THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

School of Nursing 護理學院

PolyU Nursing Dialogue

ViRTUAL HOSPiTAL

Time to Revisit or Time to Innovate?

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Associate Professor of Practice
24 October 2025

Virtual Hospital

POWERED BY PolyU Tech

Multi-Patient Management
Multi-Task Multi-Pitfall

Virtual Hospital

Stepping Into Reality

The Power of Technology

Immersive Virtual Reality

The Power of Technology

The Power of Technology

Reality- Virtuality - SPEED LEAP


Wait a minute
Not so fast!
TCL

Reality- Virtuality Continuum

Visual Perception is Manipulated by:

1.	Hearing	5.	Sense Of Balance
2.	Smelling	6.	Body Sensation
3.	Feeling	7.	The Sensation Of Temperature
4.	Touch Tactile Perception	8.	The Sensation Of Pain

Reality- Virtuality Continuum

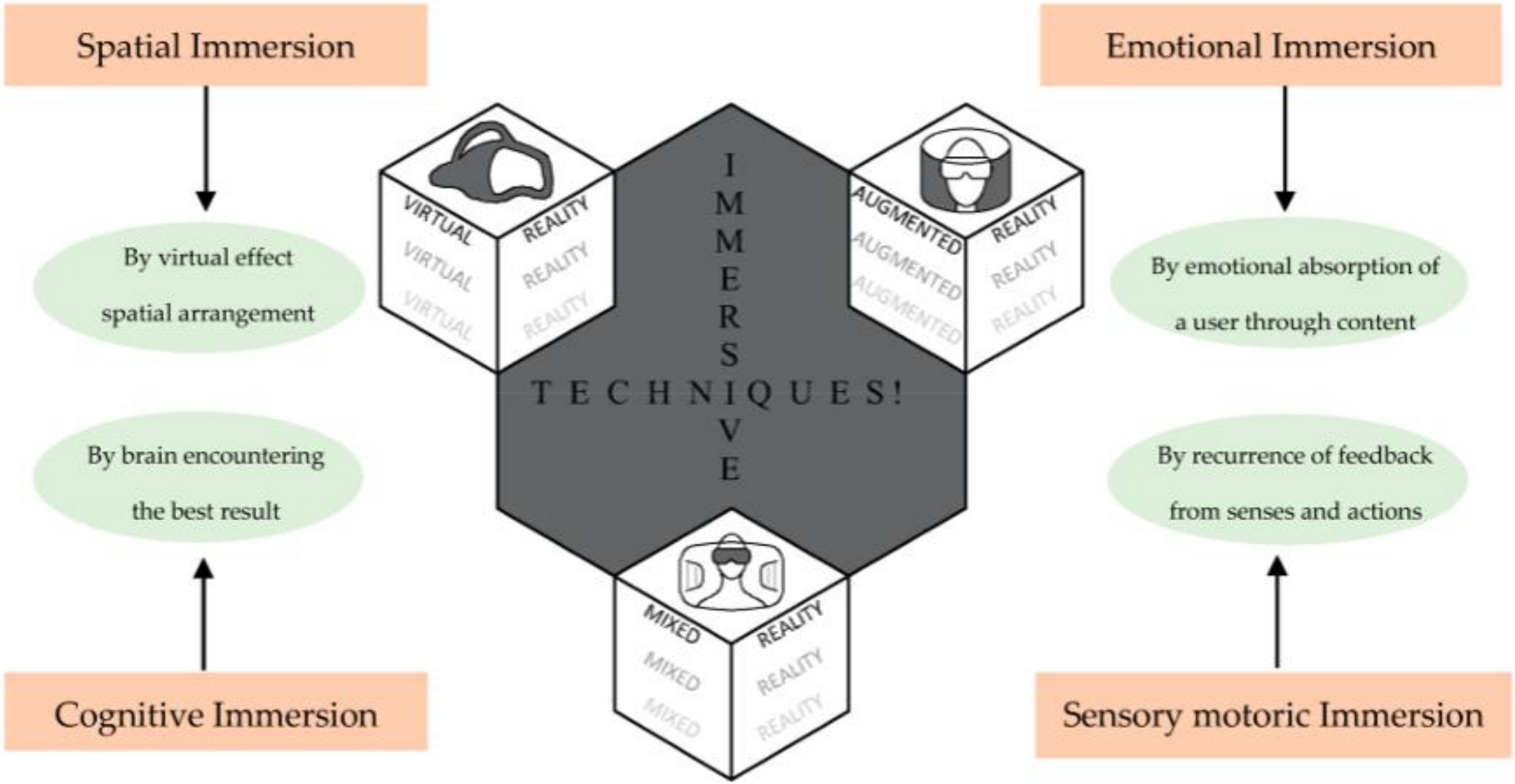

Figure 1. Major types of immersive techniques and immersion levels.

Khan, A., Sepasgozar, S., Liu, T., & Yu, R. (2021). Integration of bim and immersive technologies for aec: A scientometric-swot analysis and critical content review. Buildings (Basel), 11(3), 126–. https://doi.org/10.3390/buildings11030126

The Journey To Virtual Reality

Clinical Trial > J Clin Nurs. 2002 Jan;11(1):73-8. doi: 10.1046/j.1365-2702.2002.00561.x.

Learning intravenous cannulation: a comparison of the conventional method and the CathSim Intravenous Training System

"VR Interactive Simulator"

Figure 1. The user interfaces with CathSim via the AccuTouch device. In this figure, the user applies skin traction with her left hand and inserts the IV with her right. In addition to haptic feedback via the AccuTouch device, the user also receives visual feedback from the monitor and audio feedback from the speakers.

Abstract

Intravenous cannulation is a nursing procedure carried out in some clinical units that may induce trauma and discomfort. Nurses should be well prepared before practising the procedure with clients. Conventionally, a plastic arm was used for practice but, with innovative developments in technology, a computer program called the CathSim Intravenous Training System (CathSim ITS) is available for this purpose. This study was conducted to compare the effectiveness of learning using a plastic arm with the CathSim ITS. Twenty-eight nurses were divided into two groups and randomly assigned to the two different methods: plastic arm (control group) or CathSim ITS (experimental group). Both groups were provided with 1 hour of theory input and 2 hours of nursing laboratory work. When the nurses felt ready to practise on clients, their performances were assessed by researchers with an intravenous cannulation qualification using a validated checklist. Prior to the assessment, trait and state anxiety levels were measured using the State-Trait Anxiety Inventory (Hong Kong Chinese adaptation) to check whether anxiety would affect the performance. Following the assessment, a semi-structured interview was conducted to reveal my knowledge acquired through using the selected method. Both the control and CathSim ITS groups demonstrated a high success rate, scoring 100% and 92.86%, respectively, with their first client. The semi-structured interviews revealed that the CathSim ITS group appreciated several features of their assigned method. However, there is room for further development.

