Virtual Reality Technology: Driving Innovation in Healthcare Education and Training

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Introduction

TIPS Education Center in collaboration with the Pediatric Stem Cell Transplantation and Cellular Therapy designed and implemented Virtual Reality (VR) simulations for the Contemporary Critical Care Complications of Stem Cell Transplant and Immune Effector Cell Recipients Conference. This education program is designed for healthcare professionals, emphasizing critical care complications of Stem Cell Transplantation- Immune Effector Cell (SCT-IEC) in the pediatric population. In alignment with the institution’s strategic themes of Reach, Breakthrough and Values, TIPS Education Center sought to design educational products that would impact education within the institution and beyond our walls.

Aim Statement

The aim of this project was to deliver a highly realistic and immersive simulation experience to an interprofessional audience while maintaining COVID-19 restrictions.

Educational Tool

Virtual Reality Technology

Virtual reality (VR) is an educational tool that allows a learner to simulate a situation using a VR headset, within an interactive, computer-generated environment. The VR system does not require educators and learners to be present which makes access to the simulations more flexible and broad-based.

Virtual Reality Simulations

A total of 9 simulations (phases) were designed to address 2 complications of SCT-IEC in the pediatric population.

Cytokine Release Syndrome
5 Progressive Phases

Sinusoidal Obstruction Syndrome
4 Progressive Phases

Educational Strategies:

Scaffolding: Conceptual Scaffolding

To help learners learn to successfully navigate VR environment, the simulation included appropriate guidance (scaffolding) and support. The use of scaffolding focused on three interlinked aspects of inquiry: sense making (making connections between current and new knowledge), process management (decision making about how to proceed based on the information/hints/feedback provided; model progression- simple to complex environments), and articulation and reflection (learners express and evaluate their experiences throughout the inquiry process).

Gamification

Virtual Reality

The VR simulation used game elements and techniques to engage learners and influence learner’s behavior. Features included clear goals expressed as win states, quests (scavenger hunt), feedback, and levels (phases) which are typical of games and served to enhance learning.

Scavenger Hunt Technique

In the Intervention Scavenger Hunt component of the VR simulations, learners were tasked to find and learn about potential interventions that may be appropriate for the patient. As they learn about possible interventions, learners reflect on the case/assessment findings and their differential diagnosis to consider an intervention implementation plan.

Results/Conclusions

TIPS Education Center in collaboration with the Pediatric Stem Cell Transplantation and Cellular Therapy implemented Virtual Reality (VR) simulations for the Contemporary Critical Care Complications of Stem Cell Transplant and Immune Effector Cell Recipients Conference following didactic lecture. N=75 learners (Nurses (n=37), APPs (n=24), MDs (n=12), and other healthcare professionals (n=2)) participated in a nine hour education session focused to improve care outcomes of Pediatric Stem Cell Transplant and Cellular Therapies patients through early recognition and management of critical care complications strategies and effective interprofessional team communication. 71% (n=51) utilized smartphones/tablets, 18% (n=13) reported use of headsets alone, and 11% (n=8) used the portable headset/smartphone devices to access the VR simulations. 50% (n=36) of learners were able to fully immerse in the VR world. But, 68% (n=49) reported noticing the headsets after the VR session began. 72% (n=52) stated the system was easy to use, 89% (n=64) perceived VR as an enjoyable method of learning, and 71% (n=51) would choose VR again as a method for learning.

With COVID-19, VR is a novel education modality that is capable of providing fully immersive and highly realistic clinical simulation where even learners have access to desktop or smartphone technology. More research is needed to develop sound instructional strategies that are valid and reproducible in diverse healthcare provider learner populations.

References:


CARING

The VR simulation was designed by a collaborative, interprofessional team. The interdisciplinary education and collaborative practice approach was essential in creating synergy to promote inclusion and high-quality patient care.

INTEGRITY

The VR simulation components were designed to foster open, honest communication amongst facilitators and learners of different background and experiences.

DISCOVERY

Innovative methods were utilized to encourage continuous learning, inspire new ideas and collaboration beyond MD Anderson.

SAFETY

The VR simulation activities were designed to foster a safe environment, both physically and psychologically. All mistakes/errors were used as opportunities to improve learning.

STEWARDSHIP

In designing the VR simulations, the team was fiscally responsible in choosing and purchasing software and equipment that would allow for us to be innovative in this project, as well as many other projects.