



A New Realm for Distance and Online Learning: 360-Degree VR

Aaron Atkins
Weber State University

Franklyn Charles
Slippery Rock University

Nina Adjanin
Ohio University

Abstract

Higher education has taken steps to continue teaching and engaging with students using online video platforms, among others, as a result of the limitations imposed by the Covid-19 pandemic. While it is certainly a challenge for all involved, it also presents an opportunity to explore different pedagogical strategies and technologies for synchronous and asynchronous distance learning. The purpose of this article is to illuminate the potential application of 360-degree virtual reality technology for use as an immersive and engaging distance education classroom tool. The authors have worked with the medium in different journalistic and documentarian contexts and support its exploration in this arena.

Faculty members and department heads have long felt administrative pressure to move courses online, a move accelerated by the Covid-19 pandemic. Essentially overnight, faculty and students across the world were largely forced into Zoom-based online learning in lieu of face-to-face pedagogy. Online learning is no longer an option but a necessity (Dhawan, 2020). Many universities that risked in-person classes have been forced to move courses online as cases among the faculty and student body spiked (IHE Staff, 2020, Oct. 7). Faculty attempting to teach in this environment encountered similar issues beyond the digital

divide that frequently separates students from online learning experiences. Such disruptions include participation motivation, lack of social interaction, engagement, attention.

Additionally, faculty and students are experiencing issues adapting hands-on courses such as labs and team-based production courses such as television journalism, mass communication, and digital media. Faculty are struggling with students – particularly those who did not or have not previously sought out to participate in online education – failing to value the online experience with equivalence to in-person

Keywords: 360-Degree Video; Virtual Reality; Distance Learning

classroom experience, instead seeing it as emergency remote teaching instead of an effective teaching format (Adedoyin & Soykan, 2020; Bozkurt & Sharma, 2020; Hodges et al., 2020; Vlachopoulos, 2020). While Zoom and similar video meeting software platforms were and are heralded as a savior for Covid-related distance education, these issues continue to plague participants as they plow ahead through the semester.

Choi, Yoon, Song and Choi (2018) assert that research shows that virtual reality use in education may provide more interactive learning with fully immersive content than traditional education approaches. Metis et al. (2019) note that the nature of the immersive 360VR medium offers users the possibilities of creating video-based environments such as classrooms and laboratories. In an attempt to experiment with emerging digital technology and its application for collegiate distance learning, we suggest testing an interactive, immersive digital media format for a more (virtual) hands-on student-centered learning experience: Pre-recorded or live-streamed 360-degree video (360VR) for head-mounted displays.

360VR: Development, Theoretical Support

Reuell (2013) states that the rapid development of digital technology over the last decade has increased tech-assisted distance learning opportunities. Bowen et al (2013) suggested the increase in opportunities parallel with technology and platform costs as well as student access, and carry the potential to reduce achievement gaps in higher education. The data aligns with the uptick in use and lowering costs of 360VR cameras, distribution mechanisms, and delivery technology such as head-mounted displays. As the pandemic continues to impact the way education is delivered, 360VR camera technology can be used as a viable alternative for engaging students virtually. The use of 360VR enables students to immerse themselves fully into a classroom environment, guided by the instructor, and provides the opportunity for parasocial interaction among students (Shin, Song, Kim, & Biocca, 2019).

The availability and access to such technology influences teaching-learning approaches and has drawn many educators to test and examine distance learning possibilities. The number of virtual learning options is rapidly expanding, and universities are using it to compete for a share of the rapidly developing market. Modern technology, including the integration of 360VR video, has proven to be effective in educa-

tional and school settings around the globe. A variety of researchers have reported the advantages of using 360VR in educational contexts, such as ameliorating learning outcomes (Lin et al., 2017), increasing student motivation and engagement (Sattar et al., 2019; McMillan et al., 2017), and increasing knowledge retention and awareness (Pérez-López & Contero, 2013).

With the appropriate setup, the use of 360VR technology can enable both instructors and students to engage in a classroom or lab environment where hands-on instruction is vital for successful knowledge acquisition. The HMD can provide an engaging opportunity for the students with course content, while keeping them and faculty members safe from possible exposure to the disease.

