ACS 2022 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

Promoting Technology & Collaboration

Interprofessional Training In Virtual Reality

William Yi, MD FACS (presenter); Caoimhe Duffy, MD, MSc; Daria Harlamova, MS; Kristoffel Dumon, MD FACS; and Joshua Atkins, MD PhD

University of Pennsylvania, Philadelphia, PA

Background: Team based simulation has been shown to improve communication, teamwork among clinicians, and ultimately patient outcomes. Difficulties in gathering multiple clinicians in the same space and at the same time for this type of training has been a major barrier to its implementation. These difficulties have only been magnified during the COVID-19 pandemic. Immersive virtual reality (VR) technology offers the potential to remedy these issues by allowing clinicians to participate in team based simulation without leaving their work environment. The aim of this project was to design a platform on which team based simulation scenarios could be built and implemented for use with immersive VR.

Technology Overview: Spatial.io is a VR meeting platform in which users can utilize a VR headset and interact through avatars in a stock or custom built VR space. The platform allows manipulatable objects to be loaded in, videos to be presented, and a host of other functionalities. We used the LiDAR scanner on an iPad Pro to create a 3D scan of the preoperative area of our hospital and uploaded this into Blender, a 3D creation suite. The scans were graphically adjusted and uploaded into Spatial.io along with objects such as scalpels and stethoscopes which were created in Blender. We then designed an immersive VR team based simulation that mirrored an in-person simulation we have run in the past, post-thyroidectomy neck hematoma.

Potential Application in Surgical Simulation and Education: The technology described here allows learners to put on a VR headset from disparate locations and take part in team based simulation. Using the process described, any number of clinical simulations can be designed, whether it be in the operating room, hospital floor, or clinic space.

Potential Opportunities to Collaborate: We are in the process of running a pilot study comparing immersive VR training against in-person training. In the future we would like to demonstrate that clinical simulation can be done with users at different institutions that may be remotely located.