The Journey To Virtual Reality

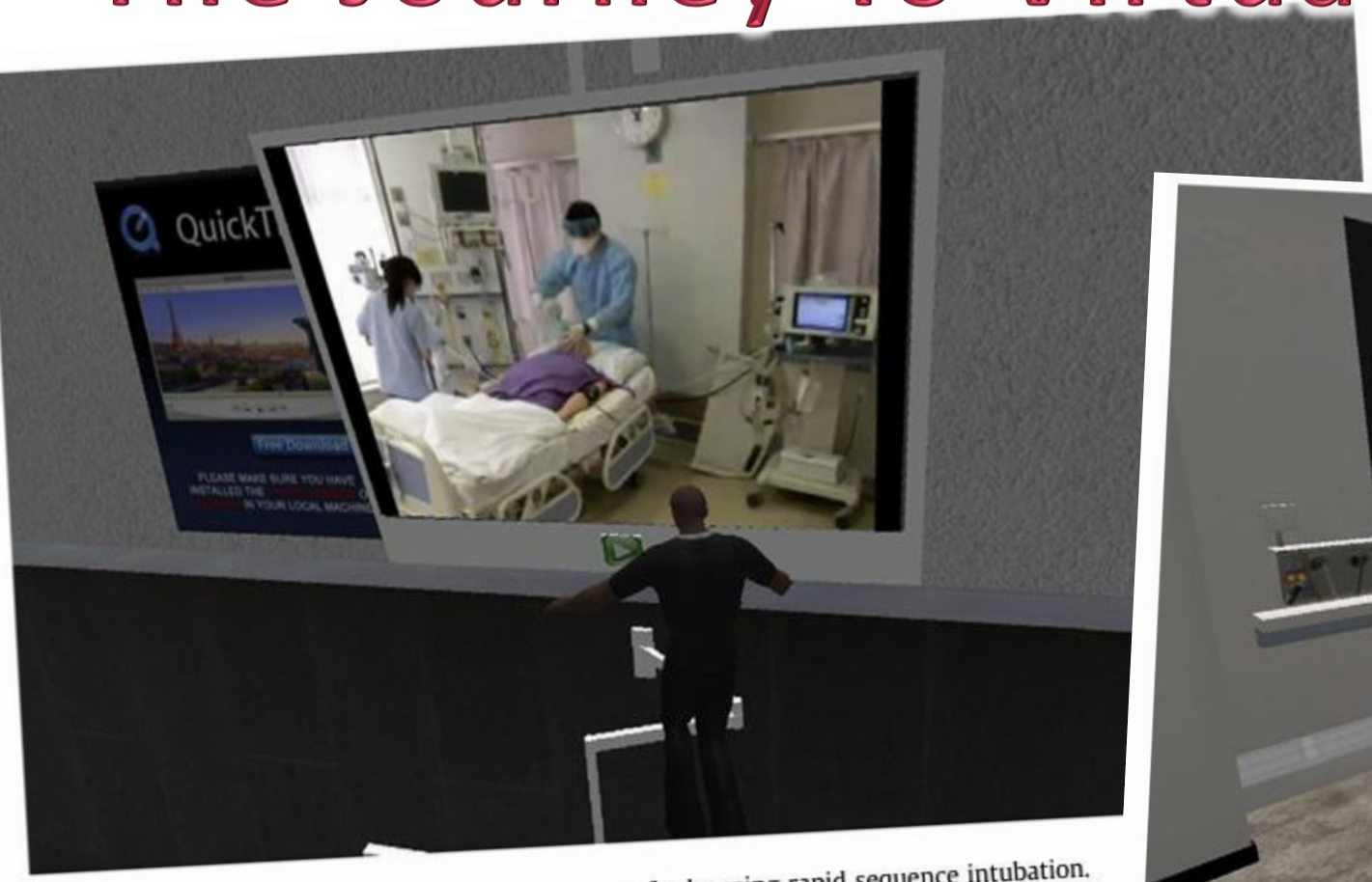

Fig. 1. A virtual classroom for learning rapid sequence intubation.

Chow, M., Herold, D., Choo, T., & Chan, K. (2012). Extending the technology acceptance model to explore the intention to use Second Life for enhancing healthcare education. *Computers and Education, 59*(4), 1136-1144.

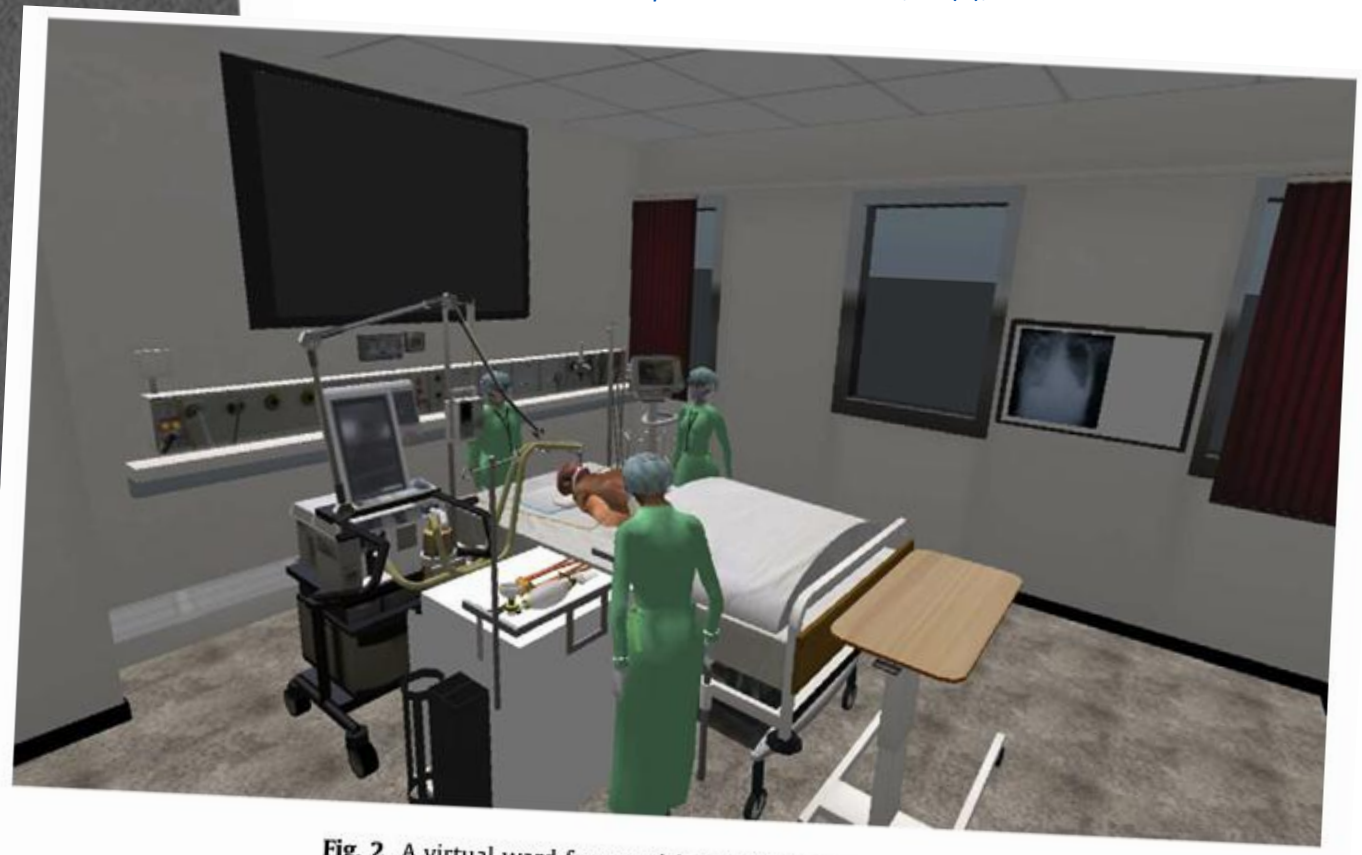

Fig. 2. A virtual ward for practising rapid sequence intubation.

Second life:
a screen-based VR simulation for skills training

The Journey To Virtual Reality

Computers & Education 59 (2012) 1136–1144

Contents lists available at SciVerse ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

Chow, M., Herold, D., Choo, T., & Chan, K. (2012). Extending the technology acceptance model to explore the intention to use Second Life for enhancing healthcare education. *Computers and Education, 59*(4), 1136-1144.

