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Students designing for students – using a "deteriorating patient" to teach second year physiology

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Advances in technology mean that 3D technologies are being used increasingly in medical science. This includes the use of portable and cost-effective virtual reality (VR) approaches as an emerging tool to engage students in immersive 'real-world' scenarios for learning and training. To develop these, both students and staff need to gain new digital and creative literacies, attributes that are critical for jobs of the future. As part of this, it is critical that the student experience is incorporated when designing technology-based curriculum and interventions, in essence, co-creation between staff and students. In physiology teaching, we are taking the novel approach of exploring the use of virtual patients to help students consolidate, contextualise, and extend their basic knowledge of 2_{nd} year physiology, in the case a deteriorating patient. Using a VR headset (or flat screen), the student is confronted by a patient with symptoms of a relevant case scenario. The student can take basic measurements (BP, breathing rate, temperature) and is then able to order specific tests (bloods, gases, ECG). Based on the results they can then make a "diagnosis" based on their 2_{nd} year physiology knowledge. After this, the students record a virtual "handover" where they present their observations to another virtual colleague. The platform is based on the Unreal game engine and uses AI methods to generate random results within the pathological range so that students are faced with different data each time they view the patient. For a more realistic experience, students follow the ABCDEFG algorithm (Airway, Breathing, Circulation, Disability, Exposure, Fluids, Glucose) and each step of the process relates back to the underlying physiology as well as providing real-world structure to their investigation. The app and framework were created by Frameless Interactive and is aimed at clinical training with pilots well received by 2_{nd} year MD students. The app is being modified for 2_{nd} year undergraduate physiology in collaboration with third year Medical Science students at the University of Sydney as part of their final year capstone project. Working in groups of 5-7, students were tasked with first choosing a body system that aligned to content taught within the 2_{nd} year unit, Key Concepts in Physiology. From here, utilising the 'deteriorating patient' model, students created the script and storyboard to be incorporated into the software platform, drawing on their own experiences in studying 2_{nd} year physiology. Gamification elements such as collecting points, unlocking challenges and leader boards as well as in-built quizzes are being included to enhance engagement. The key challenge that students faced was to create an experienced that focussed on core physiological principles rather than a clinical diagnostic trainer. Students and staff involved in this project are already experiencing the benefits of extending their digital and creative literacies in this new and exciting virtual environment. The project is ongoing in development and will be trialled and evaluated in first semester 2023 in 2_{nd} year physiology. One of the key issues, is how to engage students in their learnings. We expect that experiences such as this may provide a valuable complementary activity to support ongoing traditional learning approaches. This experience allows students to practice and apply their knowledge in a challenging and unpredictable environment and it is widely regarded that the immersion provided by VR can enhance and reinforce memory and retention. The efficacy and outcomes of the project remain to be determined; however, important curriculum design lessons are being learned along the way as we reimagine education with future technologies and students with increasing demands for flexible learning pathways.