The Hong Kong Polytechnic University
香港理工大學
Educational Development Centre
教學發展中心

GenAI in Learning, Teaching and Assessment

14

Instructor
Dr Chan Mee Kie, Maggie

Department
School of Nursing (SN)

Subject Area

Clinical Practicum

Why did the instructor use GenAI for learning and teaching?

Communication failures during clinical handover are known to contribute to adverse patient outcomes, but traditional classroom teaching and simulation methods often do not provide sufficient, repeated or authentic practice opportunities for undergraduate nursing students. Although virtual reality (VR) can recreate realistic clinical environments, its educational impact and practical implementation are constrained by technical, financial and design challenges, particularly when attempting to generate responsive, lifelike characters in real time. To address these limitations, Maggie and her interdisciplinary team integrated ChatGPT with VR to create interactive avatar nurses and patients that simulate clinical handover interactions. The team also intends that documenting their development journey will be of benefit to other nursing schools seeking to incorporate GenAI within VR simulations for similar clinical handover training.

How was GenAI used in this scenario?

Maggie's team implemented a three-layer architecture, integrating AI processing, dynamic character interaction and immersive VR functionality to develop a practical solution for clinical handover training.

At the first level, the System Layer (GPT integration), a speech-to-text module powered by Azure Speech Studio, captures students' spoken input via the VR headset microphone and converts it into text. This text is then processed by ChatGPT (OpenAI, GPT 4o), an advanced AI system configured to understand and respond to clinical handover scenarios. The AI generates responses aligned with ISBAR communication protocols, mimicking the behaviour of an experienced nurse. A text-to-speech module subsequently converts these AI-generated responses into natural-sounding audio, completing the interaction loop within the virtual environment.

The second level, the Interaction Layer (interface), synchronises the virtual character's speech with appropriate facial expressions and lip movements, thereby producing realistic, conversational exchanges that closely resemble communication with real colleagues. This layer also monitors scenario progression and manages all possible forms of interaction with the virtual environment, ensuring a coherent and seamless learning experience.

The third level, the Presentation Layer (immersive VR simulation), orchestrates the overall VR experience by integrating multiple interaction modalities and feedback mechanisms, enhancing students' sense of presence in a simulated clinical setting. Students can communicate using natural speech and hand gestures, enabling them to engage with the virtual environment in ways that closely replicate real-world clinical practice.

What was the impact on student learning?

Students reported that receiving immediate feedback from the AI nurse enhanced their use of ISBAR communication, while the consistent and objective nature of this feedback supported their development of structured, systematic communication skills and informed clinical decision-making. In this regard, AI-powered VR simulations offer distinct pedagogical advantages. The interactive nature of AI feedback moves beyond simple right-or-wrong responses, fostering mastery through deliberate practice while preserving the humanistic focus that is central to nursing education. AI agents can adapt their questioning strategies in response to students' performance, creating personalised learning pathways that progressively develop both communication skills and clinical reasoning. This technology thus complements traditional teaching by providing scalable, accessible opportunities for practice, alongside consistent exposure to higher-order thinking demands.

What were the challenges encountered during the implementation and what solutions were used?

One key challenge was that AI avatars lacking human-like facial expressions and body language tended to produce awkward, robotic communication, which reduced the authenticity of the learning experience. To address this, Maggie's team implemented real-person AI avatars modelled on students' own lecturers. This strategy markedly enhanced the sense of realism and relational connection, helping students to engage more fully with the virtual training.

Looking ahead, the team proposes that future development should focus on strengthening AI capabilities to support clinical reasoning in more complex scenarios, thereby creating advanced learning experiences that cultivate critical thinking alongside communication skills. Further research is needed to evaluate educational outcomes and to identify opportunities for ongoing AI enhancement.