Extending the technology acceptance model to explore the intention to use Second Life for enhancing healthcare education

Meyrick Chow [a,*], David Kurt Herold [b,1], Tat-Ming Choo [c,2], Kitty Chan [a,3]

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ABSTRACT

Learners need to have good reasons to engage and accept e-learning. They need to understand that unless they do, the outcomes will be less favourable. The technology acceptance model (TAM) is the most

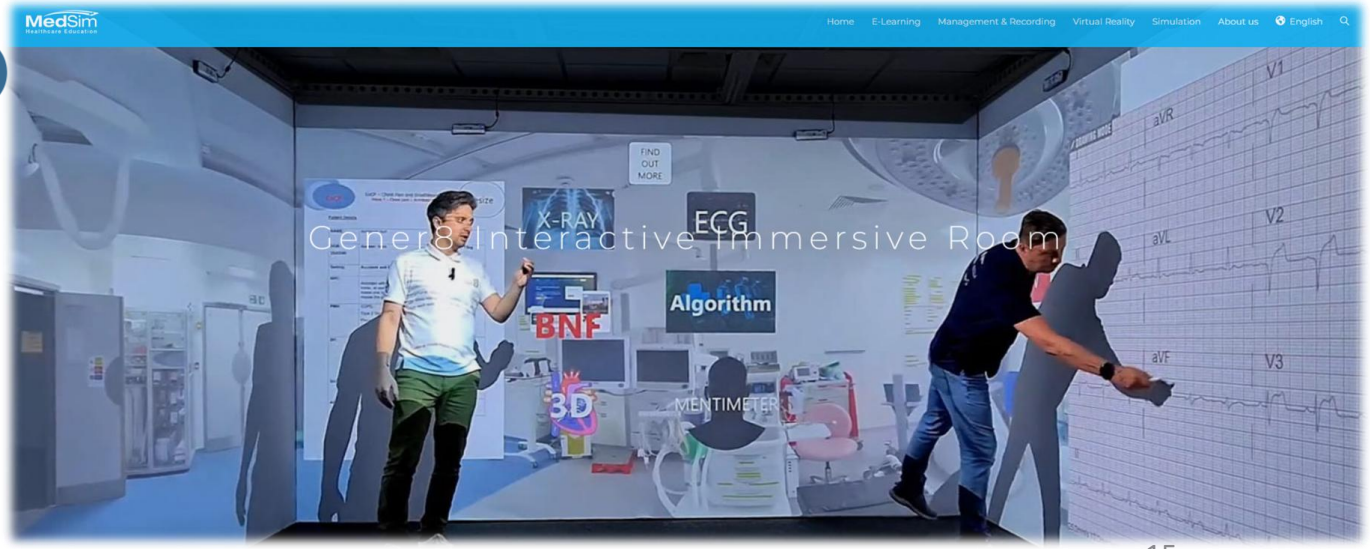
The Journey To Virtual Reality

Procedural Skills

http://www.fourd-simulator.com/

Knowledge Acquisition

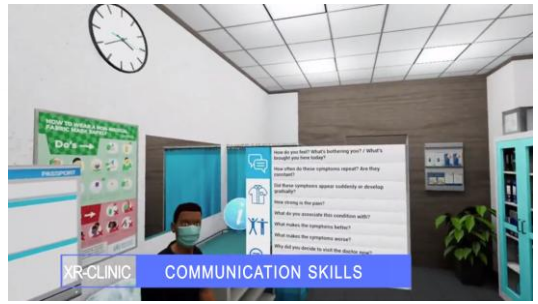
https://www.youtube.com/watch?v=LcD1VgOljLg

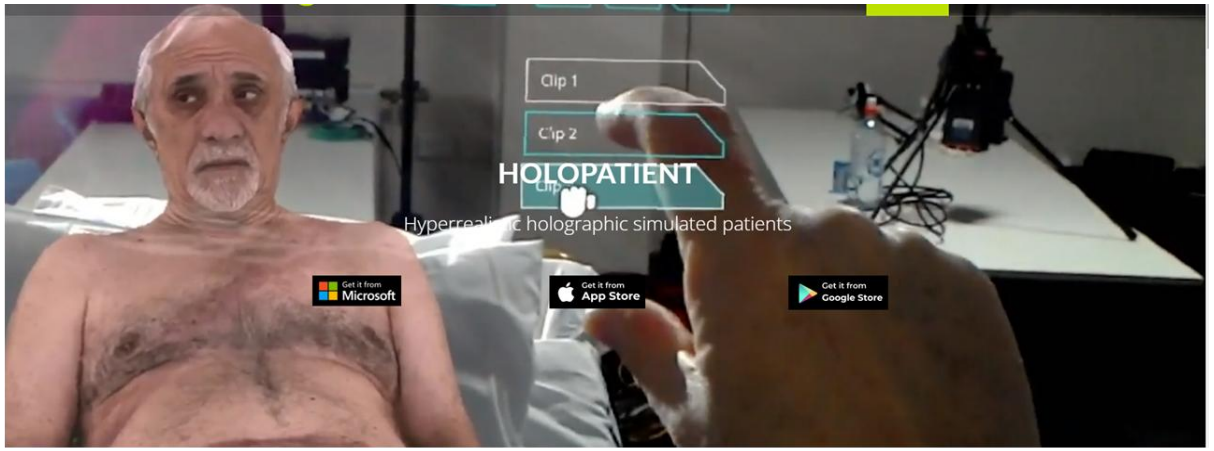


https://medsimhealth.com/

The Journey To Virtual Reality

Single Patient Management





https://www.gigxr.com/holopatient/?cn-reloaded=1

https://pdt.medicalexpo.com/pdt/medvr/xr-clinic/299050-244375.html

Existing Evidence

JOURNAL OF MEDICAL INTERNET RESEARCH Liu et al

Review

The Effects of Immersive Virtual Reality Applications on Enhancing the Learning Outcomes of Undergraduate Health Care Students: Systematic Review With Meta-synthesis

Justina Yat Wa Liu[1,2], PhD; Yue-Heng Yin[3], PhD; Patrick Pui Kin Kor[1], PhD; Daphne Sze Ki Cheung[1], PhD; Ivy Yan Zhao[1], PhD; Shanshan Wang[1], PhD; Jing Jing Su[1], PhD; Martin Christensen[1], PhD; Stefanos Tyrovolas[1], PhD; Angela Y M Leung[1,2], PhD

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[3]School of Nursing, Nanjing Medical University, Nanjing, China

Existing Evidence

Positive Learning Outcomes of IVR (Liu, et. al., 2023)

Procedural Skills

Theoretical Knowledge

Learning Experience

Conclusions: This review found that undergraduate students had positive learning outcomes and experiences after engaging with IVR teaching, although the effects may be similar to those of other forms of virtual reality or conventional teaching methods.

Multi-Challenges in Clinical Practice

Conventional Lab Practice

High Fidelity Simulations

Hardware

Pedagogy

Procedural Skills

Single Patient Management

Content

Multi-Challenges in Clinical Practice

Multi-Challenges in Clinical Practice

Clinical Risks and Errors

Medication Error

Miscommunication of Clinical Information

Delay in Care & Responses

Patient Falls

Multi-Challenges in Clinical Practice

Multi-Challenges in Clinical Practice

Deployment in Simulation Ward?

