Virtual and Augmented Realities in Medical Education

an OSF Innovation Case Study

THE OPPORTUNITY

Not much has changed in the way clinicians are taught to care for others. Medical students typically attend lectures and shadow tenured clinicians in the field, medical professionals update their competencies through online education or by attending conferences and some gain hands-on opportunities using life-like simulations. While these approaches work, they are costly, resource intensive and aren't immersive enough to help learners retain knowledge.

THE SOLUTION

Jump Simulation is transforming medical education by using the multi-dimensionality of virtual and augmented realities to develop learning opportunities for new and tenured clinicians. This is to not only condense the time faculty spend developing lectures, but to create interactive experiences allowing students to stay focused, comprehend and ultimately build competencies.

THE IMPACT

A number of VR and AR projects have either been developed or are underway, and are showing promise as successful modes of education. They are reducing the time it takes to put lectures together. Students are able to be immersed in an experience without distractions and can move at their own pace. Using VR and AR is also exposing learners to opportunities they likely wouldn't have received in formal training due to lack of exposure.

JUMP SIMULATION

Jump Simulation, a part of OSF Innovation, is one of the world's largest simulation and innovation centers with the Vision of improving outcomes and reducing costs through excellent training. For more information, visit www.jumpsimulation.org.

OSF INNOVATION

Launched in 2016, OSF Innovation is the overall umbrella initiative for the planning, structure, goals and services OSF HealthCare uses to innovate for the improvement and transformation of health care.

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PLUGGING INTO THE MATRIX

With the internet in nearly every home, business and social organization, individuals across the country have unlimited access to knowledge on just about any subject they want to know about. So, why aren't we all geniuses?

There are a variety of reasons, but, according to Dr. Matthew Bramlet, director of Jump Advanced Imaging and Modeling, a major one is that it's difficult for people to absorb complex subject material by merely reading content or watching videos.

"There are too many distractions," said Dr. Bramlet. "We believe virtual and augmented realities give us the ability to convey complicated information in digital formats that actually transfer knowledge to individuals, much like the movie where Keanu Reeves learns kung fu by plugging into the Matrix."

With that, Jump Medical Visualization (MedVis) and Jump AIM are developing and researching a variety of VR and AR learning opportunities for clinicians. The idea is to reduce the time faculty spend developing lectures, and create interactive experiences, allowing students to stay focused and build competencies.

VR AND AR COURSES

Thanks to an ARCHES grant, Dr. Bramlet and the Jump AIM team developed software allowing surgeons to pre-plan procedures in VR and teach anatomy and physiology to medical students. Ever since then, requests have exploded for his team to help others build clinical education and training using this approach.

This includes assisting faculty with the University of Illinois College of Medicine Peoria (UICOMP), medical students and OSF HealthCare clinical educators develop their own immersive lectures in VR. Dr. Bramlet is also using VR to teach bioengineering students at the University of Illinois Urbana-Champaign, a first for him.

Another way Jump is transforming medical education is through the use of AR, where computer-generated images are superimposed into a real-world view. About 10 projects have been developed or are in the works and are focused on expanding access or exposure to certain learning opportunities.

"There are certain conditions that are so rare that learners will likely never get first-hand experience diagnosing or treating them as a medical student or even a resident," said Kyle Formella, director of Jump MedVis. "We have a golden opportunity to create virtual experiences that replicate complications, situations or pathologies learners may face in the future."

The largest project undertaken by Jump MedVis is the development of the Code Cart AR, a mobile app designed to help clinicians familiarize themselves with a fully stocked, highly detailed pediatric code cart through augmented reality. The goal is for them to gain confidence in using the cart, and decrease the time it takes to find objects within it in a simulated environment.

VALUE OF VR AND AR EDUCATION

With the ability to create scalable, interactive events, Jump MedVis and AIM leaders see the potential of using AR and VR to reduce costs in training and free up faculty resources while still ensuring learners get the experiences they need to best care for patients.

They also see the opportunity to reach those who don't learn well in the classroom or prefer taking online courses.

"I believe that putting complex information into the VR or AR format can level the playing field for those who traditionally have been categorized as poor learners," said Dr. Bramlet. "This method of teaching hits on all of the types of learning many people align to—visual, auditory, hands-on and reading and writing."

At the same time, both Dr. Bramlet and Formella are careful not to turn every piece of education into a digital media format.

"We try to make sure we are aligned with a well understood issue instead of throwing something fancy at a problem that we're not confident about," Formella said. "We're more apt to use these technologies where they are useful and will make a difference for those we serve."

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– DR. MATTHEW BRAMLET, DIRECTOR OF JUMP ADVANCED IMAGING AND MODELING

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