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INNOVATIVE TECHNOLOGIES IN NOWADAY'S WORLD

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As the boldest technologies prove the right to exist, we decided to examine a range of recently published articles and Internet sites on the topic to research innovations that can dramatically change the way people will live in future years.

Purpose and objectives. Purpose: giving people a wider look at modern technology, which can be used also in healthcare, studying etc.; opening new ways to solve different problems by means of the modern technology nowadays. Objective: to research an entertainment technology for improving “serious” aspects of our life like medicine and study.

Target and subject of research. Target: Virtual Reality as an immersive artificial environment. Subject: its use, benefits and prospects.

The method of research is theoretical: analysis and systematization of the scientific literature in the subject.

The scientific novelty and practical value of the obtained results. A new way of using Virtual Reality technologies not only like a video game device, but like a cheaper, more versatile alternative to traditional simulations and anesthesia is studied for the first time.

Mostly common surgical procedures like cesarean section or appendectomies are often pretty routine – one case is similar to the next. But some especially complicated procedures — including the separation of conjoined twins — present unique challenges that can be met only with meticulous planning. For these, 3D visualization is proving to be a game-changer. Recently, Virtual Reality (VR) played a vital role in the successful separation of conjoined twins at Masonic Children’s Hospital in Minneapolis. The three-month-old twins were joined far more extensively than some other conjoined twins, with intricate connections between their hearts and livers. That meant the surgery to separate the twins would be unusually complicated — and potentially very dangerous for the twins.

Before surgery, the surgical team took Computed Tomography (CT), ultrasound, and *Magnetic resonance imaging (MRI)* scans and created a super-detailed virtual model of the twins’ bodies — and then ventured “inside” their organs to identify potential pitfalls and plan how they would be avoided during surgery.

“You look through the 3D glasses, and you can basically walk through the structure, peeling apart parts so you can look exactly what you want to see” said Dr. Anthony Azakie, one of the surgeons who separated the twins. He said the high-resolution visualization “helped minimize the number of surprises that we were potentially dealing with.”

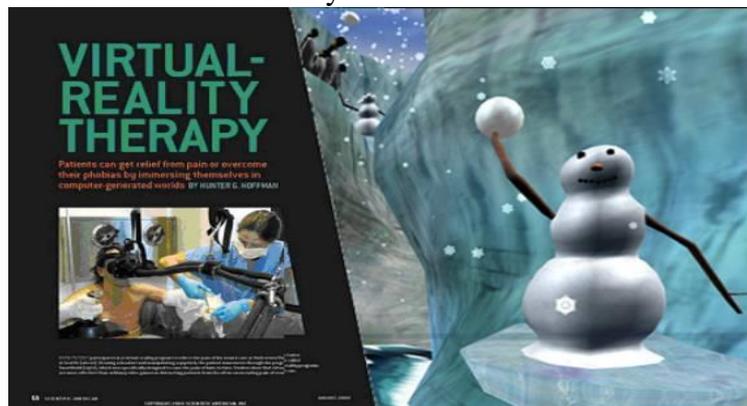
VR technology is also being used by vascular specialists like Dr. In Sup Choi, director of interventional neuroradiology at Lahey Hospital & Medical Center in Burlington, Massachusetts. When he uses interactive 3D visualizations to prepare for procedures to fix aneurysms and blocked arteries, he said, he gets “a better idea of what types of devices we have to use and what approach might work best.”

Virtual reality presents an immersive artificial environment. It is able to alleviate pain and relieve anxiety, according to the latest research. Spiegel and his team at the Cedars-Sinai Medical Center have been experimenting with the technology for a while. They found a significant decrease in pain scores in case of VR therapies.

The research team conducted an experiment, whose results were published in 2017. They observed 100 patients suffering from gastrointestinal, cardiac, neurological and post-

surgical pain.[2] Fifty patients watched a 15-minute nature video with beautiful mountains and running streams, accompanied by calming music. The other 50 patients wore VR goggles to watch a 15-minute animated game called Pain RelieVR, which was specifically designed to treat patients who have to stay in bed or have limited mobility.

The experiment showed that among 100 patients who watched the nature video, there was a 13 percent drop in their pain scores; while patients who watched the virtual reality game had a 24 percent decline in their pain levels. Spiegel even believes the future will be VR pharmacies with specialists prescribing the appropriate VR treatment to patients.



However, not only VR could help patients but doctors and medical students too. For example, a virtual simulation represents a cheaper, more versatile alternative to traditional simulations. The same thought processes and practical skills could be tested, but all that would be required is the trainee putting on VR-goggles and a pair of headphones. In the future, the breadth of simulation scenarios that could be accessed in a VR library would dwarf the offerings of even the most impressive sim lab. As the limit of what could be trained would be reflected by the imagination of the VR software developers as opposed to the practical constraints of the lab. Trainees could run using sims in the comfort of their own homes and then discuss it with their supervisor via Google Hangout at a convenient time afterward.

Have you ever watched the movies *The Deer Hunter*, *Born On The Fourth of July* or *The Hurt Locker*? Then you might understand the struggle of active participants of such traumatic events as the Vietnam or Iraq wars to get over their experiences and adapt again to everyday life. Although not only war veterans and soldiers experience post-traumatic stress disorder (PTSD), but also victims of sexual assault or abuse. [3]

In conclusion, using modern technology innovations, such as Virtual Reality can open new horizons in solving problems of mankind. It can improve our imagination about surgery, psychology and studying. It brings us new opportunities to live better and happier.

Key words: *Virtual Reality, immersive artificial environment, super-detailed virtual model, modern innovative technology, versatile alternative to traditional simulations*

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