Multi-Challenges in Clinical Practice

Objectives of Virtual Hospital:
Enhancing Clinical Competence

Decision Making

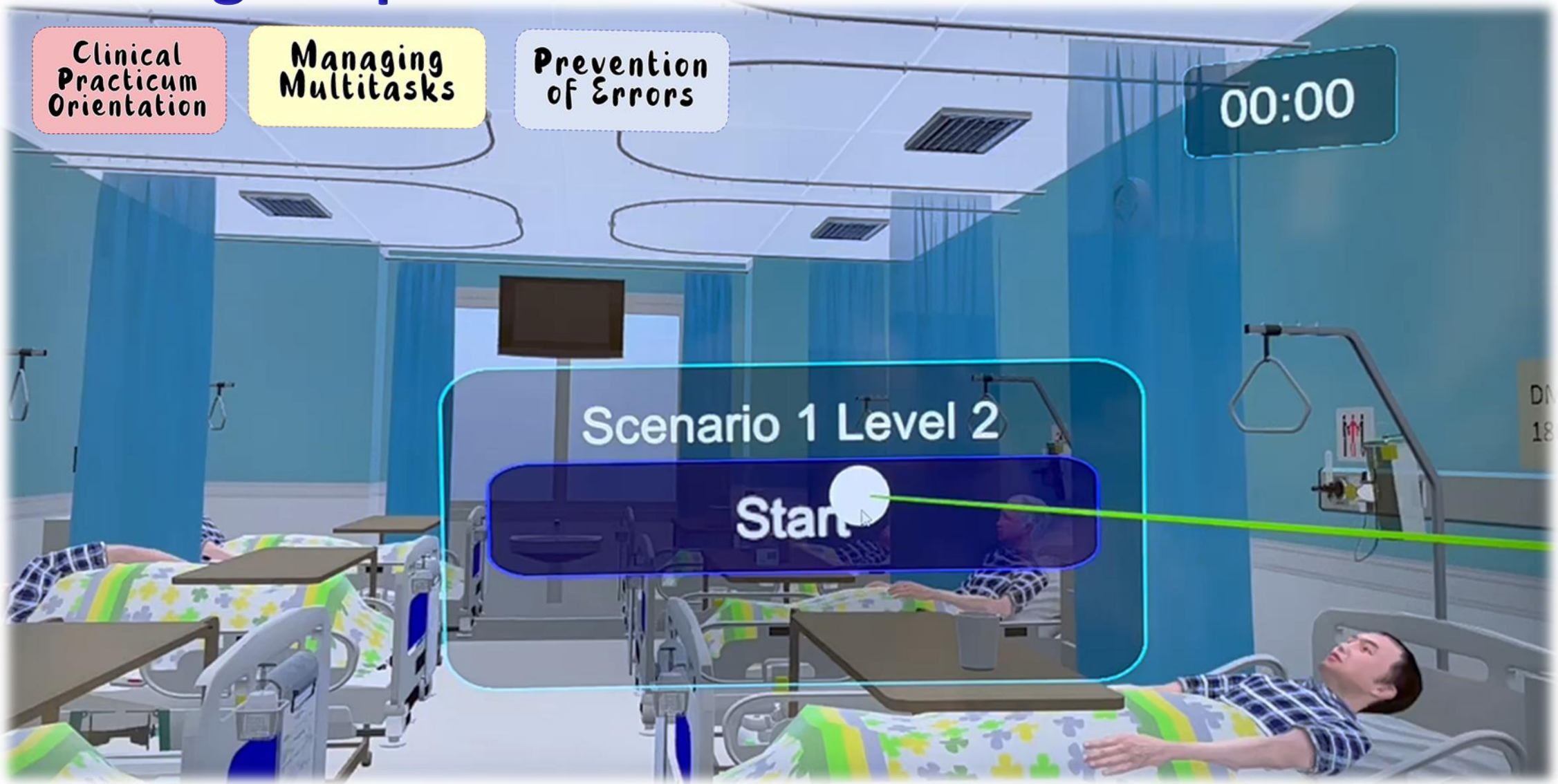
Communication Skills

Situation Awareness

Time Pressure Management

The Right Direction?!

Creating Unpredictable Scenarios



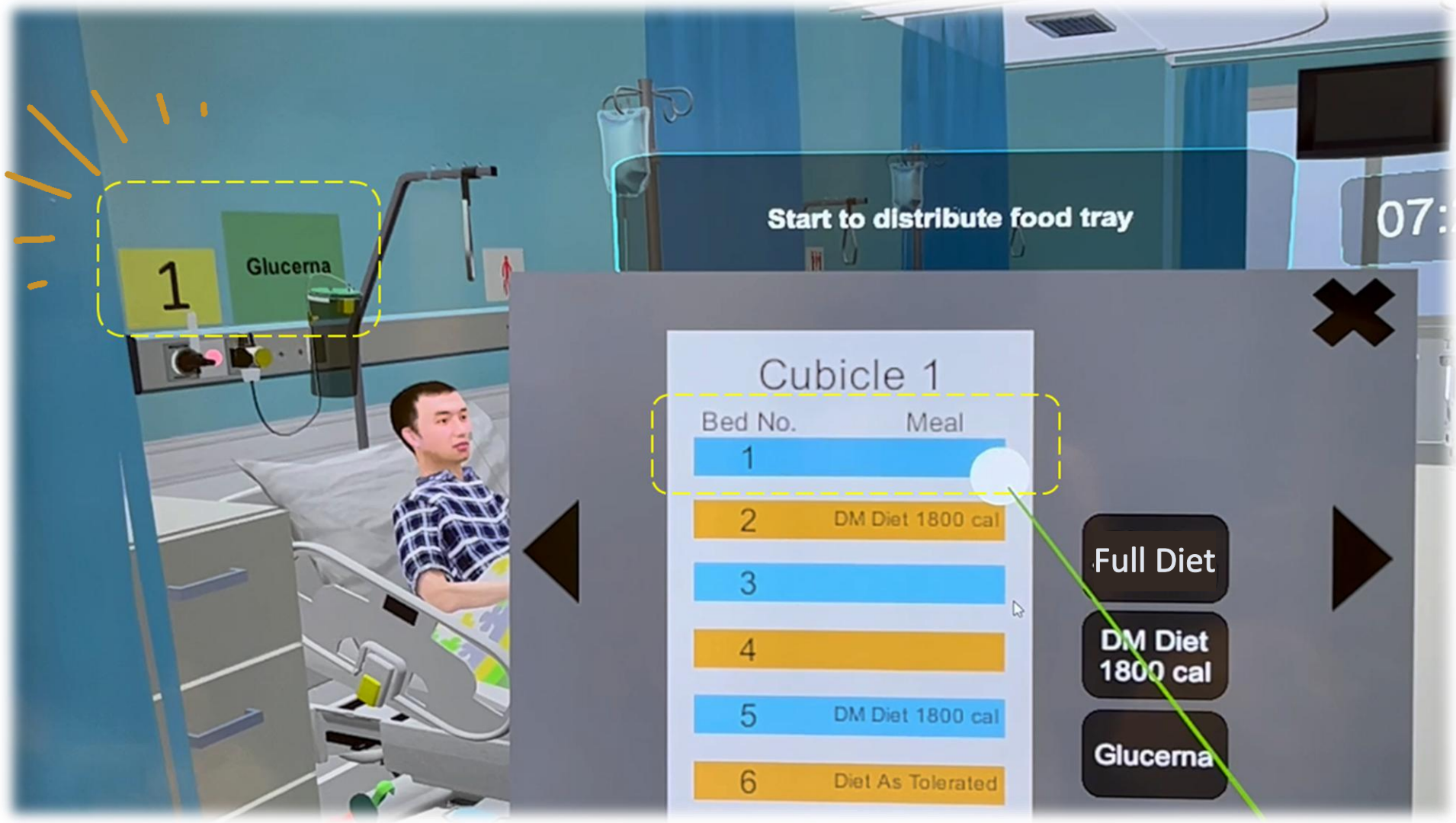
The Right Direction?!

