Interactive Technology and Smart Education

Healthcare educators' perspectives on artificial intelligence driven virtual patients for teaching communication skills

Patrick Bowers
Department of Audiology and Speech Pathology, The University of Melbourne, Parkville, Australia

Tracii Ryan
Centre for the Study of Higher Education, The University of Melbourne, Parkville, Australia

Kelley Graydon
Department of Audiology and Speech Pathology, The University of Melbourne, Parkville, Australia

Jey Han Lau
School of Computing and Information Systems, The University of Melbourne, Parkville, Australia, and

Dani Tomlin
Department of Audiology and Speech Pathology, The University of Melbourne, Parkville, Australia

Received 17 February 2025
Revised 30 May 2025
Accepted 9 June 2025

Abstract

Purpose – Artificial intelligence (AI) driven virtual patients (VP) are a novel learning tool that may be used to develop healthcare students' communication skills. Despite this, lack of investigation into educators' viewpoints of AI tools presents a critical oversight, given their crucial role in successful adoption. This study aimed to establish healthcare educators' attitudes towards AI-driven VPs for teaching communication skills and identify educators' preferences in terms of design and implementation features.

Design/methodology/approach – Participants were 15 educators representing nine healthcare disciplines. Data were collected using a brief online survey and in-depth individual interviews.

Findings – Five themes were established. Educators held mostly positive attitudes towards AI-driven VPs, however their willingness to adopt this technology related to concerns around workload, views of AI and controlled, proper use. Preferred design features included realistic, multimodal interactions with varied cases and objectives. Providing feedback to students and using VPs as supplementary activities were viewed as important for implementation.

Originality/value – This study provides a vital understanding of key factors that should be considered when preparing for use of emerging AI tools to develop healthcare students' communication skills. It addresses the gap in research on educators' attitudes towards using AI-driven VPs as a teaching tool. Importantly, this study

Funding: This research was supported by an Australian Government Research Training Program Scholarship.

Conflict of interest: The authors have no conflict of interest to disclose.

Interactive Technology and Smart Education

1741-5659
DOI 10.1108/ITSE-02-2025-0036

reports factors that influence educators' willingness to use AI-driven VPs and provides valuable insights for practical design and implementation.

Keywords Artificial intelligence, Communication, Virtual patient, Interdisciplinary, Educators

Paper type Research paper

Introduction

Artificial intelligence (AI) offers a compelling way to deliver active learning opportunities that afford development of key clinical skills to healthcare professions students, including patient-centered communication. One innovative solution to support such communication skill development is an AI-driven VP, which can allow students to practice conversations outside of a traditional placement environment. Providing experiential learning opportunities to support students in developing these skills is vital to avoid negative consequences of substandard clinical communication, such as poor health outcomes and malpractice claims (King and Hoppe, 2013). Digital representations of patients that can dynamically interact with students are now able to be created and deployed into various health professions curricula thanks to the rapid progression in the AI subfield of natural language processing and advances in large language models specifically (Bowers *et al.*, 2024).

Differing modalities and technical features have recently emerged in VPs, with text or speech-based interactions possible, while VPs can now take on the visual appearance of a text window, avatar, virtual reality (VR) animation or social robot (Bowers *et al.*, 2024; Borg *et al.*, 2025; Gutiérrez Maquilón *et al.*, 2024). A range of sources of AI-driven VPs have also emerged, including various bespoke solutions by healthcare educator or researcher groups (Shorey *et al.*, 2020; Suárez *et al.*, 2022; Xu *et al.*, 2024; Chan and Li, 2023) as well as commercial offerings such as VP Simulator (Geeky Medics, 2024), SimConverse (SimConverse, 2024) and Spark (PCS.ai, 2025). Although more options are being created, further developments in the accuracy and seamlessness of speech-based systems and the emotional nuance and responsiveness of AI-driven VPs have been encouraged (Xu *et al.*, 2024; Borg *et al.*, 2025; Gutiérrez Maquilón *et al.*, 2024; Shorey *et al.*, 2020). Despite the technological possibilities, few research studies have directly asked educators across disciplines what they believe is important to consider for the development and implementation of such learning tools (Bowers *et al.*, 2024).

Understanding educators' perspectives of AI learning technologies is vital, given the potential for strong emotional responses towards their use and calls for further research into ideal approaches for their integration in tertiary education (Kizilcec, 2023; Zawacki-Richter *et al.*, 2019). It is pertinent to focus on institutional factors that encourage adoption of simulation-based learning activities (Issenberg, 2006), including the comfortability of educators to use and teach with AI. The Unified Theory of Acceptance and Use of Technology (UTAUT) outlines that performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) are key factors that facilitate acceptance of new technologies by users (Venkatesh *et al.*, 2003). Educators are therefore critical to successful adoption of AI-driven VPs, given SI relates to students' views around important people believing a particular technology should be used and FC refers to organisational and infrastructural supports of such technology (Venkatesh *et al.*, 2003). Considering this, we must understand the needs of educators to achieve trust of such technologies, in terms of capability and adoption (Nazaretsky *et al.*, 2022). While investigating the capabilities of technology to drive learning in clinical education environments is key (Moro *et al.*, 2020), there is also a need to ensure that educators are involved in constructing a pedagogically sound and strategic implementation plan. Too often, the approach to adopting new

educational technologies taken in health professions education is impromptu and unsystematic (Wozniak *et al.*, 2018). To achieve impactful and enduring integration of new technology, such as AI-driven VPs, we need to better understand the views of health professions educators.

