Use of Immersive Environments to Address the Challenge of Entrustability in Recognition of the Critically-ill Patient

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METHODS / APPROACH

• Data was collected from a convenience sample of beginning third year medical students at VR laboratories within the University of Illinois College of Medicine, Peoria.
• The VR experience combined didactic instruction with interactive elements. Long term programmatic goal is behavior change. The modules incorporated elements of immediate feedback, visible learning and teaching, examples of self-exploration, problem-based learning, and multimedia instruction(3).
• Didactic recordings on evaluation of critically ill patients were done in a 3D VR HMD software environment (Enduvo©) and HTC Vive© hardware, followed by learner practice in patient assessment and MCQs.
• Video cineloups shared in window-like projections in 3D space allowed learners to evaluate patients’ appearance, monitor output, ECGs, x-rays, and lab results in 24-minute modules, (adult with dysrhythmia, Image 1, and pediatric asthma exacerbation, Image 2).
• Cases followed a template progressing through stages from mild to severe. Assessment tasks followed each objective, with explanations for correct answers given within the modules.
• Observers measured time spent in the module and captured if the HMD was removed; after the modules, learners completed a survey including ratings of pre-post confidence.

RESULTS / OUTCOMES

We present data from 20 learners. (Figures 1-6) Median correct response rate for assessment questions was 82.5% for the pediatrics case (range 40% to 100%) and 90% in the adult case (range 65% to 100%). Forty-five percent of participants rated the VR experience equal to lecture, and 35% rated VR superior.

DISCUSSION

Positive learner satisfaction, increased confidence, and extended time spent in the modules suggest learner engagement, facilitated by the limited distraction format of VR. Questions were automatically graded without extra faculty time. We demonstrated improved learner confidence in management of these exemplar cases, and suggest this promising programmatic evaluation(4, 5) warrants future exploration of changes in knowledge and performance.

SIGNIFICANCE

Advantages of this teaching method include: digital content scalability, asynchronous self-paced lessons, case standardization between learners, efficient use of faculty time, and no requirement for faculty to know software coding. The immersive background and case stimuli strive toward environmental fidelity, combines clinical and basic science learning, provides immediate feedback to learner relative to faculty consensus of correct answers, and minimizes distractions by nature of the HMD environment.

REFERENCES


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