrated into a broader pedagogical approach. For instance, real-time roleplays, multi-student scenario branching, or augmented simulations could better scaffold the experiential learning needed for complex behaviour management. PST22 (university A) insightfully concluded, "The chatbot helped me think, but it didn't make my words have weight in a real class. Real kids respond to tone, timing, and relationship-all things you can't model with Jamie".

Dittrich et al. (2022) reinforce this perspective, arguing that exposure to authentic, emotionally rich, and multifactorial teaching experiences is essential for developing the practical and psychological competencies of future teachers. Without these immersive challenges, tools like chatbots risk remaining theoretical rather than transformational.

7. Conclusions

This study has explored how an AI-powered chatbot can support PSTs in developing behaviour management skills through simulated, low-risk interactions. Grounded in SCT, the findings highlight that the chatbot offered initial benefits by fostering self-efficacy, encouraging experimentation, and providing immediate feedback. PSTs reported feeling more confident and prepared to manage student behaviour after interacting with the chatbot, particularly before their professional placements.

However, post-placement reflections revealed limitations. While PSTs appreciated the chatbot's structure and intent, many found the interactions lacked the complexity, emotional nuance, and unpredictability that were more likely to occur in real classrooms. In addition, for a small number of PSTs the tool's linear dialogue, simplistic behavioural modelling, and absence of non-verbal cues constrained its perceived realism and practical value after real-world teaching experiences. These findings suggest, in part, some limitations in the design of the chatbot.

These findings suggest that while AI chatbots can serve as effective entry-level tools for behaviour management training, they must be integrated into broader, multi-modal teacher education programs to maintain their relevance and impact. Enhancing behavioural diversity, emotional authenticity, and contextual complexity within chatbot simulations will be essential for their continued development. Ultimately, chatbots should not replace real-world experience, but rather complement it by scaffolding foundational skills in a supportive, iterative learning environment.

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Conflict of interest

The authors state that they have no conflicting interests.

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