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Student and lecturer perceptions of augmented and virtual reality in anatomy: A Sri Lankan case study

Janaka Eranda¹, Hewapathirana Roshan² & Karunathilake Indika³

¹Ministry of Health, Sri Lanka; ²Department of Anatomy, Genetics and Biomedical Informatics, Faculty of Medicine, University of Colombo, Sri Lanka; ³Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka

I. INTRODUCTION

Anatomy is considered as one of the key components of undergraduate medical education. Hence, it is important to have a sound knowledge in anatomy to proceed into clinical medicine. Didactic lectures, textbooks, prosected specimens, and cadaveric dissection are the most frequently used anatomy teaching methods. However, with the emergence of COVID-19 pandemic, conventional teaching and learning were challenged. Technology integration for medical education has been increased during COVID-19 in many countries. With the integration of new technologies to the anatomy teaching, the traditional 'directed self-learning' started to move towards 'self-directed learning'. This transformation however, was not without various challenges, especially in low-resource settings such as Sri Lanka (Karunathilake et al., 2020). Augmented reality (AR), Virtual reality (VR), and principles of gamification play an important role in motivation and engagement in medical teaching and learning by enhancing interactivity (Moro et al., 2021). Such technologies also found to have positive impact on students' spatial understanding and 3D comprehension of anatomical structures.

The objectives of this case study were to identify the context-specific factors in designing AR/VR-based anatomy instructional materials and to assess the student motivation and engagement to use gamification in their studies. The instructional systems design model ADDIE (Molenda, 2003), which is an acronym for *Analyze*,

Design, *Develop*, *Implement*, and *Evaluate*, was used to develop the instructional materials in this study since it found to ensure the appropriateness of the materials used in an optimal manner to bring the maximum educational outcome.

II. METHODS

During the study, mixed-method tradition was followed in a Sri Lankan medical faculty from September 2020 to February 2021. Ethics approval was obtained from the Ethics Review Committee of the Postgraduate Institute of Medicine, University of Colombo where the study was exempted from the review process. Purposive sampling was the method adhered recruiting 92 undergraduate medical students and 20 lecturers with the informed consent of the participants. The methodology was phased out according to the ADDIE model.

A. Analysis

A qualitative study was conducted using semi-structured interviews with the lecturers. The interviews were informed by the six dimensions of the Hexagonal E-Learning Assessment Model - HELAM (Ozkan & Koseler, 2009) which consists of students' attitudes, teachers' attitudes, technology-enhanced learning, content quality, service quality and supportive factors in designing effective E-learning materials. This phase revealed lecturers' suggestions to develop AR/VR contents in terms of graphical user interfaces, modes of