Evidence suggests interdisciplinary input from various educators, researchers and technical experts can strengthen the effectiveness of AI learning tools (Luckin and Cukurova, 2019). Neglecting educators' opinions could lead to poor design, ineffective implementation and a lack of trust in such tools, limiting their potential benefits for students. Given similar applications of such tools across differing healthcare professions, this study aims to gain educator perspectives from multiple disciplines. This research will also draw upon the UTAUT as a theoretical framework that can guide understanding educators' attitudes towards accepting and using AI-driven VPs. To address identified research gaps, this study aims to answer the following research questions:

RQ1. What are educators' attitudes around the use of AI driven tools (i.e. Virtual Patients) for teaching communication skills?

RQ2. What are the key design and implementation features educators think should be considered when developing an AI driven VP for communication skill development?

Materials and methods

A mixed-methods approach was used for this study, with an online survey providing quantitative data and semi-structured interviews supplying qualitative data to further explore educators' views. This methodology was chosen to be able to deeply explore educators' perspectives through detailed responses in interviews and triangulate that with the survey data, to enhance the validity of our findings. This project received ethical approval from the University of Melbourne (project ID: 28293). Informed consent was obtained from all participants prior to data collection.

Participants

Healthcare educators were recruited from nine different entry-to-practice degrees at one tertiary institution using a maximum variation purposive sampling strategy. Educators were invited to participate via email if they were actively teaching into a healthcare degree and held any experience with teaching communication skills. Information about educators to determine suitability for participation was accessed from publicly available university profiles. Through our sampling strategy targeting different healthcare disciplines and experience levels, we aimed to capture a wide range of perspectives. Recruitment continued until data saturation was reached. Fifteen educators participated and demographic information about them is presented in Table 1.

Survey

Prior to being interviewed, educators completed a short survey hosted online using Qualtrics software (Qualtrics, Provo, UT) to collect demographic information and establish their broad views on communication teaching and learning, and the use of technology and AI (Appendix 1).

Table 1. Demographic characteristics of all educators ($n = 15$) in this study

Characteristic	Educator n (%)
Gender	
Female	11(73)
Male	4 (27)
Discipline	
Audiology	3 (20)
Dentistry	2 (13)
Medicine	1 (7)
Nursing	2 (13)
Optometry	2 (13)
Physiotherapy	1 (7)
Psychology	1 (7)
Social work	1 (7)
Speech pathology	2 (13)
Years of teaching experience	
Less than 3 years	2 (13)
3 6 years	4 (27)
7 10 years	4 (27)
11 15 years	4 (27)
16 20 years	0 (0)
21 years or more	1 (7)

Source(s): Authors' own work

Interview procedure

A semi-structured interview protocol was created by the research team, pilot tested by Author 1 with an early career Audiology educator and refined before data collection commenced (Appendix 2). Interviews were conducted online and audio recorded using Zoom Communications Inc. teleconferencing software.

Data analysis

A reflexive, inductive thematic analysis using methods described by Braun and Clarke (2006) was used to analyse interview data. This followed the process of: 1. Data familiarisation, 2. Coding, 3. Generating initial themes, 4. Reviewing and refining themes, 5. Defining and naming themes and 6. Writing up (Braun and Clarke, 2006). Author 1 performed iterative coding and initial theme generation, following a period of data familiarisation through editing transcripts generated by Kaltura Media. Initial notes about key discussion points were made during transcript editing by author 1. Once coding was completed (using NVivo software), these were arranged into preliminary themes. At this point, Author 2 independently reviewed the codes and initial themes and consultation occurred between the two authors until they were agreed about the content of each theme. Naming and refining themes with final written analysis was performed by Author 1.

Trustworthiness

Strategies to achieve trustworthiness are important to use when analysing qualitative data (Ahmed, 2024). To achieve credibility, the authors triangulated interview data with survey data and aimed to acknowledge and discuss any preconceived assumptions in relation to data collection and analysis, given their backgrounds in tertiary education. This reflexive process

involving peer debriefing was important to also establish confirmability and minimise the impact of any potential researcher bias on the final outcome of data analysis. We aimed to achieve dependability by documenting decisions made throughout the thematic analysis. To determine transferability, descriptions of our sampling strategy, methods and data have been provided.

Results

Descriptive statistics of survey responses

Educators were surveyed about their current communication-focused teaching activities, with the most used activities being clinical placements and lectures (by 80% of educators, respectively). Following this was workshops/seminars (73%), roleplay and group discussions (67%), observations (60%), standardised patients (33%) and finally VP (27%). Of our participant group, 60% reported being either very or extremely comfortable with using technology, while the remaining 40% felt not at all comfortable or neither comfortable nor uncomfortable. When it came to awareness of the capabilities of AI, 93% felt they were somewhat to moderately aware, with 7% being very aware. Sixty-seven percent of educators reported they had used an AI tool as part of their teaching practice, mostly using ChatGPT to create assignment rubrics, quiz questions, lesson plans, images or case studies, as well as use it to brainstorm, synthesise ideas and simulate a patient for students to practice case history taking.

