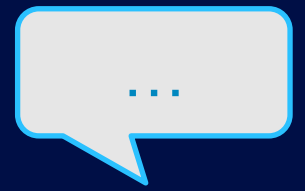
The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff and students we are privileged to work and learn every day with Indigenous colleagues and partners.

Incorporating student voice into the creation of AI-driven virtual patients



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d Faculty of Engineering and Information Technology, University of Technology Sydney

Background

- Effective communication is key to patient centered care, positioning patient as central to their own care (King & Hoppe, 2013)

- Documented challenges with sourcing clinical experiences for students (Pearce et al., 2022; Smith et al., 2023) and evidence of differing levels of communication training being delivered across disciplines (Zota et al., 2023).

- Artificial intelligence-driven virtual patients are becoming increasingly sought after for supporting communication skills learning in healthcare education (Bowers et al., 2024).

- Need for AI-driven VPs that are based in educational theory and consult key stakeholders (Bowers et al., 2024)

Background

- Design-based research an approach to incorporate student voice into the process of conceptualising, creating and iteratively refining a virtual patient platform (Anderson & Shattuck, 2012).
- Using concept of Students as Partners to enhance understanding of their experience, improve teaching materials, build trust (Mercer-Mapstone et al., 2017).
- Kolb's learning cycle to guide the VP learning process (Kolb, 2014).

Research questions

RQ1: What are student attitudes around the use of AI driven tools (i.e. Virtual Patients) for learning communication skills?

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

RQ3: What are Audiology students' initial evaluations of a pilot AI VP for the purpose of communication skill development?