Creating Clinical Pitfalls

Clinical Practicum Orientation

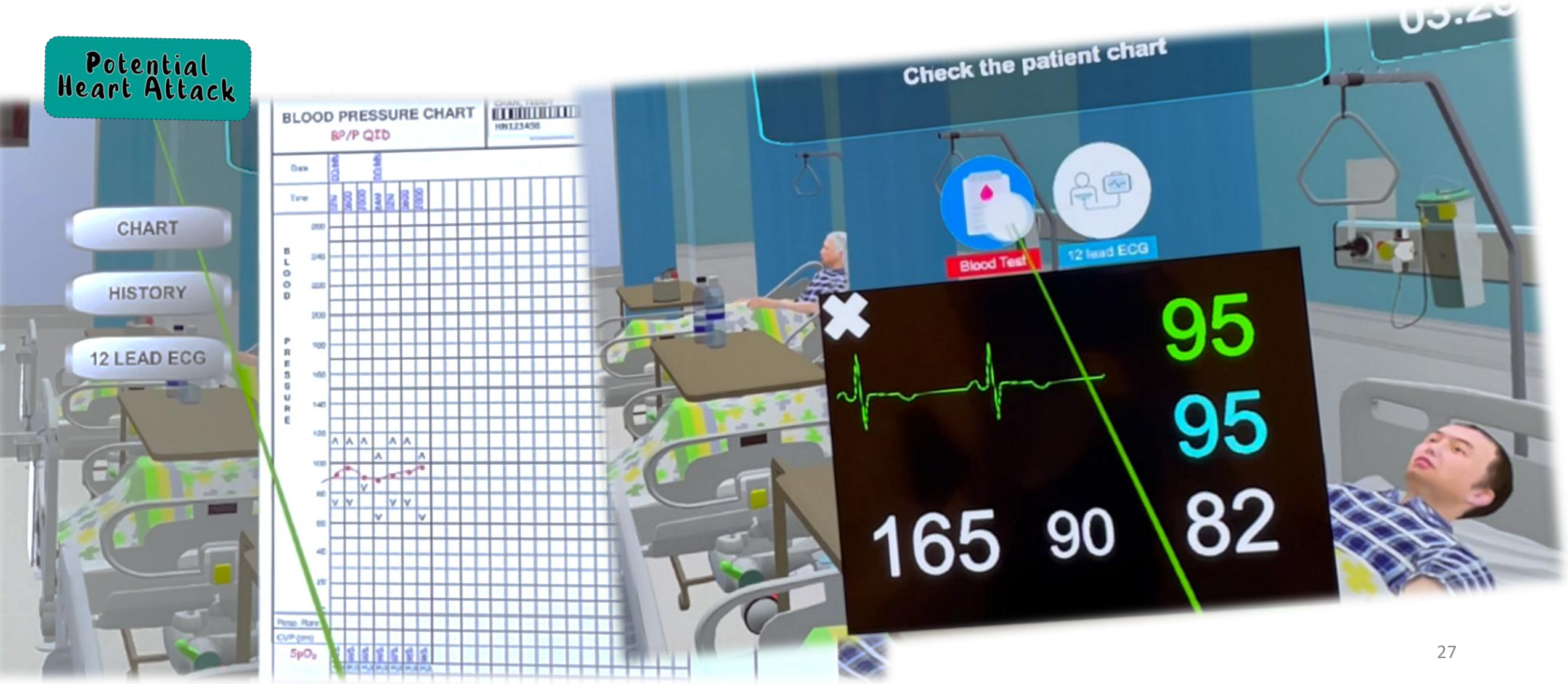
Managing Multitasks

Prevention of Errors



The Right Direction?!

Creating Non-specific Health Issues



The Right Direction?!

Creating Interprofessional Contexts
Creating Peer-Led Learning Opportunities

Neurological Assessments

The Right Direction?!

Creating The Sense of Empathy

Challenges of Delirium

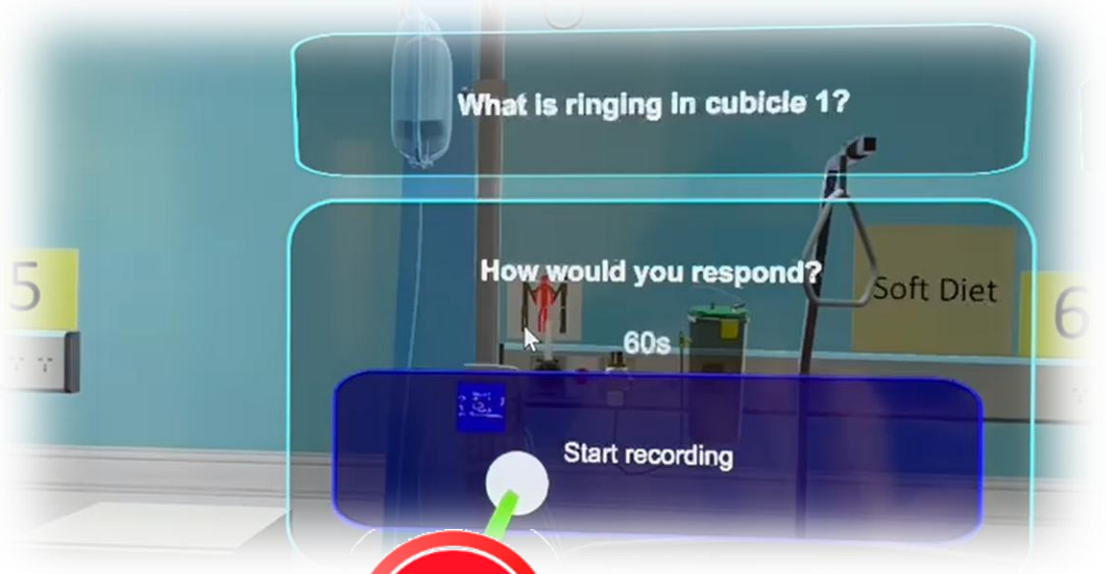
Figure 2. Scenarios simulating the hallucinations experienced by older adults with delirium.

(Liu, et. al, 2024)

The Right Direction?!

Pedagogy

Interactive Approach



Voice Recording

Identify Immediate Responses

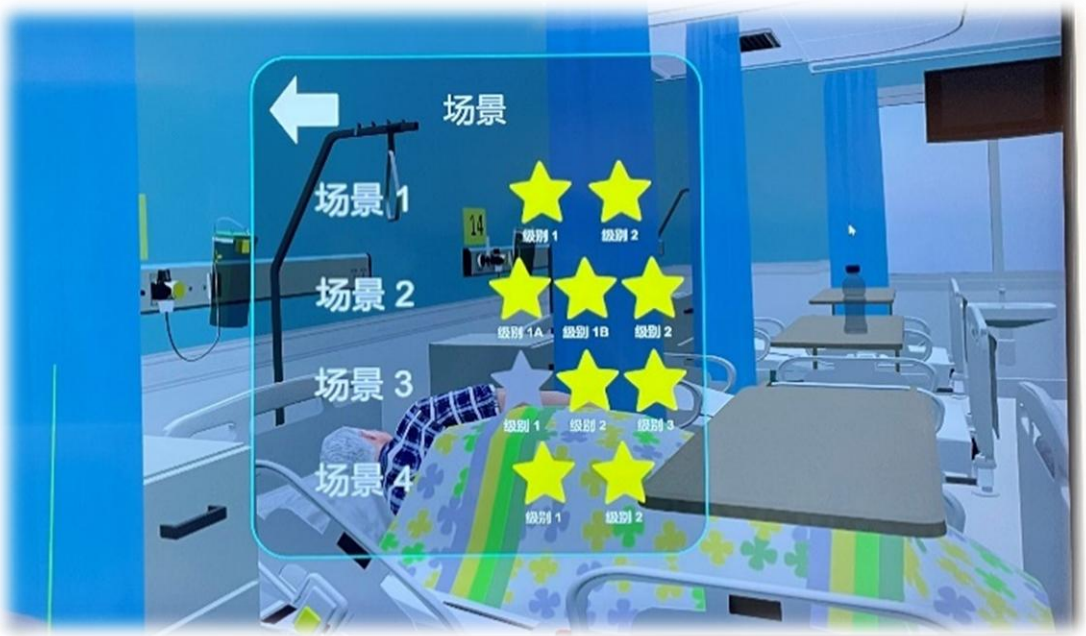
Multiple Choice Questions

Reconsider & Reflect

The Right Direction?!