Thematic analysis findings

*RQ1: What are educators' attitudes around the use of AI driven tools (*i.e. *Virtual Patients) for teaching communication skills?*

Theme 1: perceived value. Educators held mostly positive attitudes towards AI-driven VPs and described the potential value they might hold. A key benefit illustrated was providing students with more practical-based options for learning, which was seen as vital for the development of skills. Current opportunities for students to experientially develop skills for patient-centered care were viewed as limited and criticisms were drawn of peer role play activities, for example:

> When I get the students to do role playing […] it's highly reliant on the student who's playing the patient to make the process last. So, if they're like: "Do you have any pain?" "No." You're not going to get anywhere, (Educator 13, Nursing).

Accessing educators or actors to act as simulated patients instead was described as difficult and costly. Providing additional standardised virtual environments for equitable student practice was therefore seen as an improvement in helping students to reach communication competencies:

> I still think it's better than at the moment – students can only practice talking to a patient for three months a year on placement, if they get that placement. Whereas if we were using AI generated patients […] they could potentially do it all year around, (Educator 8, Social Work).

Educators thought VPs presented a low-pressure, safe environment, where students would be free to make mistakes with little consequence. This could lead to students joining clinical placements feeling less stressed or anxious than is currently noted by educators. They assumed student confidence and preparedness would consequently increase, given the additional chance to experiment and refine lines of conversation before needing to talk with a real patient. For these reasons, educators showed support of including VPs in their teaching practice and thought students would be open to the idea of using such tools.

In fact, some educators reported already experimenting with ChatGPT for clinical history taking practice within classes. However, these educators acknowledged limitations in the effectiveness of text-based ChatGPT to convey an authentic patient experience to students and therefore uncertainty around the value of this, with one educator commenting:

> We tried giving ChatGPT some history questions and getting it to answer as a patient and the answers were just well beyond [what] any normal human would actually say, (Educator 1, Audiology).

For this reason, a solution that was more bespoke was desired. Overall, educators perceived that some value and breadth could be added to programs through inclusion of AI-driven VPs.

Theme 2: willingness to adopt. Educators' attitudes towards adopting AI-driven VPs are related to their perceived value. If teachers didn't see value in this kind of technology, it was unlikely that they would be interested in incorporating it in their teaching:

> Implementation into the curriculum does sometimes depend on who's actually implementing it and whether they are a supporter or not of whatever it might be – because they have to be convinced that it's actually worth that effort, (Educator 7, Medicine).

Educators believed the creation and use of AI-driven VPs would take a lot of financial and temporal resources, with questions raised about how this was managed by institutions. Training on use and troubleshooting was seen as vital for successful adoption. If using these tools only added to educators' workloads, they were unlikely to support them:

> I think there'd be a bit of hesitancy around […] "How can I use it in a way that will be easy for me and not put extra burden on me as a teacher and not detract from or take away from something I'm already doing in terms of time?" (Educator 12, Psychology).

Most participants described a willingness to use AI-driven VPs yet felt that other educators may differ. Some speculated there was a subset of "early adopter" educators ready to accept VPs, while others would have concerns because they were an AI tool, with one educator suggesting that:

> The fact that it is AI perhaps would increase the hesitancy because again, I think there's a "Oh, this is new" and this resistance to it […] people conflating some current uses of AI in other contexts – the opposition to some of those uses – with educational uses, (Educator 9, Physiotherapy).

Educators thought some students may also be against the use of such tools for the same reason. Expanding further, concerns were raised about privacy and proper use of the technology, with educators advocating for guidance around these issues. Some felt that VPs need to be strictly controlled, both to avoid any inappropriate lines of conversation from the student or the VP itself and to ensure that data of patients and students was not accessed to make or improve software without explicit permission granted. In terms of negative consequences from using VPs, educators felt that over-reliance in replacement of other learning activities could lead to poorer clinical skills. Concerns arose around students extrapolating too much from VP-based experiences and feeling over-confident or lacking real-world skills, such as eye contact, if their primary training was VP-based. Through this theme, educators were able to give valuable insights around the factors that may facilitate or prevent successful adoption AI-driven VPs.

RQ2: What are the key design and implementation features educators think should be considered when developing an AI driven VP for communication skill development?

Theme 3: functionality. Educators expressed a need for high-fidelity VPs, which have the capacity for visual and auditory realism. They desired non-verbal aspects to foster the development of all key communication skills by students, with one educator explaining it would be ideal to be:

> Talking to someone [a VP] who looks real and can converse in a way that's not robotic and provide that experience that is really authentic and reflects what the students would see or have in clinical practice (Educator 4, Dentistry).

Using voice technology was desired, as this would require active listening and a level of processing truer to real life than typing might, with one educator commenting:

> To introduce things like tone and pitch and volume […] that's more information for the students to kind of consider and make decisions on […] it's more realistic to have to respond as you're thinking rather than sit there, think about your response and then type it in, (Educator 14, Nursing).

However, educators stressed that voices must sound realistic and work seamlessly. If available voice and visual technologies fell short of delivering a smooth experience, then educators felt there was still value in delivering a purely text-based VP to students, acknowledging that this may be more modest in terms of the scope of skill development:

> If they're really novice, and you just want to work on one skill […] maybe a text interaction can allow them to focus on that and remove distractions, (Educator 10, Speech Pathology).

