

REALITY OR VIRTUAL REALITY? HOW VR IS CHANGING THE EDUCATIONAL EXPERIENCE



Imagine learning about the War of 1812 by being dropped right into the middle of battle, or taking a flying tour over the streets of Paris to view different architectural styles, or going inside an eyeball to understand how the optic nerve functions.

The stuff of science fiction? Perhaps. But virtual reality is making science fiction a reality—and a truly effective learning tool.

Virtual reality, where gamers achieve immersion into video games and the military simulates battlefield scenarios for training purposes, is now helping students experience—not just learn about—new concepts, new environments and new ways of viewing things. In the education sector, virtual reality is taking learning to a whole new level.

Strap on a headset, connect to the network, and the possibilities are endless. From virtual field trips to immersive learning experiences, virtual reality can take concepts from imagination to realization, actually showing students the way things work beyond static pictures or videos.

VIRTUAL REALITY: THE BACKGROUND

The concept of virtual reality as we know it has been around for almost 100 years. In 1935, science fiction author Stanley G. Weinbaum wrote the story, “Pygmalion’s Spectacles,” which described a pair of goggles that let the wearer experience a holographic world that included

smell and touch. Since then, the concept has been tried in multiple environments, including research, training and gaming.

Today, virtual reality is used for several applications spanning a number of industries. Some of the more notable applications for virtual reality include:

Pain Management: Medical practitioners are managing a patient's acute pain by immersing their senses in a positive experience, such as calming natural scenery. Researchers theorize the technique helps distract patients from their pain.¹

Treatment of PTSD: Using a type of therapy known as virtual reality exposure therapy (VRET), doctors are helping soldiers and others battling post-traumatic stress disorder (PTSD) to overcome the condition. VRET also is being used to treat certain phobias.²

Spaceflight Training: NASA is training future astronauts on the finer points of working in space, including spacewalks and other activities related to being on the International Space Station.³

The use of virtual reality for myriad applications is vast and growing. It stands to reason, then, that education is prime territory for the technology. The global virtual reality technology (software and hardware) market is expected to reach \$40.4 billion by 2020, with an installed base of 4.5 million stand-alone virtual reality devices by that time.⁴ And in a survey of technology users conducted in early 2017, respondents listed education as the second most likely industry to be impacted by virtual reality in the next five years, behind gaming.⁵

BENEFITS OF VIRTUAL REALITY IN THE CLASSROOM

Beyond the coolness factor of being able to experience environments and events in a more sensory way, virtual reality holds a number of benefits to learning. Its ability to make any subject matter more interesting is one of virtual reality's major advantages, especially among today's population of digital-native students.

At its most visceral level, virtual technology is, in a word, enjoyable. Students do not endure the traditional learning methods of reading or listening to a lecture; rather, they experience the subject matter through sensory cues such as hearing a wave crash against a rock or touching the fur of a wild animal, for example.

Because it is a totally immersive environment, with the headset blocking out all distractions, students are able to completely focus on the subject matter. For students with attention deficit disorders or who are easily distracted, virtual reality can help keep them on task and more engaged, which can lead to deeper learning.

In addition, virtual reality can enable educators to personalize instruction for their students. No two virtual reality experiences are alike, due to users' ability to manipulate the content during the session. Educators can discuss students' individual views of the content, tailoring each conversation to match what students experienced and making their instruction more meaningful.

Virtual reality also can help draw out students who typically don't engage in the classroom—by being excited about the technology, they may be more motivated to speak up and share their experiences with fellow classmates.

REAL-LIFE EDUCATIONAL APPLICATIONS

Although virtual reality in the classroom is a nascent technology, its popularity is growing quickly. In classrooms worldwide, in both K-12 and in higher education, virtual reality is being used in a number of applications.

Perhaps the most common application of virtual reality in the classroom is virtual field trips. Using technologies and programs such as Google Expeditions, students can explore undersea caves, archaeological digs in Peru and even the surface of Mars, all without leaving the classroom. In addition, a growing number of museums, including the Smithsonian, now offer virtual tours, enabling students to visit their collections from wherever they are.