Pedagogy

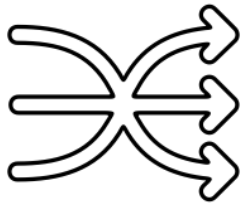
Gaming Approach



The Right Direction?!

"Content"

6 Scenarios



Distinct Levels of Progression

Simple to Complex

Clinical Practicum Orientation → Managing Multitasks → Prevention of Errors

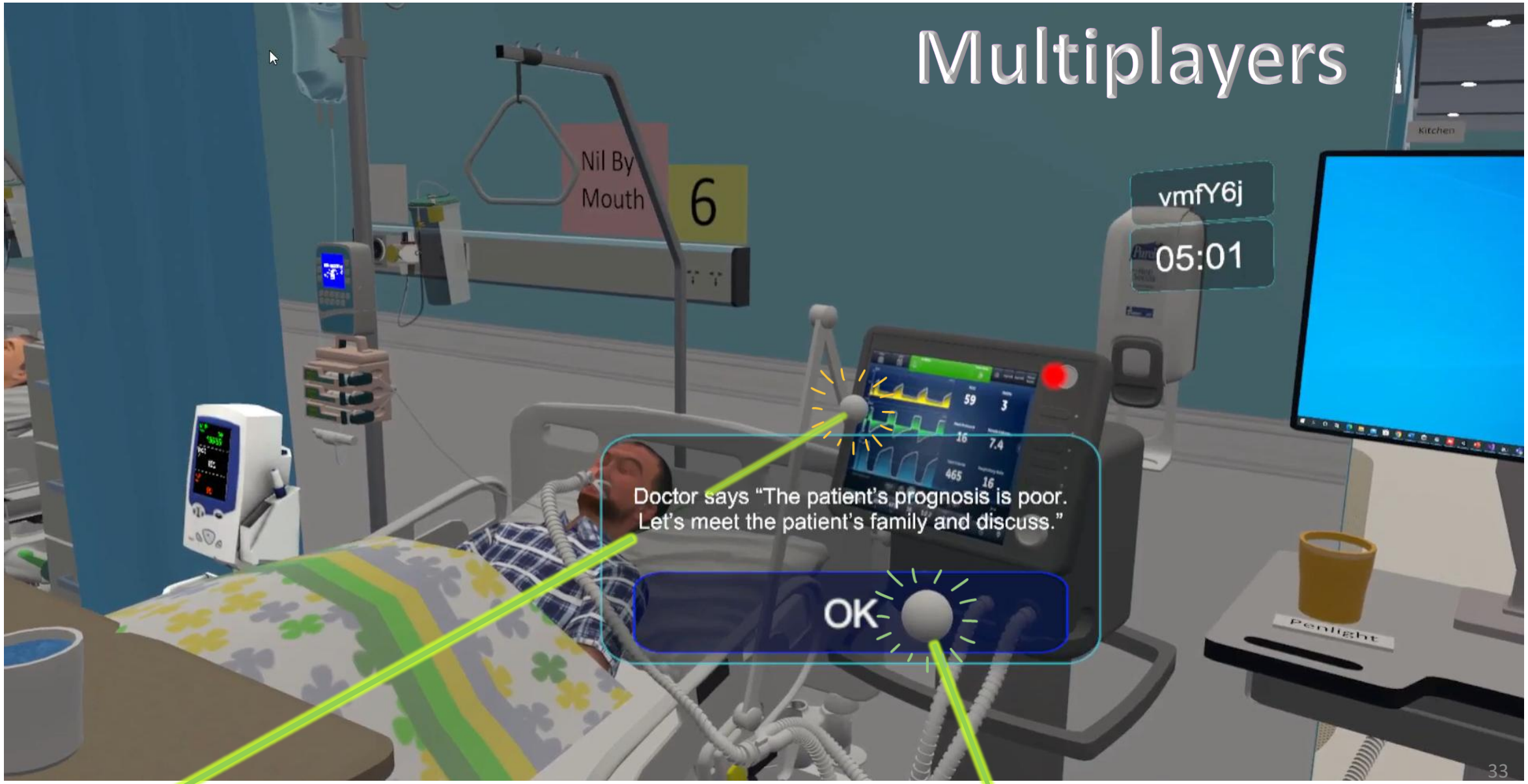
Single Profession to Inter-Profession

Potential Heart Attack → Neurological Assessments → Fall Risks

Professional Perspective to Patient's Perspective

Challenges of Delirium

The Right Direction?!



Evidence-Driven Momentum

Clinical Practicum Orientation

Managing Multitasks

Prevention of Errors

High Satisfaction

Versatile

Stimulating

Realistic

Promote Self-Confidence

Decision Making

Situation Awareness & Vigilance

Communication & Interaction

Phase 1: Cross-sectional Survey

Evidence-Driven Momentum

Clinical Practicum Orientation

Managing Multitasks

Prevention of Errors

How does VR training influence your learning experience?

Immersing in a High-Stress Time Critical Environment

- “I heard an alarm go off and it made me **feel very nervous**
- “We have to **be highly alert** because things would not happen as planned

Debriefing Discussion

Evidence-Driven Momentum

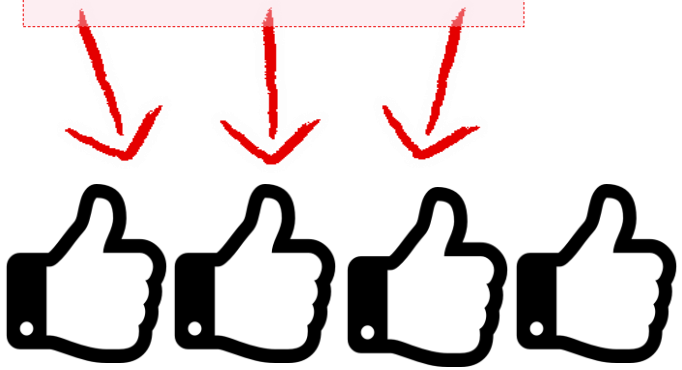
Potential Heart Attack

Significantly Higher Scores

Virtual Hospital

vs

High Fidelity SIM



- Situation Awareness & Vigilance
- Decision Making
- Communication & Interaction

Phase 2: Waitlist Control

Evidence-Driven Momentum

How does VR training impact your learning experience?

Cultivating a Sense of Alertness

> I feel a sense of **tension** and **urgency** and becoming aware of the clinical situation

Cultivating Clinical Reasoning

> I learned to **prioritise** and make the **right decisions** when having to handle unexpected incidents

Evidence-Driven Momentum

Neurological Assessments

Team-based Learning Impact

Quality of Learning

Clinical Reasoning Ability

Professional Development

High Satisfaction

Phase 3: Survey & Narrative Reply

Nursing & Radiography

Evidence-Driven Momentum

JMIR MEDICAL EDUCATION

Challenges of Delirium

Original Paper

The Effects of Immersive Virtual Reality–Assisted Experiential Learning on Enhancing Empathy in Undergraduate Health Care Students Toward Older Adults With Cognitive Impairment: Multiple-Methods Study

Justina Yat Wa Liu[1,2], PhD; Pui Ying Mak[1], BSc; Kitty Chan[1], PhD; Daphne Sze Ki Cheung[1,2], PhD; Kin Cheung[1], PhD; Kenneth N K Fong[3], PhD; Patrick Pui Kin Kor[1], PhD; Timothy Kam Hung Lai[1], MSc; Tulio Maximo[4], PhD

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[4]School of Design, The Hong Kong Polytechnic University, Hong Kong, China (Hong Kong)