To assist grounding the VPs in real-world experiences, educators suggested visually representing typical workplaces such as hospitals, community health centres or schools. Suggestions of using VR technology expanded on this point, to further the feeling of being present in a clinical space. In addition to visual aspects, an interactive and engaging experience was seen as key to capturing students' interest and driving learning. Suggestions also included some degree of choice for students or potentially incorporating gamified elements, given student exposure to this in their daily lives. Educators also desired the ability to customise VP software for their specific teaching needs and learning objectives, acknowledging this required collaboration with technical experts. No matter which modality were to be presented to students, educators emphasised it could hold merit if it was user-friendly and sophisticated.

Theme 4: diversity of scenarios. Educators expressed the opinion that "the virtual patient has to represent the patient population", (Educator 3, Dentistry), to properly reflect the intricacies of human behaviour and drive authenticity. A high priority for educators was diverse representation of patients, with different complaints and varied personalities, with one educator advocating for:

> Not just having a white, male, single patient, but changing personalities. It needs to be a range of different characters or people that are representative of the population that the students will come across in their clinical experiences, (Educator 1, Audiology).

A range of specific clinical tasks, patient characteristics and scenario objectives were described as relevant for AI driven VPs (captured in Figure 1).

Suggestions to ensure VPs accurately reflected real patients included educators creating them or basing them on actual clinical cases, in the hopes this could provide robust and authentic training data for the generative AI model driving the VP. Caution was encouraged to ensure stereotypes were not perpetuated in VP form, with one educator providing the following example:

> Patient presents with a specific type of sarcoma that only comes to HIV and then you've got a male young patient. So immediately, your mind goes to something specific […] these biases should be eliminated. And we need to be very careful about such things so that we do not enforce certain images in the learner's mind that then propagates later in their practice, (Educator 3, Dentistry).

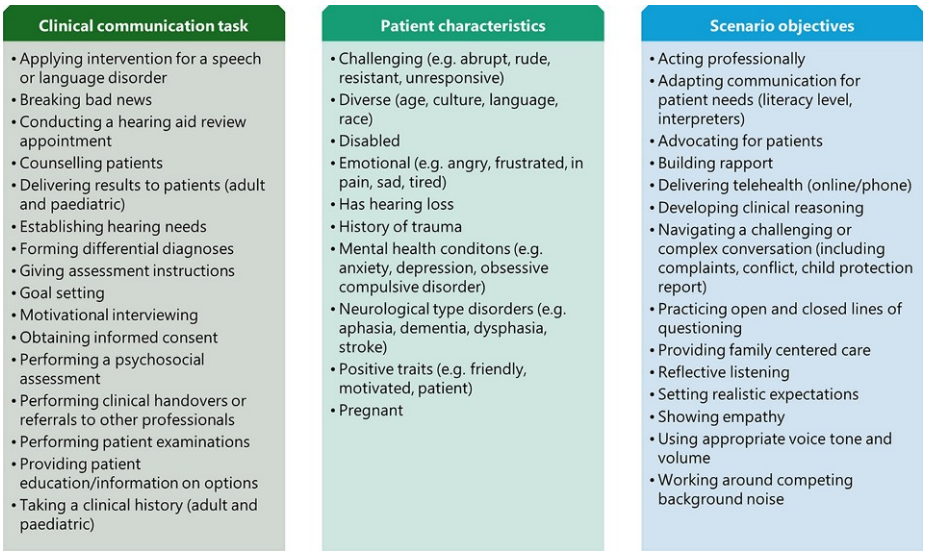

Figure 1. Key design elements reported by educators mapped to the framework of clinical communication tasks (specific kinds of interactions that professionals may enact), patient characteristics (inherent features or personality aspects) and scenario objectives (aims of encounters)
Source: Authors' own work

If the VPs were limited in their backstories, realism of clinical disease presentations or ability to respond to a wide range of input questions or topics, this could limit the experience and therefore the communication development of the student:

> I think that the AI person has to have a whole history […] a childhood and family and all of that, because different things come up in conversation, (Educator 11, Speech Pathology).

Similarly, if the encounters presented no element of challenge, this was thought to limit the learning that could occur. As communication is often complex and occurs alongside more technical-based clinical tasks, educators suggested that elements of these could also be represented, where students need to engage in both a simulated technical component as well as a communication-based one. In summary, a rich representation of patients across multiple clinical encounters was valued by educators.

Theme 5: practical implementation considerations. Educators highlighted essential aspects of implementing VPs into a curriculum, with practical suggestions for how this might best occur (see Figure 2).

While there was a place for VPs to address perceived gaps in students' communication skills learning, educators encouraged implementation that did not overload curricula or take away from other valuable learning activities. Some held views that they could replace role plays but cautioned that students may be concerned about VPs as a replacement (especially of clinical placements). However programs decided to implement VPs, it was encouraged that they ensure they were balanced with real patient encounters during clinical placements:

> I don't think AI would completely replace having patient contact. I don't think anything can, but I absolutely think it can really supplement it well, (Educator 7, Medicine).