Student attitudes

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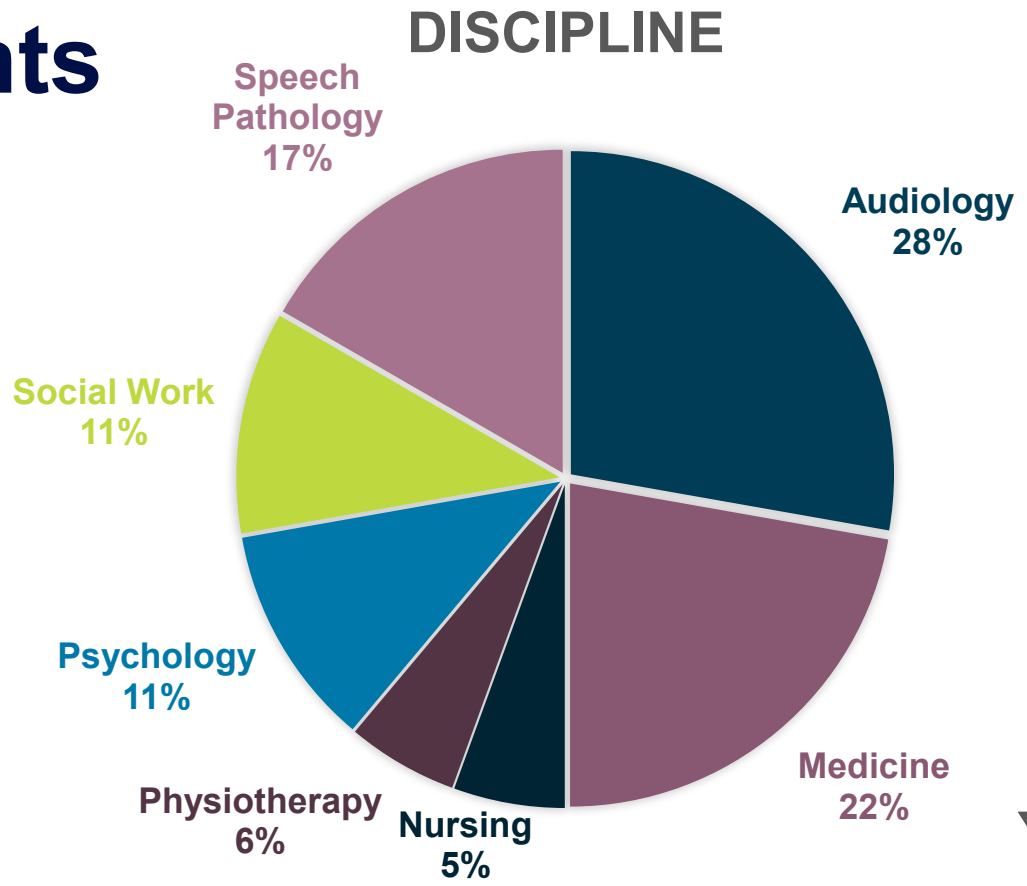
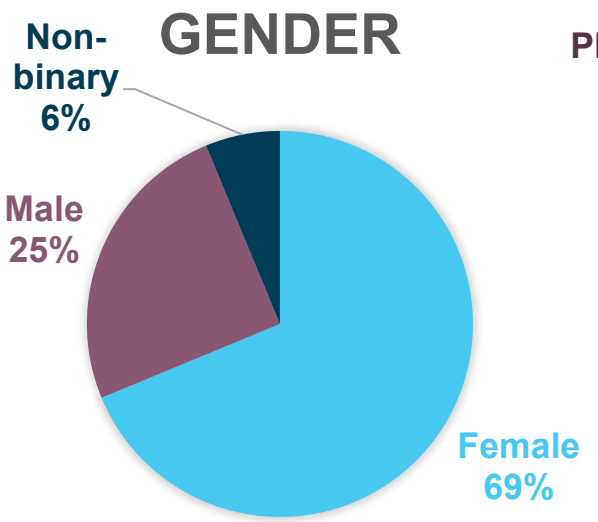
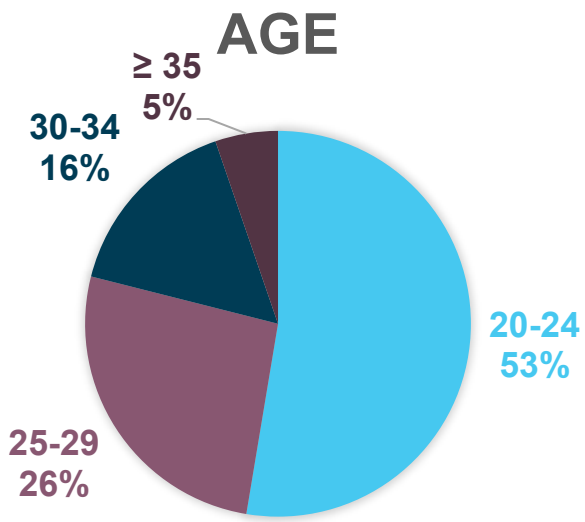
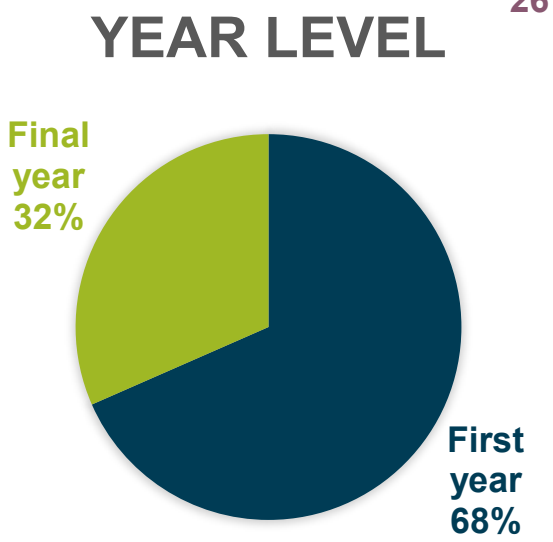
Participants
n = 19









Findings

"…something that just helps kind of bridge that gap between the kind of in class practicing of it and that huge, huge jump to dealing with a real human being," (First year medical student, FG2).

"When you're speaking on the fly, it's hard to predict what you would say or what you would come up with as you're asking the questions…Whereas, if you've got time to think and type it out, you come up with a better question," (Final year Audiology student, FG3).

I would just say, like, it sounds great in a perfect world, but I think that there'd need to be a lot of conversations and transparency around how the whole thing worked (First year Speech Pathology student, FG3)

"And then if it's like an interactive software, how would they store students' information? So, is it like just local storage? Is it stored in the cloud?" (First year medical student, FG3).