Evidence-Driven Momentum

Challenges of Delirium

The Effects of IVR-assisted Experiential Learning on Enhancing Empathy in Healthcare Undergraduate Students towards Older Adults with Cognitive Impairment: Multiple-Methods Study

(Liu, et. al, 2024) JMIR Medical Education

Empathy

High Satisfaction

High Self-Confidence

Nursing & Occupational Therapy

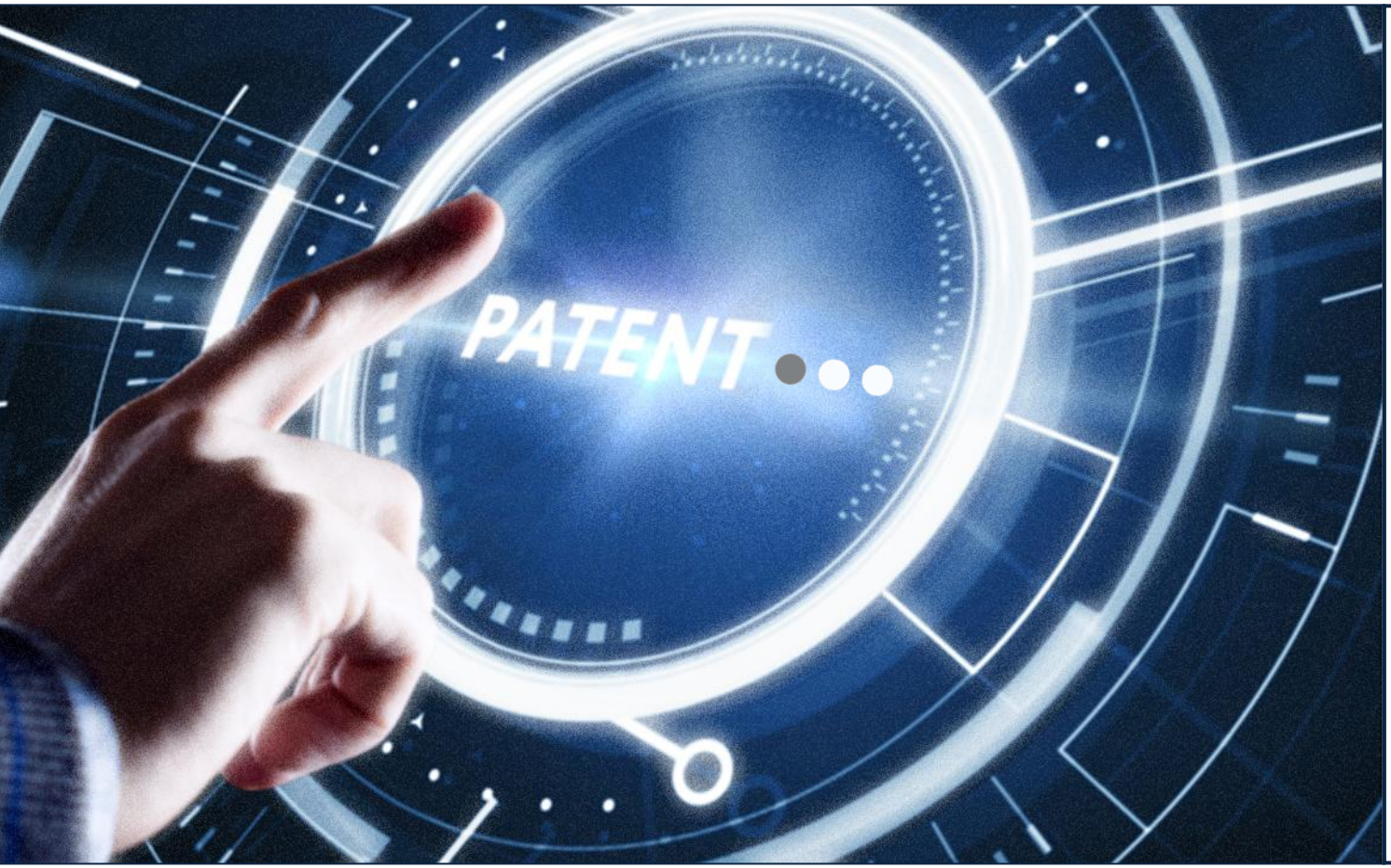
Revisit? Innovate?

Revisit? Innovate?

Student Satisfaction

Revisit? Innovate?

Knowledge Transfer



HK short-term patent HK30083446

Revisit? Innovate?

Integration to the Curriculum

Pre-Clinical Activity

Subject-based Activity

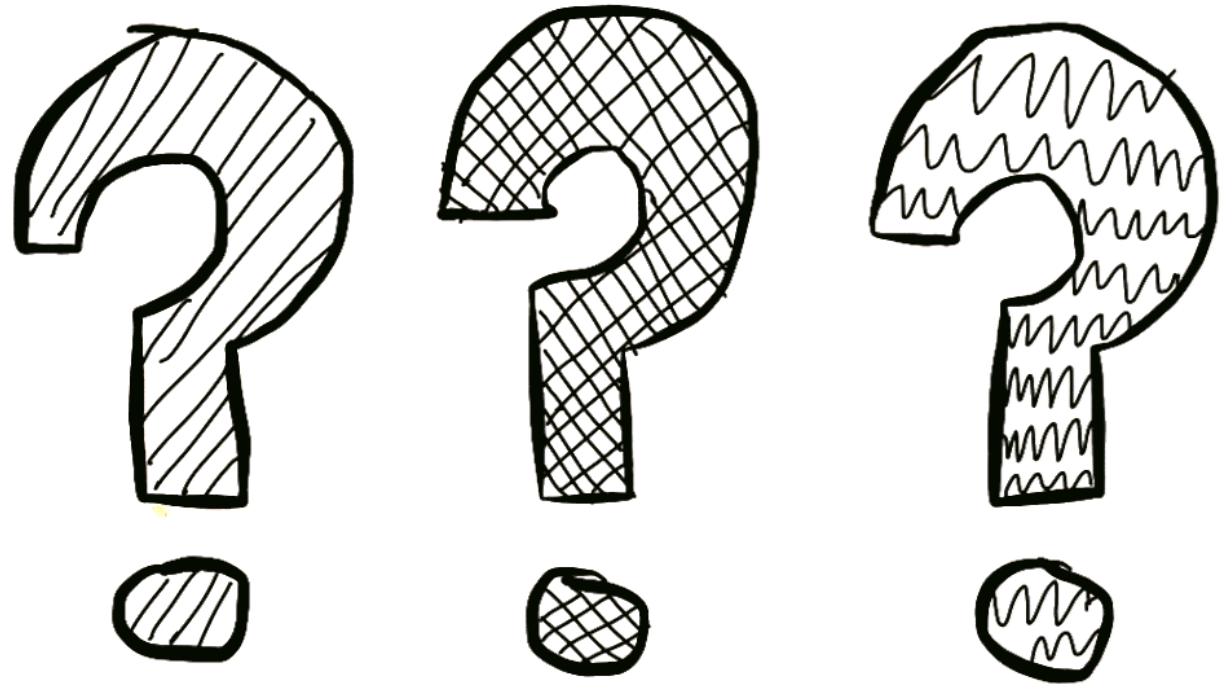
Revisit? Innovate?

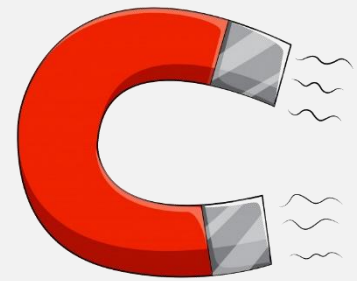
Revisit? Innovate?

Revisit? Innovate?

Revisit? Innovate?

