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Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Optimising Healthcare Education with Design-Based Theory

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In complex, and socially dynamic educational systems, traditional research methodologies often fail to connect with everyday practice, creating a need for “usable knowledge” when solving individual and collective education problems (Design-Based Research Collective, 2003). Traditional methods are effective, but do not necessarily uncover the nature of changes to student thinking during an education experience. With this, Design-Based Research (DBR) is a proposed solution that emerges as a pivotal methodology in educational research, as it aims to integrate theories of learning with practical experiences. Seen as a systematic yet adaptable approach, DBR integrates iterative cycles of analysis, design, and evaluation in collaboration with researchers and practitioners within authentic educational settings, (Harrington, 2012; Wang & Hannafin, 2005).

This (poster) presentation will describe how DBR was utilised to create a learning environment to improve learning experiences within healthcare education. An analysis of the problem highlighted that healthcare students experienced high levels of anxiety during high-fidelity simulation when asked to perform and treat simulation manikins (Aiello et al., 2023). In part, the main issues relate to a lack of environmental authenticity, resulting in under-stimulation and performance anxiety resulting in over-stimulation. This relates to the Yerkes Dodson stress performance curve and suggests that too little or too much arousal results in poor performance (Yerkes, 1908). The hypothesis therefore was to design a solution for peak performance by increasing environmental authenticity and managing anxiety.

Method

The hypothesis is conceptualised as a ‘design solution’ rather than an intervention. To provide an authentic learning experience virtual reality environments were developed, and to aid performance anxiety, the centering technique was used. Centering is a visualisation technique that teaches participants to focus on the here and now, reduce negative thoughts, and lower anxiety. Virtual reality scenarios were provided prior to each simulation and included a ward-based environment (nurse students) and a rescue helicopter (paramedic students).

The study involved 35 Master of Nursing Science, Entry to Practice student nurses at the University of Melbourne and 33 Bachelor of Health Science, Paramedicine students at Auckland University of Technology and industry experts within nurse and paramedic education. All data was collected for each cohort iteratively in 2023 and 2024 to evaluate and develop the design. Data collection included using the State-Trait Anxiety Inventory as a pre-test baseline to measure general and long-standing anxiety for each participant. Within-test heart rates was recorded on a Polar H10 chest strap to measure an objective physiological response to stress. Post-test participants completed the Competitive State Anxiety Inventory–2R after each simulation to understand subjective anxiety and several focus groups were completed to gain further insight into experiences and perspectives.

Discussion and Conclusion

This presentation outlines the design characteristics used to support student learning within healthcare education settings. Design-Based Research offers a robust framework to develop and refine educational practices through iterative design and implementation cycles. Early results suggest that both virtual reality and the centering technique impact healthcare learning and the implementation of this approach could lead to long-term resilience and build confidence that maximises potential.

Keywords: Design-based Research, Performance Anxiety, Clinical Simulation, Virtual Reality, Centering Technique

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