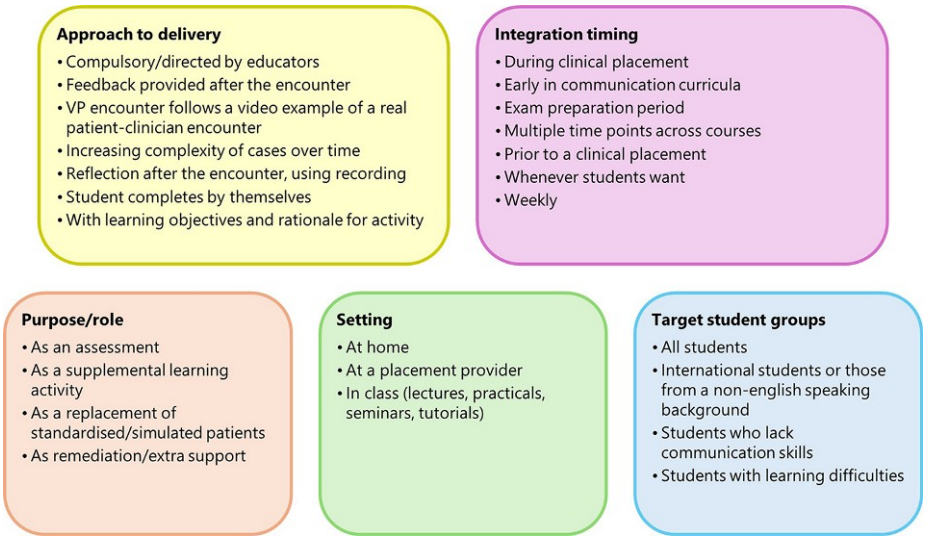

Figure 2. Key implementation features suggested by educators across the aspects of approach to delivery, timing of integration across courses, purpose/roles of VPs, settings and which student groups may be targeted

Source: Authors' own work

While there could be applicability for all students to use AI-driven VPs across courses, value was seen in using them for routine patient encounters early on, as a kind of priming tool for clinical placements. They could then develop in terms of complexity towards degree completion, to support progressive skill development.

Educators highlighted feedback provision and reflection on performance would be essential for students to develop skills. Some saw the potential for affording students to use VPs in their own time at their own convenience, with one suggesting:

> They might want to be able to practice at eleven at night where certainly no teaching staff is going to be willing to jump on with them and do some practice, (Educator 2, Audiology).

In this case, the VP software would need to be capable of providing authentic feedback for learning to the student following the encounter, with one educator commenting:

> If the platform's able to provide the students feedback as they go, then I think it's a terrific thing to actually a tool to give them to use outside of scheduled teaching activities, (Educator 14, Nursing).

If students completed the VP encounter in the presence of educators, perhaps within class or on placement, then they could receive feedback from them instead – with some educators holding the view this may be better for the student:

> I don't know how good the AI would be at giving students that insight […] sometimes it does need a conversation with a real person to say, "You did this very well, but we need to keep working on this", (Educator 2, Audiology).

Allowing students to access and use VPs wherever and whenever they want could be a way to afford many more hours of self-led practice; however, some educators cast doubt over whether students would use the technology if not instructed to as part of their classes. This

extended to concerns that students who need most support with their communication might elect not to use them. Not having VPs tied to assessment in some way was seen as another factor that may lead students to neglect their use. No matter how, when and where they were introduced, educators felt it was essential that the VPs were easily accessible to students to minimise barriers to using them, such as students lacking personal laptops or stable internet connections.

Discussion

This study characterised what educators from nine healthcare disciplines think about the use of AI-driven VPs for communication skill development and can inform their future development and implementation. It is apparent that educators are approving of incorporating this emerging technology into their curriculum, provided it benefits students and does not present an increase to educators' workload. While educators may express preliminary support for such tools, it is important that they remain involved in the creation and implementation to ensure final products are fit for purpose.

Educators' willingness to adopt AI-driven VPs was supported by multiple factors such as VPs being easy to use and contributing something to students' learning, indicating support in the UTAUT dimensions of PE and EE. If educator support is clear to students, this is likely to improve student acceptance, as it relates to SI (Venkatesh *et al.*, 2003). The support for AI-driven VPs established in this study has been reflected in a study by Choi *et al.* (2023), surveying primary and secondary educators about AI learning tools in general. These authors found that holding "constructivist" pedagogical beliefs increases educators' likeliness to accept such tools, in comparison to those holding "transmissive" (or "traditional") beliefs. On the other hand, educator concerns around privacy, consent and ethical use appeared to increase hesitancy to adopt AI-driven VPs in our study. These concerns are a novel finding in relation to VPs, considering a review of studies investigating educators' attitudes about non-AI driven VPs failed to report the same concerns (Fąferek *et al.*, 2024). These findings indicate such concerns may arise from the fact these VPs are AI-driven, mirroring findings from Choi *et al.* (2023), who reported perceived trust of AI teaching tools was an important factor for intended adoption.

