

WHEN IT MATTERS MOST

AIR METHODS ANSWERS THE CALL



HOW VIRTUAL REALITY AND GAMING IMPROVE CLINICAL EDUCATION

To achieve the best patient care and outcomes, healthcare providers continually seek innovative approaches to improve training for current and future healthcare workers. However, the constantly changing needs and expectations of learners and educators driven by advances in technology have created new challenges to delivering high-fidelity, immersive training on a wide-scale and digital platform. The COVID-19 pandemic has only accelerated demand for digital alternatives for clinical education.

Serious gaming and gamification are two innovative solutions to digitizing medical training that are effective and enjoyable for users. While both utilize gaming elements to deliver education in an engaging and digital format, the two differ in terms of design intentions. Serious gaming focuses on creating content for education, while gamification adds game-like elements to existing processes. Educators and game developers often work together to create these game-based applications that incorporate lessons and courses with the gaming elements, and are designed to be, “[efficient in engaging and motivating learning by using rewards and badges to encourage study.](#)”

When incorporated in a meaningful way with clear objectives, these learning tools have driven [positive outcomes in knowledge acquisition among users](#). In [one study](#), for example, radiology students who used an electronic learning platform with game elements experienced fewer errors when diagnosing chest x-rays and said they had more confidence in their diagnoses. Specifically, the study found a significant improvement in users’ diagnostic confidence and a [reduction in error rate from 39% at the start of the game to 22% by the final test](#). Gaming also gave the students the ability to see several different case difficulties they likely wouldn’t experience in clinical practice, better preparing them for instances in which more difficult cases arise.

In [another study](#) comparing traditional learning to serious gaming and in clinical education, game learning was in many cases found to be more effective for improving knowledge, skills, and satisfaction. There is [some evidence](#) that serious games and gamification interventions are more effective for improving skills than traditional learning.

These studies also highlighted the importance and positive effect of using serious gaming as a complementary tool in medical education, rather than a replacement for experiential learning. Users developed analytical skills, strategic thinking, knowledge, multitasking, decision-making, communication, and [psychomotor skills](#). The key to success in these programs was a [focus on the quality of the learning](#), rather than the capabilities of the technology used.

Virtual reality: An immersive approach to education

Virtual reality (VR), on the other hand, has the unique ability to make users believe they’re in a different environment, enabling experiential learning in a digital environment that feels real. The greatest value of VR is to fully immerse users in a virtual world and create a feeling of being there. This involves users wearing a VR headset to place them inside a specific setting and scenario. They can then engage with the virtual environment and characters as if they were in the middle of a chaotic emergency department, for example. VR bridges the gap between classroom experiences and high-stakes, high-fidelity simulation experience by delivering typically labor-intensive training [quickly and at scale](#). VR also makes training more immersive, letting users gain comfortability with situations that may be impossible or incredibly difficult to replicate in the real world.

VR provides the ideal tool for digital healthcare education, applying the principles behind high-fidelity manikin simulation to an immersive virtual world that [engages all four brain systems \(cognitive, behavioral, emotional, and experiential\) in synchrony](#). Additionally, VR can provide limitless training in multiple scenarios that can be experienced multiple times, making it more effective than traditional methods. These situations were previously difficult, even impossible, to simulate during real-world training and had to instead be done on-the-job. Now, these highly interactive trainings can be individualized and done from virtually anywhere.

Additionally, VR enables users to receive feedback immediately, with trainers logged into the system to monitor sessions and assess users’ responses and interaction. As VR technology advances and access increases, users will be able to connect from almost anywhere and train through an endless number of scenarios, working alongside multiple participants around the world.

This virtual immersion [can bolster users’](#) confidence to perform tasks in a real on-the-job setting. VR training has also been shown to [significantly reduce stress and anxiety in students](#), and it [improves postintervention knowledge](#) scores when compared to traditional learning. In fact, [multiple studies have shown](#) a large improvement in postintervention cognitive skills scores in intervention groups compared with controls. VR’s higher interactivity is also more [effective for skills outcome](#) when compared with less interactive methods. VR training has the potential to speed up the training of healthcare skills and could even allow learners, depending on the specialty level, enough practice to be job-ready before entering a medical facility and seeing patients.

And users are enjoying the learning. In a study of radiography students using VR simulation training, [94% of students](#) who used the tool would recommend it. Users have also [reported an increased presence and focus](#) during these high-immersion VR sessions, showing how this style of training can positively affect how the memory of learning is built and give users a more positive feeling about their learning.

Serious gaming, gamification, and VR training can all provide quality, cost-effective learning in a way that is flexible, portable, enjoyable, and allows interaction with instructors and peers through multi-player functions. These tools provide learners opportunities to be part of active learning, solving clinical problems, and gaining experience in a low-risk environment. These digital training tools are also reusable, making for longer and more frequent interactions to improve knowledge and skill retention and broadens the scope of learning. Additionally, these immersive training styles [have shown to improve users’ cognitive skills](#) when compared to traditional learning.

Air Methods’ redesigned air medical training program

As a result of the success of serious gaming, gamification, and VR-based training in the hospital setting – in addition to the need to train clinicians remotely during the pandemic – Air Methods has redesigned its clinical education to embrace these emerging technologies.

Clinical training is now designed around improving patient outcomes and focusing on problem-solving and communication while caring for simulated patients using a combination of high-fidelity human patient simulators and serious gaming activities. Air Methods has also partnered with California-based VR developer SimX to create the first large-scale air medical VR training program.

Air Methods’ clinical education team is developing a library of advanced clinical scenarios capable of bringing multiple players together to treat patients in the virtual environment. These scenarios will include resuscitation, ventilator management, balloon pump, ECMO (extracorporeal membrane oxygenation), and various trauma situations. Additionally, they will all incorporate Air Methods protocols and patient care guidelines.

The program will start with 24 VR headsets: 12 at the clinical training centers and 12 that will travel to various bases across the country. Air Methods’ clinical education team will incorporate the use of the VR headsets into current training standards. The ability to move the VR headsets around to bases will reduce the cost of training and travel expenses.

Comprehensive education is at the heart of medical practice and the best way to build the skills and confidence of healthcare professionals to make the right decisions to achieve the best patient outcomes. Live-action high-fidelity manikin simulation was previously the gold standard for providing experiential training in a low-risk setting, but the pandemic created demand for more digital options. Serious gaming, gamification, and VR are alternatives that can build necessary skills and knowledge through immersive experience in a cost-effective way that also increases access and deliverability. These tools give users to opportunity to experience very realistic scenarios, particularly with VR, in a low-stakes environment that makes them better prepared for the real thing.

Even as technology advances to provide the most realistic digital and virtual training, digital solutions are not a panacea and will not fully replace in-person training and first-hand patient experience. However, they have proven to be effective as a powerful education tool that can improve decision-making skills and knowledge to provide better patient care and outcomes.