Communication task

- Breaking bad news
- Clinical history taking
- Delivering diagnoses
- General inspection
- Genogram mapping
- Giving instructions for assessments
- Information giving
- Motivational interviewing
- Telehealth based consultation

Patient characteristics

- Aggressive or angry
- Anxious or scared
- Culturally diverse
- Depressed
- English as a second language
- Fast talker
- Interrupts clinician
- Low health literacy
- Member of a minority group
- Paediatric
- Parent of child
- Resistant to treatment options
- Uncooperative
- Uncomfortable

Scenario objectives

- Dealing with emotions
- Diagnosing an uncommon disease
- Managing self-harm risk
- Navigating communication breakdown
- Showing empathy
- Supporting patients and families through end of life issues
- Working with complex communication needs

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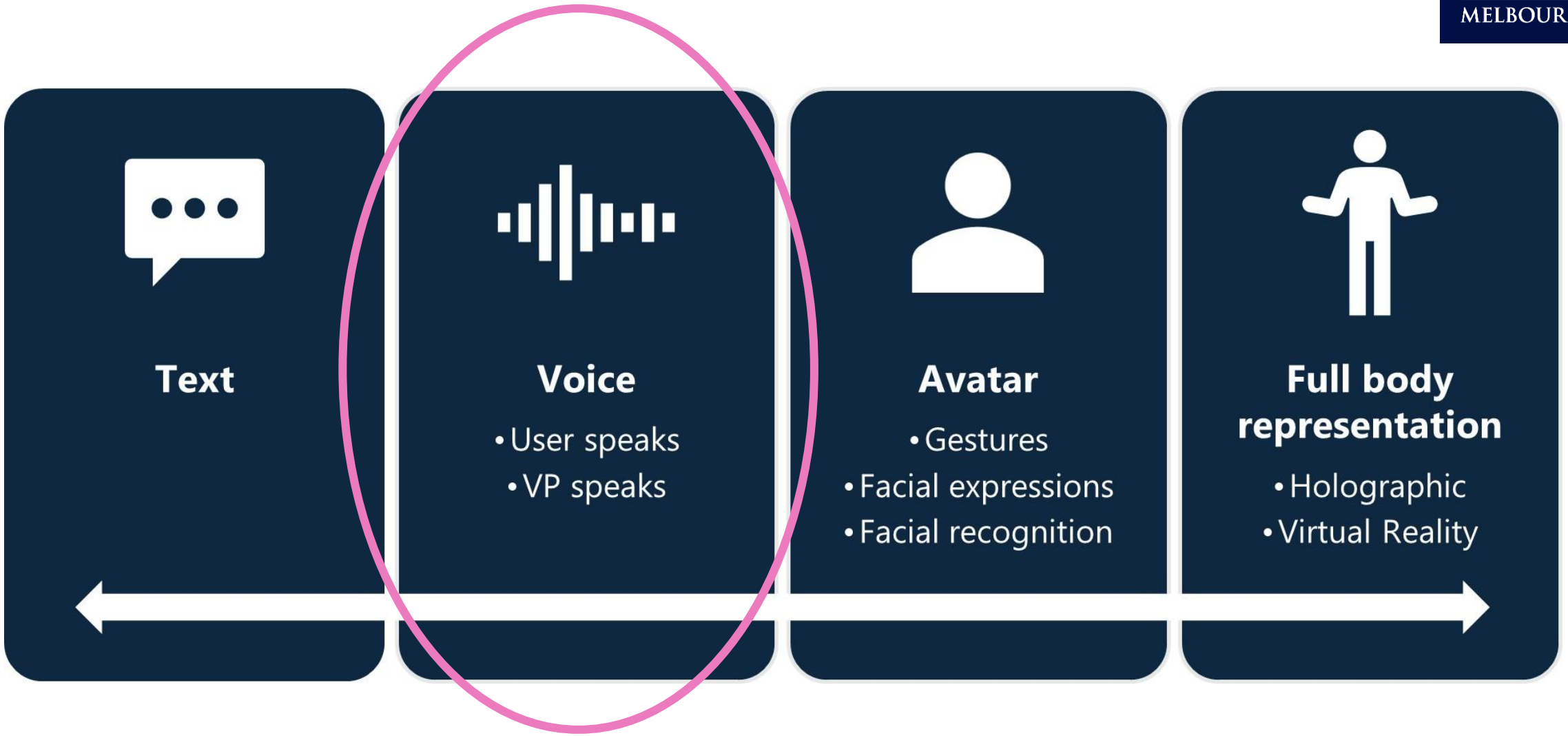
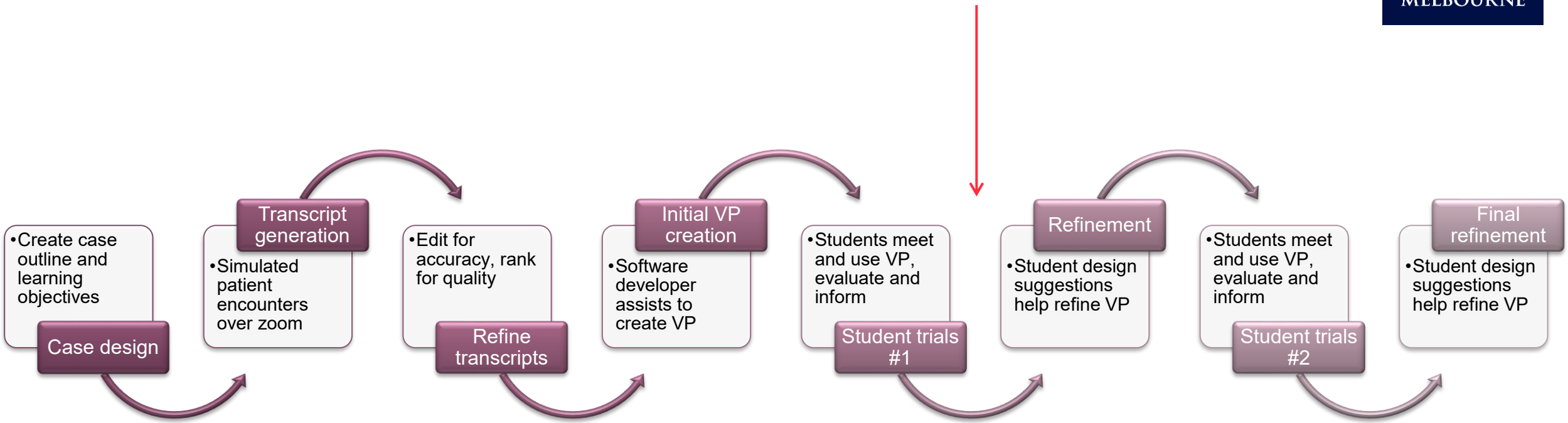
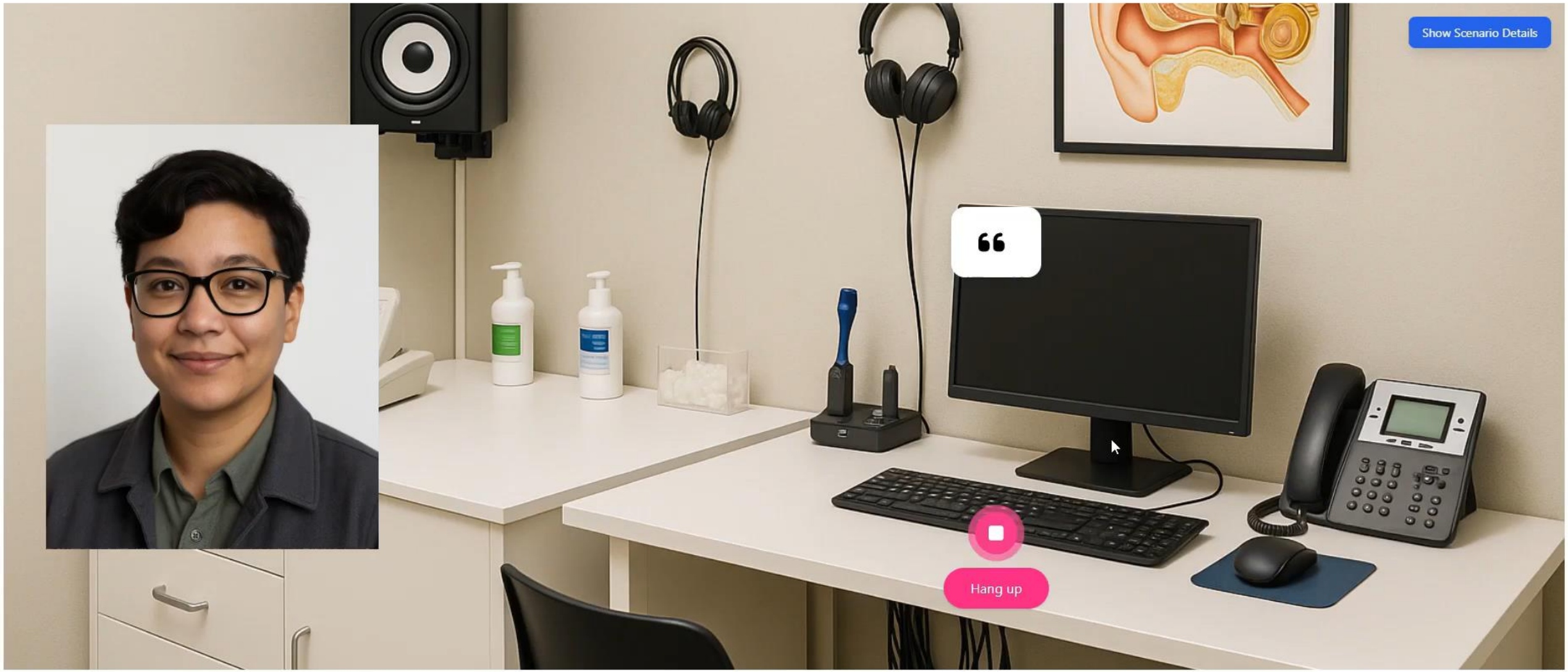

