1ST EAST ASIA CLINICAL SIMULATION CONFERENCE

ID: 16

Evaluating a Cave VR (Virtual Reality) Dyspnoea Simulation for Nursing Students: Competence, Engagement, and Transferability

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INTRODUCTION

Dyspnoea is a common nursing problem in clinical settings and can lead to fatal outcomes. Prompt, effective management is therefore crucial. Newly graduated nurses are no exception. To support skill development, our team of experienced nurses and information technology experts developed a typical dyspnoea simulation scenario and delivered it to nursing students through an immersive, team-aware Cave VR practice environment. This study evaluates the impact of the Cave VR dyspnoea simulation on nursing students' competence in: (1) identifying respiratory distress and monitoring SpO_2; (2) initiating oxygen therapy according to patient need; (3) implementing respiratory management—including psychological support, breathing and coughing guidance, suctioning, and inhaler use—while maintaining infection control; and (4) providing aftercare and conducting follow-up monitoring.

METHODS

The study employed a prospective, single-group educational evaluation with a mixed-methods approach.

A total of 129 second-year nursing students participated in the Cave VR learning activity. They were divided into six groups of approximately 20 students and rotated through the activity. Each session consisted of one VR participant and about 20 observers. The simulation depicted a 71-year-old patient with COPD and a chest infection in a medical ward. The VR participant followed a predefined workflow (Fig. 1), which included 10 embedded decision points designed to elicit and assess targeted clinical reasoning. Student observers recorded procedural performance using a checklist (Fig. 2). Each session lasted approximately 10–12 minutes.

After the session, students completed a survey using a 0–5 Likert scale to rate perceived learning effectiveness across domains, engagement, confidence, and transferability, as well as their likelihood of recommending the activity. Open-ended comments were also collected .

Figure 2: Performance checklist

Course: N232F respiratory disorders

Management of dyspnoea in clinical setting (VR)
Date:
Participant:
Observer:

Performance Evaluation
Please check the performance of the participant on the following items by circle your answer of item 1-10.

	item		Remarks
1	Able to identify a patient is in respiratory distress	Yes/No/Unsure	
2	Demonstrates psychological support and breathing advice	Yes/No/Unsure	
3	Utilizes SpO2 monitor effectively	Yes/No/Unsure	
4	Applies oxygen therapy correctly	Yes/No/Unsure	
5	Implements infection control measures appropriately	Yes/No/Unsure	
6	Performs oral suction technique proficiently	Yes/No/Unsure	
7	Performs nasopharyngeal suction technique proficiently	Yes/No/Unsure	
8	Completes the suction procedure with appropriate follow-up	Yes/No/Unsure	
9	Administers Ventolin puff effectively	Yes/No/Unsure	
10	Conducts aftercare appropriately	Yes/No/Unsure	
11	Overall performance (Rating 0-5) 0 = Nil, 5 = Optimum		
12	Any further comment:		

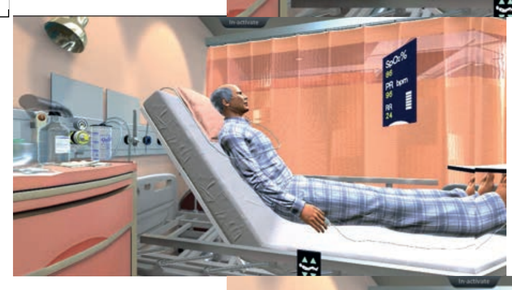
Figure 1: Flow of Cave VR Simulation

VR participant wears a pair of glasses

Choose session

Case presented with signs & symptoms

Vitals checking



Promote ventilation

Infection control

Suction techniques

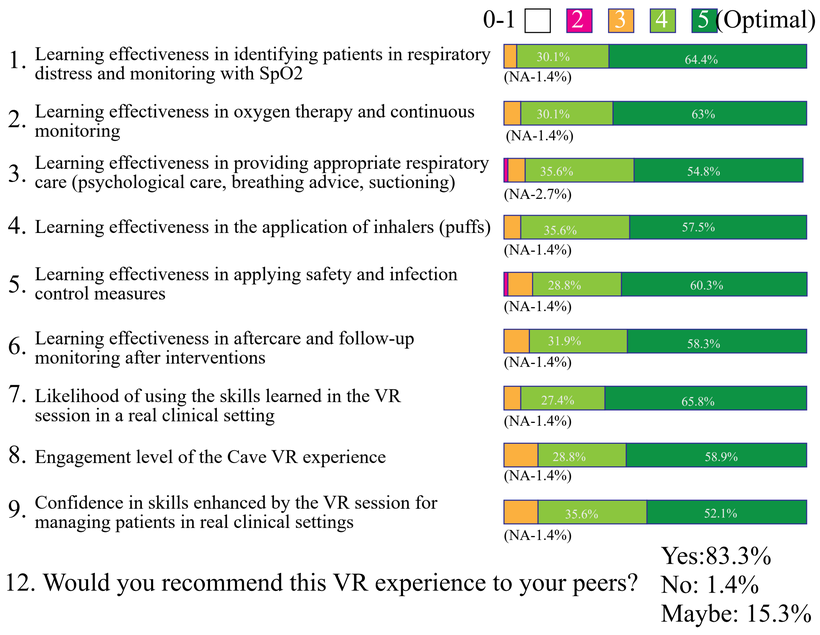
Decision making

Check medications

Puff technique

Follow up care

Learning Experience Evaluation



12. Would you recommend this VR experience to your peers?
Yes:83.3%
No: 1.4%
Maybe: 15.3%

Qualitative comments

10. What did you like most about the cave VR experience? (selective)

Realism	• Good experience, can confirm in ward - like setting • The real-time situation of patient's condition in clinical environment. • Can react to the patient just like real • I like about the scenario. It is very realistic and the setting of the hospital is also same
Stepwise clarity	• It was a very interesting and memorable experience! It was very helpful to integrate details of knowledges to have a deeper understanding in nursing process. Thank you!!! • I can experience the clinical case in real life knowing step by step to approach the patient • Step by step to do the hold Nursing process • I can know the whole process of how to taking care of the patient
Immersive engagement	• It's fun to learn through interactive activities • I like about we can restudy all the procedure about handling a patient with dyspnoea. • The VR setting grabs our attention and allows us to immerse in the simulation.
Safe practice without timely equipment setup	• No need to gather equipment when training skills • Provided clear information about the patient • Can have some choice to lead us make decisions • There are some questions to guide us to thinking

11. What aspects do you think could be improved in the VR simulation? (selective)

- Smoother interaction and louder audio.
- The screen is too shake, so dizzy
- Briefing session for the VR
- The view of vision can be less dizzy
- Enhance the engaging chances of students
- Can have more sim lab in facing different health problems
- Hopefully everyone can play it
- It is all good . Cannot be better i think!!
- The technique of VR. It may be difficult to control at first
- The duration can be longer
- Time management could be improved. Also, incorporating more details into the VR simulation can be considered (eg. Setting the oxygen concentration for different kinds of mask)

CONCLUSION

The Cave VR dyspnoea simulation produced high self-reported learning effectiveness across key respiratory competencies, with strong engagement, confidence, and perceived clinical transferability. The model aligns well with checklist-driven procedural training and decision-making for COPD-related dyspnoea.

IMPACT

Cave VR represents a scalable, resource-efficient modality for acute respiratory skills training in undergraduate curricula. Iterative refinements based on student feedback—stability, audio, timing, enhanced parameter controls, and expanded scenarios—are likely to further improve educational yield and readiness for real-world management of dyspnoea.

Please scan QR Code for video demonstration

WELCOME for comment & suggestions!