SCHOLARSHIP OF TECHNOLOGY ENHANCED LEARNING

SoTEL Symposium 19-20 February 2020

MESH360: Developing Meaningful Authentic Critical Care Simulation.

Stephen Aiello
Auckland University of technology
Stephen.aiello@aut.ac.nz

Norm Wilkinson
Auckland University of Technology
Norm.wilkinson@aut.ac.nz

Submission Type: Case Study (20mins + 10minsQ&A)

Keywords: Virtual reality, Immersive simulation, Paramedic, Design based research

Abstract:

Paramedics deal with a variety of emergency situations, ranging from natural disasters to road traffic accidents. Higher education providers need to critically explore how to best prepare student paramedics for high risk, unforeseen events that require critical awareness and diagnostic problem-solving capabilities. Hi-fidelity mannequin based simulation is a widely adopted and proven technique for clinical training and critical care response education (Kaufman, 2010). However, traditional mannequin based simulation in isolation limits a meaningful learning context and authentic real-world assessment influences.

The MESH360 project involves a collaborative transdisciplinary team of designers and educational researchers, in the design of XR to enhance student and professional paramedic training to prepare practitioners for the environmental stressors and critical care decisions involved in high-risk situations.

This presentation explores the third iteration prototype design stage of an immersive reality (XR) enhanced simulation project in critical healthcare higher education. To promote student engagement through innovative learning tasks, XR was employed to introduce critical elements of patient and practitioner risk and stress by creating a learning environment that more authentically simulates these elements.

Design Based Research (DBR) provided a structure within a four-phase iterative framework (McKenney & Reeves, 2012) when designing the XR learning environment (Cochrane et al., 2017). Using DBR, the project explored the impact of mobile XR enhanced simulation for novice and professional paramedics. This project explored the development and implementation with an enhanced simulation scenario involving a virtual helicopter ride and an immersive simulated patient rescue.

The project used mixed methods to triangulate qualitative and quantitative data within the design. We measured participant stress by recording heart rate (HR) followed by subjective qualitative participant responses and feedback (Pre and post participant surveys, and post focus group). The thematic analysis showed a positive and enthusiastic experience by the students. Whilst some thought there was room for increased helicopter fidelity, all students believed that XR provided a more authentic experience. This presentation will demonstrate the methods and user reaction of this prototype study.

This is the third iteration prototyping a DBR project that explores the development of an immersive reality framework for enhanced critical care simulation for educating paramedics within an authentic learning environment. A learning solution was implemented into an educational setting offering context to real-world learning within an engaging authentic environment. The next stages of the research will iteratively evaluate and refine prototype immersive reality learning environments, comparing the impact upon both novice and expert paramedics. This will inform the next phase of the DBR project that will focus upon the development of design principles for a transferable design framework.

References

Cochrane, T., Cook, S., Aiello, S., Christie, D., Sinfield, D., Steagall, M., & Aguayo, C. (2017). A DBR Framework for Designing Mobile Virtual Reality Learning Environments. *Australasian Journal of Educational Technology (AJET), 33*(6), 54-68. doi: https://doi.org/10.14742/ajet.3613

Kaufman, D. (2010). Simulation in Health Professional Education. In D. Kaufman & L. Sauvé (Eds.), *Educational Gameplay and Simulation Environments: Case Studies and Lessons Learned* (pp. 51-67). Hershey, PA, USA: IGI Global.

McKenney, S., & Reeves, T. (2012). *Conducting educational design research*. London: Routledge.