The concerns reported by our participants underscore wider calls for policy on the careful and ethical roll out of AI tools in higher education (Nguyen *et al.*, 2023). Institutions may be able to provide training and development opportunities for educators (especially those aligning with a transmissive pedagogy) to learn about emerging AI tools and afford them time to experience their potential applications. They may also have a role in ensuring that AI technologies are properly evaluated, and local privacy policies are implemented to preserve educators' and students' confidence in AI tools. Further actions institutions could take to support integration of AI based learning technologies such as VPs may include: strengthening supporting infrastructure, appointing supporting personnel and organisational units to ensure equitable access, implementing policies to encourage a culture of AI adoption and experimentation and forming partnerships with other institutions to construct and share best practices (Alenezi, 2023; Tarisayi, 2024). Given the ethical concerns raised by educators, we also propose that existing frameworks or principles may be followed to support AI-driven VP integration, such as the Ethical Impact Assessment created by UNESCO (2023). This is a tool that assists project teams to identify potential positive and negative impacts of a particular AI system and reflect on the ethical issues that should be addressed or mitigated as part of its development and implementation. A guiding document such as this may prove useful in ensuring key concerns and risks raised by stakeholders are addressed.

It is important to establish what stakeholders need before design and implementation of AI-driven VPs and through this study, we found a wide range of potential scenarios that

could be presented to students, along with purposes for doing so. Though many clinical communication tasks were relevant across disciplines, we also heard examples specific to disciplines, which further underscores the requirement for VPs that are adaptable to the needs of each profession. Careful planning by each program to assess how VPs fit into curricula as complementary tools also appears needed. While some educators felt certain activities could be replaced by AI-driven VPs (particularly student or staff-led role plays), there was a prominent sentiment of viewing the tools as supplementary, supporting literature on integrating AI in the tertiary space more widely (Chan, 2023).

Implications

Our findings highlight the need to focus on incorporating input from multiple sources when it comes to the successful adoption of AI-driven VPs for communication skill development. This includes research on educational frameworks and pedagogically sound methods (Luckin and Cukurova, 2019), consulting educators from multiple disciplines about their specific requirements, incorporating student voice to ensure technology meets learners' needs and using technological experts that can develop software. Shorey *et al.* (2019) suggested that educators and developers should meet regularly throughout the entire design and deployment process and find a common language to communicate in when creating AI-driven VPs. This may help to ensure features that were encouraged, like voiced interaction and diverse presentations of patients to avoid stereotyping, come to fruition. In addition to these implications, we recommend educators make a needs assessment of specific communication skills their students need further support with, integrate AI-driven VPs gradually, communicate expectations and objectives of VPs to students, monitor and evaluate impact and finally stay informed of technological advancements amongst their teaching teams. With educators being upskilled and confident to implement AI learning tools, this will help to shape students' expectations of the technology and the rationale for its use, both key for success (Wu *et al.*, 2022). To further support the creation and deployment of AI-driven VPs we offer a set of educator-informed design principles, based on the findings of our thematic analysis (Table 2). By following these principles, developers can ensure key stakeholders' needs expectations are addressed.

This study may serve as a guide to educators and software developers around some of the key use cases for AI-driven VPs focused on communication skill development. However, it is important to note that this is a rapidly evolving space, and educators must remain proactive to stay up to date as advancements occur. We recommend that future research around AI-driven VPs creation incorporates students, software developers, institutional IT staff and educator input, through participatory design approaches. Collaborating with key stakeholders will ensure technology aligns with pedagogical needs and infrastructure capabilities. In addition, as curricular integration of AI-driven VPs advances, further research evaluating the impact on learning of differing iterations of these technologies on learning will be vital.

Limitations

While our sample represented nine healthcare disciplines, all participants are from the same institution, which may limit generalisation somewhat. Views may differ in other institutions, countries and disciplines not captured here. Such differences may also be compounded by local level of support for AI and technology-enhanced learning in general. With the sampling strategy we implemented, it is also possible that educators who held more positive views about AI tools accepted the invitation to participate, with those opposed to their use not willing to partake. Future comparative investigations across diverse countries and institutions

Table 2. Educator-informed design principles

Category	Design principles
Interface design	• Implement multimodal options with supporting visuals • Develop realistic speech-based interactions • Present user-friendly software that is easy to use and accessible
Scenarios	• Work with educators to ensure scenarios reflect realistic patients for a given health discipline • Ensure diversity of patient characteristics • Embed constructive feedback on performance throughout scenarios
Ethical protocols	• Include clear data privacy and storage policies, indicating what data may be collected and why • Protect data of students and allow students to opt out of data collection • Make users aware of the capabilities of the technology and for what purposes and contexts it should be used in

Source(s): Authors' own work

will therefore add to our findings and explore to what degree contextual factors impact educator attitudes. In this study, educators did not interact with an AI-driven VP. In future studies, educators could validate or challenge findings reported here if they have experience or use of VPs, so introducing a prototype for them to interact with may be beneficial.

Conclusion

Through this study, we were able to characterise key educational design features that students and educators valued with regards to AI-driven VPs. Educators are generally supportive of including AI-driven VPs in communication skills-based curricula, suggesting that they could afford students opportunities to build confidence in patient-centered care skills in a safe environment. Factors that could affect willingness to adopt this technology include views around AI, workload, concerns around privacy and overreliance. Educators desired high levels of realism be presented to students, both technically by using voice and animation, as well as content-wise, through patient personalities and clinical scenarios. In summary, many use cases were identified by educators, who should have a role in ensuring that the correct balance is struck between current learning activities and the introduction of these emerging learning tools.

Acknowledgments

The authors wish to thank all of the participating educators for their time and honesty.

