Using augmented reality to enhance college learning

How higher education can benefit from implementing augmented reality

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Just 20 years ago, earning a college degree exclusively online was a far-fetched dream. Today, college students can not only earn an entire degree from home — they can tap immersive technology both on campus and off to enhance their learning experiences.

There is no way to deny the impact technology has made on the higher-education landscape. Technical advancements have removed the constraints of the traditional college classroom setting and elevated curriculum to an entirely new level.

Offering online classes is just the start. Institutions of higher education must continue to be trailblazers when it comes to engaging students – and giving them the best access to learning resources. Augmented reality is an excellent example of this type of innovation.

People often are aware of AR being used on social media or in video games, but its adoption in the higher-education setting could change experiential learning forever.

What exactly is augmented reality?

AR layers digital information in the real world in real time using various sensors, cameras and projectors to augment, or enhance, reality. AR provides new ways to interact with digital information within a user's field of view, including head motion, voice control, hand gestures and touch.

AR mobile games such as *Pokémon GO* and *Zombie, Run!* are global hits, blending the real world and animation to make the virtual creatures and scenery look even more realistic. AR games such as these offer players real-world benefits, too, such as encouraging physical activity. This level of engagement makes sense for incorporation in the higher-education learning experience.

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What are the benefits of AR in higher education?

AR offers rewarding possibilities for students receiving higher education. AR can strengthen a student's learning environment, usually via a mobile device or computer screen, providing the opportunity to interact with and visualize a concept that is otherwise tough to access or nearly impossible to comprehend. For example, anthropology students can experience and explore the Egyptian ruins on a virtual field trip without traveling internationally.

"With AR, you can exceed the limits of reality, expanding the range of topics that can be learned as skills, rather than as abstract knowledge. Students can also safely, and relatively cheaply, practice skills by repeating tasks," said Lani Bertino, Distinguished Engineer on Verizon's XR Product Innovation and Realization team.

AR technology also can reach students who may otherwise struggle to engage, particularly at a college level. It can maximize efficiency, too, without sacrificing the educational experience.

"Augmented and virtual reality solutions have proven effective for many special-needs students, including those with ADHD and some forms of autism," said Niko Chauls of XR Product Partnerships at Verizon. Indeed, researchers have found that students with ADHD can benefit from AR curriculum because it stimulates attention and engagement. Separate research reports an increase in the selective and sustained attention of children with autism using AR and more positive emotions towards the tasks at hand.

Another benefit of AR in higher education is its ability to foster collaboration; for example, architecture students can join forces to build a house to see how it stands up to weather, such as high winds or hail, which enables students to learn in an immersive environment.

AR-enhanced education also has numerous benefits that affect learning, costs and safety. Consider a lab or experiment requiring dangerous materials, special equipment and supervision. These experiments can now be conducted safely at home in either an AR or virtual reality, or VR, setting— and they can be repeated multiple times. AR technology uses the real world to enhance experiences, often accessed with a smartphone, where the user guides the interactivity. VR is more immersive and taps a fictional environment, often requiring a headset device, where the technology steers the user.

A good example of this concept is an AR or VR human cadaver, as opposed to using a real-life one. Using a digital double for the cadaver, this resource becomes limitless and nearly free once the first holographic model has been created.

Bertino cites research from EDUCAUSE and others that says immersive technology such as AR is especially effective for supporting skills-based and competency-based teaching and learning. This is because AR boosts student engagement with learning materials and deepens student interaction with complicated problems. Instead of simply reading about a concept, students can engage with it through AR and other immersive technology, aiding in comprehension and real-world applications.

How augmented reality is changing the college landscape

While universities hope to soon see campuses return to full in-person strength, it is apparent that an increased interest in teaching and learning digital tools will stick around, even after the pandemic has ceased. Incoming college students are digital natives, and their organic understanding of and ability to work online effectively should be further cultivated in higher education. Colleges and universities must take advantage of opportunities to leverage technologies that enhance learning, such as AR.

"AR offers the opportunity to provide the user expertly authored instruction any time, any place needed. This capability is a force multiplier in that many students could benefit from the expert instruction from one instructor, where an existing environment is available," said Public Sector Solutions Manager Charlie Caggiano.

"Anytime, anywhere learning; plus, personalization of the learning experience," Bertino added.

Having access to learning resources that are immersive, relevant and "come off the page" allow college students to take their learning to new depths, improving equitable learning opportunities in the process.

AR and the future of higher education

AR offers a plethora of advantages for virtual learning in the higher-education setting.

From health care and aviation to space and military, there are endless applications of AR in nearly every industry. Colleges and universities are adopting this immersive learning technology to offer students in all fields simulation opportunities and innovative training.

Digital fluency and literacy are vital skills to have to navigate a complicated future. Students who are experienced in augmented, mixed, assisted and virtual reality will have a distinct advantage in the workforce down the road.

As education continues to evolve with technology acting as the driving force behind these improvements, AR could enable educators to provide more creative instruction and allow students to gain knowledge in new, immersive ways.

"A University of California at Berkeley study shows that experiential learning in a VR environment is significantly faster, and that learning retention is much greater. Some of those findings can be applied to AR as well," Chauls said.

Impressive AR statistics

As technology advances, the potential of augmented reality becomes even clearer. **Consider these stats:**

In the US, **83.1 million** people use AR at least once a month, according to Poplar,

and as many as **32%** of users have used AR for shopping.

80% of information presented via VR was retained,

compared with **20%** when listening to a lecture alone.

By 2022, there will be **3.5 billion** AR users globally —

over 25% of the world's population, according to Poplar. **This is a jump from the 200 million recorded in 2015.**

GlobalWebIndex reports that **35%** of AR users are between ages 16 and 34.

The total AR and VR market is expected to reach **$94.4 billion** by 2023, per Research and Markets data.

As people become more well-versed with AR, they will become more comfortable using it for various applications and in learning new things. Colleges and universities have always been some of the most progressive places in society. Whether higher-education students are learning on physical campuses, or virtually, adopting immersive technology such as AR will continue to keep the process of learning moving forward.

Verizon is committed to providing secure connectivity and delivering immersive learning options to help students, teachers and faculty thrive.

"Verizon can deliver speeds up to 10 times faster than some other 5G networks, which means better support for real-time AR applications," Bertino said.

With solutions to help solve the biggest learning challenges today — from hybrid learning to securing campuses — Verizon assists with learning from virtually anywhere, addressing the homework gap and driving digital inclusion.

"Think, attending physicians demonstrating surgery plans to remote students, overlaying patient data on their bodies. Or enabling multi-language classes because AR can translate books on the fly. Or real-time digital twinning of aircrafts to teach preventive maintenance. Even remote-assist teacher assistants to support the learning effort," Bertino said.

If you want to create the future of learning for your students and teachers, it's time to learn more about how Verizon Higher Education solutions are built right to transform learning experiences.

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