Virtual reality is also being used as a tool to teach new concepts in a more accessible and stimulating way. Using the technology, students can perform virtual dissections, view 3-D renderings of body parts and even look inside a volcano to understand lava flow, for example. The immersive experience can help students better understand and retain the instruction, leading to deeper learning.

Another area showing true promise in the classroom is virtual reality's use as a teaching tool for students with special needs. Through virtual technology, students are able to explore or create new environments and realize what otherwise would be difficult or impossible for them to experience in real life due to their physical or mental limitations.

Research is currently underway to determine whether virtual reality can help students who have autism, with positive results so far. An article in *The Independent* earlier this year notes that: "... The potential for related VR applications – if used sensitively and intelligently – is vast: in classrooms, it could provide a flexible and affordable support scheme to autistic spectrum children at key stages in their development."⁶

CONNECTIVITY AND VIRTUAL REALITY EDUCATION

The ability to teach students by offering them the chance to experience content in ways never before possible may sound enticing to many. However, the reality behind virtual reality is the need for connectivity. And not just any type of connectivity: The networks carrying virtual reality content must provide a seamless and genuinely immersive experience without buffering, pixelating or pausing the app to let the network catch up.

Beyond bandwidth to run the program, most virtual technologies demand connectivity to the cloud, as many are cloud-based and need a constant connection to not only run the program but also to collect and store the data to ensure a continuous experience the next time a user logs on to the program. However, such a constant connection can further contribute to possible latency issues that can degrade the virtual reality experience.

What's more, the school or educational facility's network must be robust enough to handle the data traffic of both wired and wireless connectivity, including virtual reality programs.

Recognizing the impact of virtual reality and other technologies on network performance, network providers have invested heavily in their infrastructures to be able to handle the increase in capacity and bandwidth demands.

Technologies such as SD-WAN together with high-speed broadband connections are helping

solve some of the traffic issues. SD-WAN is a next-generation solution designed to simplify complex networks, increase control and visibility, reduce costs and deliver consistent network and application performance across a distributed enterprise. SD-WAN utilizes open-source technologies and provides a level of intelligence to the network that doesn't exist in traditional WANs, enabling smarter and more efficient routing of traffic.

The application-aware nature of SD-WAN enables IT administrators to determine the most intelligent path for their applications and push, manage and update policies for optimal application and network performance across their business. What's more, SD-WAN is centrally managed, so all provisioning and changes to the network and applications are done from one location, reducing the amount of time and manpower necessary to manage the network.

THE NETWORK IS THE KEY

The network is a vital element in delivering an optimal virtual reality experience. As such, the network should provide high availability, high bandwidth and redundancy from all locations and via any type of connection.

To ensure “always-on” connectivity today for new technologies such as virtual reality, and to provide the path for advanced technologies down the road, schools should look for a network service provider whose network is ready to handle the bandwidth needs of today and in the future. The network should be secure, high-performing and adjustable to accommodate fluctuations in bandwidth needs. A good network service provider will address current demands and anticipate future needs to guarantee the school can continue to provide its population of students and instructors with a stellar experience.

CONCLUSION

Virtual reality is giving students the opportunity to experience content in ways never before possible. The myriad benefits of virtual reality—making learning more accessible and resulting in deeper learning and greater engagement—have the potential to make a lasting impact on the way students learn and retain information.

Realizing the promise of virtual reality is dependent on the network, which must provide a seamless and genuinely immersive experience to the user. Schools, therefore, must ensure their networks are robust enough to handle the increased traffic and bandwidth demands of virtual reality technologies.

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3 Loren Grush, “Walking Through Space in NASA's Virtual Reality Lab,” The Verge, Aug. 22, 2017, <https://www.theverge.com/2017/8/22/16178138/nasa-virtual-reality-lab-mars-rover-simulator>

4 “VR Virtual Reality Technology Statistics,” Statistic Brain Research Institute, Aug. 11, 2017, <http://www.statisticbrain.com/vr-virtual-reality-technology-statistics/>

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6 Natalie Catren, “Virtual reality may be a help to autistic children in the classroom,” Independent UK, April 12, 2017, <http://www.independent.co.uk/news/science/virtual-reality-may-be-a-help-to-autistic-children-in-the-classroom-a7676391.html>