Author contributions

Conceptualization: Patrick Bowers, Tracii Ryan, Kelley Graydon, Jey Han Lau, Dani Tomlin; Methodology: Patrick Bowers, Tracii Ryan, Kelley Graydon, Jey Han Lau, Dani Tomlin; Formal analysis and investigation: Patrick Bowers, Tracii Ryan; Writing – original draft preparation: Patrick Bowers, Tracii Ryan, Kelley Graydon, Jey Han Lau, Dani Tomlin; Writing – review and editing: Patrick Bowers, Tracii Ryan, Kelley Graydon, Jey Han Lau, Dani Tomlin; Funding acquisition: Patrick Bowers; Resources: Patrick Bowers; Supervision: Tracii Ryan, Kelley Graydon, Jey Han Lau, Dani Tomlin.

Data availability statement

The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

Ethics approval

This project received ethical approval from the University of Melbourne (project ID: 28293).

References

Ahmed, S.K. (2024), "The pillars of trustworthiness in qualitative research", *Journal of Medicine, Surgery, and Public Health*, Vol. 2, p. 100051, doi: 10.1016/j.glmedi.2024.100051.

Alenezi, M. (2023), "Digital learning and digital institution in higher education", *Education Sciences*, Vol. 13 No. 1, p. 88, doi: 10.3390/educsci13010088.

Borg, A., Georg, C., Jobs, B., Huss, V., Waldenlind, K., Ruiz, M., Edelbring, S., Skantze, G. and Parodis, I. (2025), "Virtual patient simulations using social robotics combined with large language models for clinical reasoning training in medical education: mixed methods study", *Journal of Medical Internet Research*, Vol. 27, p. e63312, doi: 10.2196/63312.

Bowers, P., Graydon, K., Ryan, T., Lau, J.H. and Tomlin, D. (2024), "Artificial intelligence-driven virtual patients for communication skill development in healthcare students: a scoping review", *Australasian Journal of Educational Technology*, Vol. 40 No. 3, pp. 39-57, doi: 10.14742/ajet.9307.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101, doi: 10.1191/1478088706qp063oa.

Chan, C.K.Y. (2023), "A comprehensive AI policy education framework for university teaching and learning", *International Journal of Educational Technology in Higher Education*, Vol. 20 No. 1, p. 38, doi: 10.1186/s41239-023-00408-3.

Chan, C. and Li, F. (2023), "Developing a natural language-based AI-chatbot for social work training: an illustrative case study", *China Journal of Social Work*, Vol. 16 No. 2, pp. 121-136, doi: 10.1080/17525098.2023.2176901.

Choi, S., Jang, Y. and Kim, H. (2023), "Influence of pedagogical beliefs and perceived trust on teachers' acceptance of educational artificial intelligence tools", *International Journal of Human–Computer Interaction*, Vol. 39 No. 4, pp. 910-922, doi: 10.1080/10447318.2022.2049145.

Fąferek, J., Cariou, P.-L., Hege, I., Mayer, A., Morin, L., Rodriguez-Molina, D., Sousa-Pinto, B. and Kononowicz, A. (2024), "Integrating virtual patients into undergraduate health professions curricula: a framework synthesis of stakeholders' opinions based on a systematic literature review", *BMC Medical Education*, Vol. 24 No. 1, p. 727, doi: 10.1186/s12909-024-05719-1.

Geeky Medics (2024), "Virtual patient simulator", Poole, United Kingdom, available at: https://geekymedics.com/virtual-patient-simulator/ (accessed 8 May 2025).

Gutiérrez Maquilón, R., Uhl, J., Schrom-Feiertag, H. and Tscheligi, M. (2024), "Integrating GPT-based AI into virtual patients to facilitate communication training among medical first responders: usability study of mixed reality simulation", *JMIR Formative Research*, Vol. 8, p. e58623, doi: 10.2196/58623.

Issenberg, S.B. (2006), "The scope of simulation-based healthcare education", *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, Vol. 1 No. 4, pp. 203-208, doi: 10.1097/01.SIH.0000246607.36504.5a.

King, A. and Hoppe, R.B. (2013), "'Best practice' for patient-centered communication: a narrative review", *Journal of Graduate Medical Education*, Vol. 5 No. 3, pp. 385-393, doi: 10.4300/jgme-d-13-00072.1.

Kizilcec, R.F. (2023), "To advance AI use in education, focus on understanding educators", *International Journal of Artificial Intelligence in Education*, Vol. 34 No. 1, pp. 1-8, doi: 10.1007/s40593-023-00351-4.

Luckin, R. and Cukurova, M. (2019), "Designing educational technologies in the age of AI: a learning sciences-driven approach", *British Journal of Educational Technology*, Vol. 50 No. 6, pp. 2824-2838, doi: 10.1111/bjet.12861.

Moro, C., Stromberga, Z. and Birt, J. (2020), "Technology considerations in health professions and clinical education", in Nestel, D., Reedy, G., McKenna, L. and Gough, S. (Eds), *Clinical Education for the Health Professions: Theory and Practice*, Springer Singapore, Singapore, doi: 10.1007/978-981-13-6106-7_118-1.