Text
Voice
• User speaks
• VP speaks
Avatar
• Gestures
• Facial expressions
• Facial recognition
Full body representation
• Holographic
• Virtual Reality

Iterative design

Design


•Create case outline and learning objectives
Case design
Transcript generation
•Simulated patient encounters over zoom
•Edit for accuracy, rank for quality
Refine transcripts
Initial VP creation
•Software developer assists to create VP
•Students meet and use VP, evaluate and inform
Student trials #1
Refinement
•Student design suggestions help refine VP
•Students meet and use VP, evaluate and inform
Student trials #2
Final refinement
•Student design suggestions help refine VP


Show Scenario Details
Hang up

Likert scale data

Adapted from: Borsci, S. et al (2021). Campillos-Llanos, L. et al (2021)
Chatbot usability scale, simulated patient dialogue system scale

Item	% agreement
I was immediately made aware of what information the VP can give me.	100
My waiting time for a response from the VP was short.	90
The VP's responses were easy to understand.	90
The VP gives me the appropriate amount of information.	90
The VP is user friendly	70
I find that the VP understands what I want and gives me relevant replies.	70
I feel like the VPs responses were natural.	60

Likert scale data

Item	% agreement
The VP only gives me the information I need.	60
The VP was able to keep track of context.	50
The interaction with the VP felt like an ongoing conversation.	50
The VP could handle situations in which the line of conversation was not clear.	40
Communication with the Virtual Patient was clear	40
I am satisfied with the VP's functionality.	30

Findings of trial one interviews

Issues

Suggested changes

What not to do

What works well

Potential benefit

Emotional reactions

Issues

- **Kept cutting student off or too fast**
- **Voice and text mismatch**
- **VP kept repeating itself**
- **Voice unnatural**

"I feel like it's sort of like a double-edged sword… it's nice that you're getting a really fast response from them, but also I'd be expecting for a thought from them and then the answer"
(Student 5)

Suggested Changes

"I think probably what would have made it easier for me is if there was a transcript (but that doesn't happen in real life anyway, so I don't know)" (Student 6)