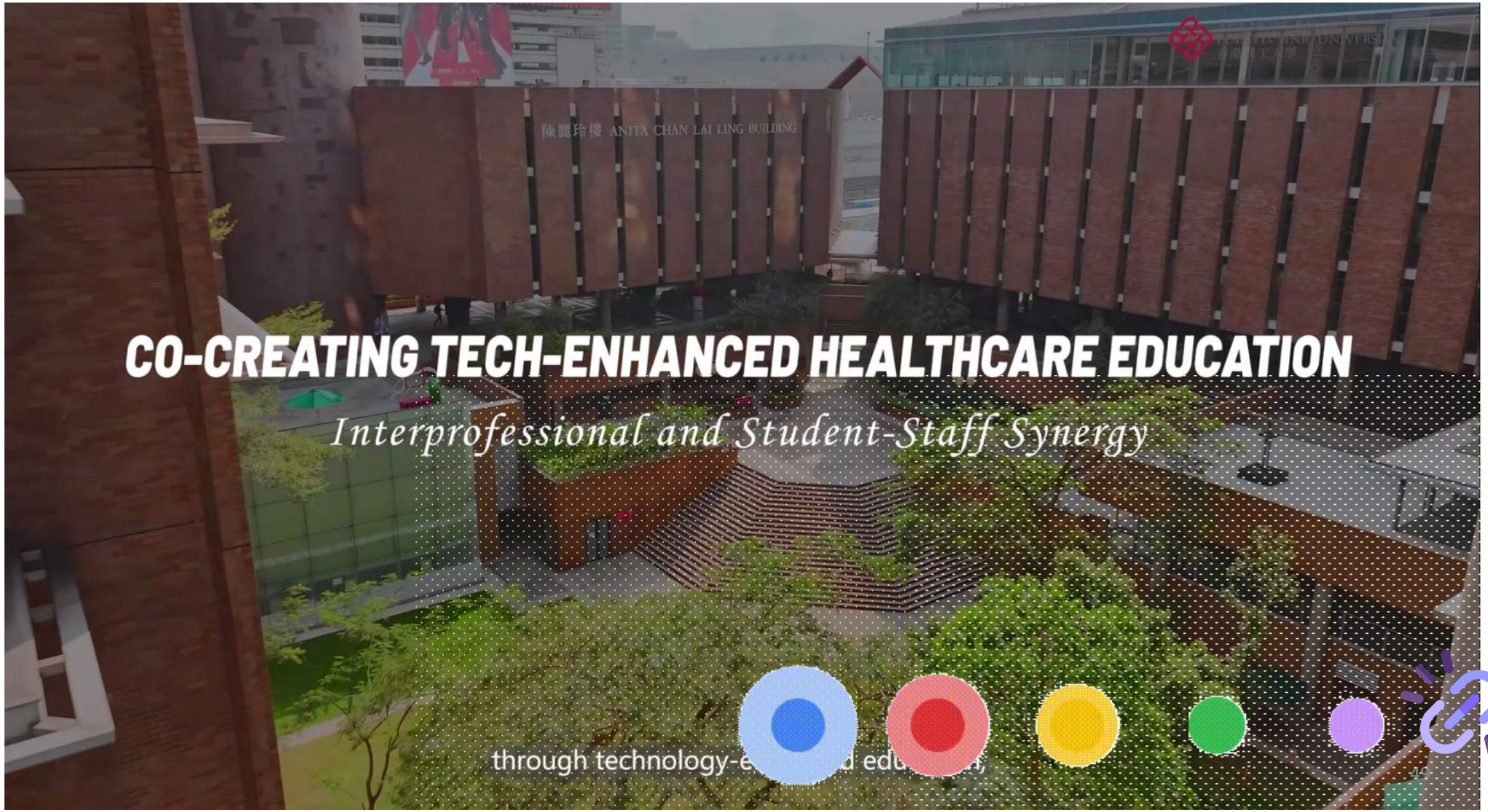
Clinical Learning Outcomes





Multi-sites Studies

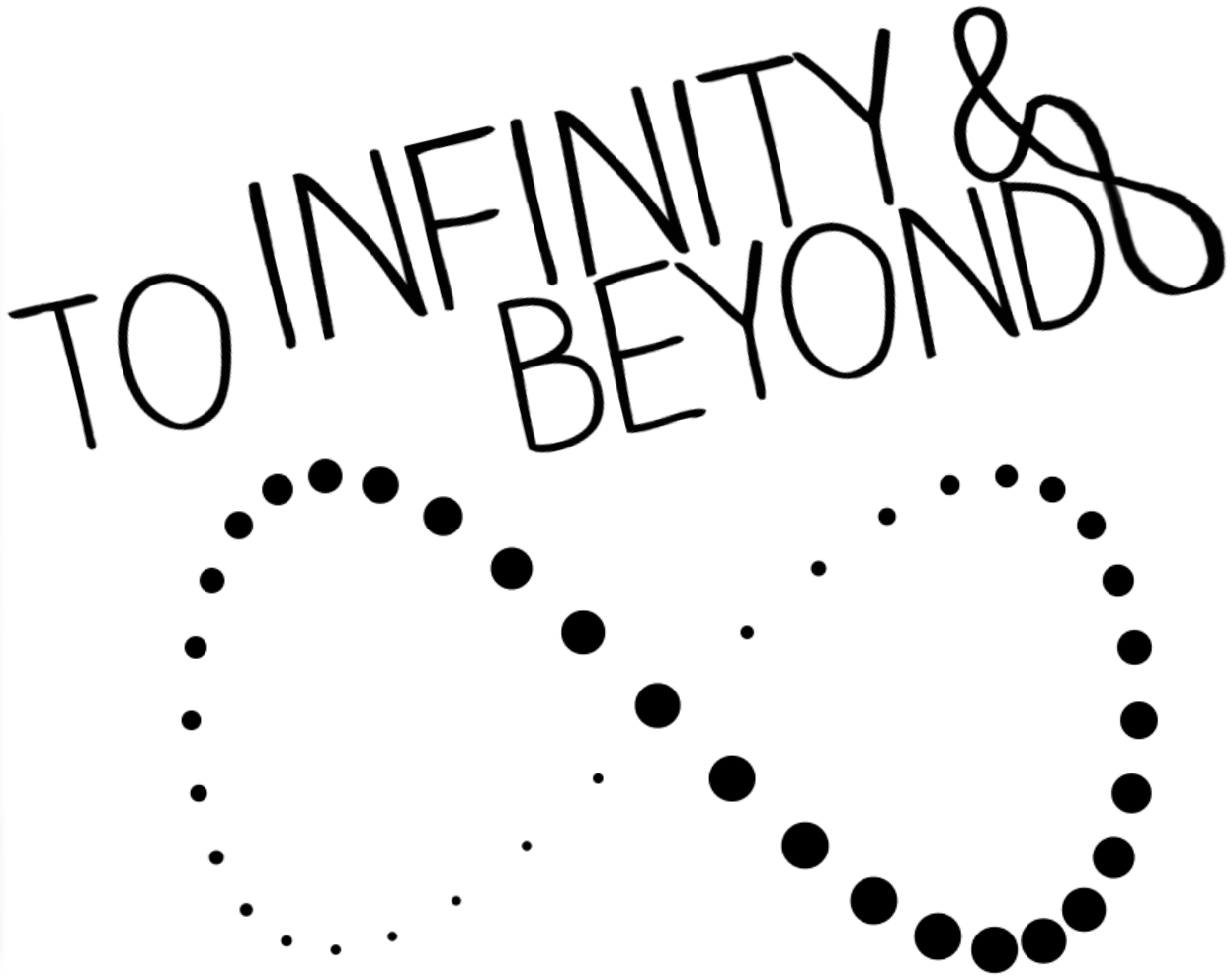
Revisit? Innovate?



Revisit? Innovate?

A Critical Mass for Innovative Teaching

Revisit? Innovate?



VIRTUAL HOSPITAL

Engage to Learn Empower to Succeed