Nazaretsky, T., Ariely, M., Cukurova, M. and Alexandron, G. (2022), "Teachers' trust in AI-powered educational technology and a professional development program to improve it", *British Journal of Educational Technology*, Vol. 53 No. 4, pp. 914-931, doi: 10.1111/bjet.13232.

Nguyen, A., Ngo, H.N., Hong, Y., Dang, B. and Nguyen, B.T. (2023), "Ethical principles for artificial intelligence in education", *Education and Information Technologies*, Vol. 28 No. 4, pp. 4221-4241, doi: 10.1007/s10639-022-11316-w.

PCS.ai (2025), "Spark", available at: www.pcs.ai/spark (accessed 20 May 2025).

Shorey, S., Ang, E., Yap, J., Ng, E.D., Lau, S.T. and Chui, C.K. (2019), "A virtual counseling application using artificial intelligence for communication skills training in nursing education: development study", *Journal of Medical Internet Research*, Vol. 21 No. 10, p. e14658, doi: 10.2196/14658.

Shorey, S., Ang, E., Ng, E.D., Yap, J., Lau, L.S.T. and Chui, C.K. (2020), "Communication skills training using virtual reality: a descriptive qualitative study", *Nurse Education Today*, Vol. 94, p. 104592, doi: 10.1016/j.nedt.2020.104592.

SimConverse (2024), "SimConverse", available at: www.simconverse.com/ (accessed 8 May 2025).

Suárez, A., Adanero, A., Díaz-Flores García, V., Freire, Y. and Algar, J. (2022), "Using a virtual patient via an artificial intelligence chatbot to develop dental students' diagnostic skills", *International Journal of Environmental Research and Public Health*, Vol. 19 No. 14, p. 8735, doi: 10.3390/ijerph19148735.

Tarisayi, K.S. (2024), "Strategic leadership for responsible artificial intelligence adoption in higher education", *CTE Workshop Proceedings*, Vol. 11, pp. 4-14, doi: 10.55056/cte.616.

UNESCO (2023), "Ethical impact assessment: a tool of the recommendation on the ethics of artificial intelligence", UNESCO, doi: 10.54678/YTSA7796.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User acceptance of information technology: toward a unified view", *MIS Quarterly*, Vol. 27 No. 3, pp. 425-478, doi: 10.2307/30036540.

Wozniak, H., Ellaway, R.H. and de Jong, P.G. (2018), "What have we learnt about using digital technologies in health professional education?", *Medical Journal of Australia*, Vol. 209 No. 10, pp. 431-433, doi: 10.5694/mja18.00152.

Wu, W., Zhang, B., Li, S. and Liu, H. (2022), "Exploring factors of the willingness to accept AI-assisted learning environments: an empirical investigation based on the UTAUT model and perceived risk theory", *Frontiers in Psychology*, Vol. 13, p. 870777, doi: 10.3389/fpsyg.2022.870777.

Xu, J., Yang, L. and Guo, M. (2024), "Designing and evaluating an emotionally responsive virtual patient simulation", *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, Vol. 19 No. 3, pp. 196-203, doi: 10.1097/SIH.0000000000000730.

Zawacki-Richter, O., Marín, V.I., Bond, M. and Gouverneur, F. (2019), "Systematic review of research on artificial intelligence applications in higher education – where are the educators?", *International Journal of Educational Technology in Higher Education*, Vol. 16 No. 1, p. 39, doi: 10.1186/s41239-019-0171-0.

Appendix 1

Table A1. Survey

Survey item	Response options
1. What is your gender identity?	Male Female Non-binary/third gender Prefer not to say Self-describe
2. Healthcare discipline	Please specify:
3. Years of teaching experience	Less than 3 years 3 6 years 7 10 years 11 15 years 16 20 years 21 years or more
4. What activities are included in your teaching of communication skills?	None Workshop/seminar Group discussions Lectures Observations Clinical placements Standardised patients Virtual patients Roleplay Other (please specify)
5. How comfortable are you with using technology?	Not at all comfortable Slightly comfortable Neither comfortable nor uncomfortable Very comfortable Extremely comfortable
6. How would you rate your awareness of the capabilities of artificial intelligence?	Not aware Somewhat aware Moderately aware Very aware Extremely aware
7. I have used artificial intelligence within my role as an educator	Yes (please specify details) No

Source(s): Authors' own work

Appendix 2

Table A2. Semi-structured interview protocol

Question	Prompt
1. Can you give me some background on your experience with teaching and your current role?	
2. What do you see as important considerations for learning activities that aim to develop students' communication skills?	
3. What are your thoughts on AI?	• What do you think about AI's role in teaching and learning? • Have you used any AI tools as part of your role?
4. What kind of experience do you have with virtual patients?	
5. What do you think about the use of AI to create virtual patients?	
6. What do you think about using these virtual patients in the context of teaching students to communicate better?	
7. If virtual patients using AI are to be created, what do you see as important considerations?	
8. What functions or features should these virtual patients have?	
9. What kinds of communication scenarios do you think would be ideal for this kind of virtual patient?	
10. How do you see them fitting into your curriculum best?	
11. Are there any concerns or challenges you see in relation to the uptake or use of these virtual patients?	
12. Did you have any additional thoughts you have on our topic that you'd like to share?	

Source(s): Authors' own work

Corresponding author
Patrick Bowers can be contacted at: patrick.bowers@unimelb.edu.au