- **Do it at home, alone (readily accessible on LMS)**
- **More scenarios**
- **Live transcript**
- **Make VP responses shorter**
- **Better mechanism for when to talk/edit what was said**
- **Providing feedback**
  - As a report
  - As another interaction
  - From a tutor

What not to do

- **Do it in class**
- **Rely too much on it**

"If this is the only way students get to practice, I think they would struggle when they meet a real person"
(Student 4)

What works well

- **Having a voiced interaction**
- **The realism of it**
- **Relevance of responses**
- **User Interface (including text)**
- **Transcript being available afterwards**

"I think it's more useful to do it voice-based, because obviously in clinic you don't have time to type out your questions, so it's a lot more realistic."
(Student 2)

Potential benefit

- **Useful for learning**
- **Found enjoyment**
- **Flexible time and place tool**
- **Practice for gaining confidence**
- **See use across entire course, prep for exams**

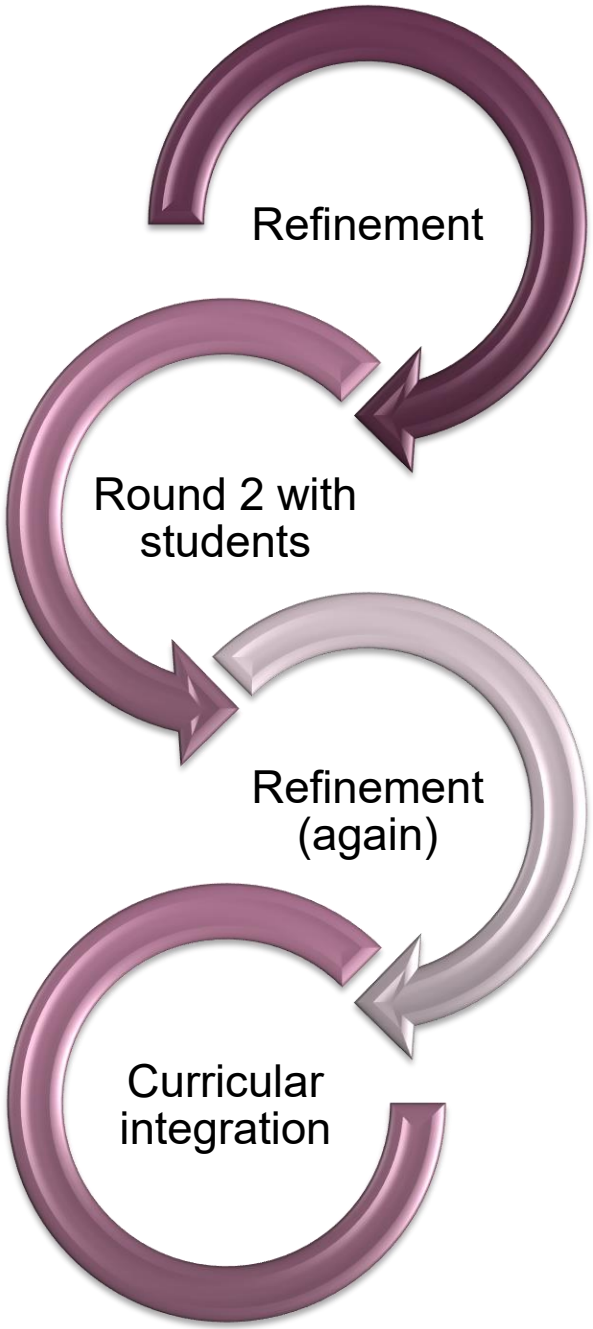
"This is really cool, because I'm having real-time practice with the AI and he can respond to my speech and [it] resembles a conversation - that's good for me to practice" (Student 8)

Emotional reactions

- **Awkward/weird/apprehensive**
- **Impressed/excited**
- **Nervous**
- **Engaged**
- **Confused**
- **Annoyed**

"I guess I was pretty nervous while I was doing it as well, that was more because I was like, 'oh what is this, this is kind of a new experience'" (Student 6)

Next steps


Refinement
Round 2 with students
Refinement (again)
Curricular integration

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Thank you

Questions?