This type of learning is already being explored via private education production companies such as ClassVR and Lenovo for K-12 education (ClassVR, n.d.; VIAR360, n.d.), and for laboratory and training-specific courses such as at NC State's Distance Education and Learning Technology Applications in biological sciences and Landscape Architecture, among others (Wisn, 2018, June 8). 360VR learning can transform online or distance learning in to a more enhanced and engaging student learning environment (Babich, 2019, Sept. 19). Penn State University tested the efficacy of 360°VR technology for a nursing course to gauge student interaction and engagement (PSU News, 2018, July 25). While creating fully computer-generated simulations is an arduous and lengthy process, creating and live-streaming 360VR video can be accomplished relatively smoothly.

Barriers and Limitations

The first barriers to exploring the use of this technology for classroom use in the manner described above is startup cost and training both faculty and students. However, costs of 360VR-capable cameras with both recording and live-streaming capabilities has dropped significantly over the last five years as quality has increased. The availability of inexpensive 360-degree cameras and headsets such as the Insta360 One X priced around \$400 and Oculus Go for \$150 has reduced the barriers to entry that previously kept researchers and educators from considering it a viable medium (Johnson, 2018). As for training, technical issues are one of the biggest concerns: both students and educators are having trouble with the much simpler Zoom format, so detailed training on both cam-

era and headset operation is necessary.

Motion sickness may also occur, but only likely when motion is employed on the camera end. Another potential adverse effect is parasocial interaction which, although more cognitively engaging, carries the potential for lost human connection. By putting on a device and entering the virtual world, over time a sense for real human interaction in the classroom could be lost. Experimentation and best practice-testing will significantly streamline the training process for faculty, and training students on the use of HMDs is not difficult. To further streamline the process, immersive training videos can be created and disseminated to faculty and students. The use of 360°VR and HMDs in the classroom will further revolutionize the delivery of distance and online course content among a student demographic that is more digitally inclined and versatile with the use of Information and Communication Technologies (ICTs).

While much has been mentioned and written about how 360VR can be used to enhance the classroom experience for students and faculty, there is a lack of resources that provide comprehensive knowledge on how the technology can be used. In [this example](#) from Ohio University's Gaming and Immersive Design lab, Zulhiczar Arie, Tom Burton, and Adonis Durado provide a resource for creating and producing interviews, a technique that could be used to deliver classroom materials, lectures, interactive discussions, and so on. It provides a multifaceted approach for recording shots, positioning the camera, as well as some basic dos and don'ts

[After Solitary 360](#), produced by Frontline, provides an interesting illustration of how 360VR can be used to simulate a lab environment. This video exemplifies a lab can be replicated and students placed into the environment to conduct experiments. The video provides takes the viewer and immerses them into a solitary confinement prison cell, where they can experience what the surrounding of this environment is. A search of any video-based platform will demonstrate the possibilities the medium provides for journalism and entertainment, and can readily be applied to education and training.

Exploration, Experimentation, Implementation

The use of 360VR is not suggested as a catch-all for immersive, interactive online learning in higher education. It requires ample research and testing before any such claim can be made. However, the technology

exists and is on the uptick in education and training simulation.

Students' acceptance of the use of technology in their learning during time of COVID-19 may play an important role in building an improved environmental consciousness. If we are not able to take students to see specific environment, we believe that education delivered through the use of 360VR can "bring" these remote areas to the students, especially when a specific topic must be understood in the present.

Post-pandemic, this technology can be utilized to attract students from diverse locations globally. While some may argue that the lack of internet access may be an impediment, we caution and remind those individuals that the access to this technology was out of the reach of many potential consumers less than a decade prior. As the technology continues to push boundaries and break barriers, it is imperative that as faculty members we continue to explore new way of delivering pedagogy to the curious minds that are enrolling into our various departments.

To identify if college students intend to embrace 360-degree lectures with a VR headset and to see as well as hear about climate change and tropical regions, it is crucial to establish a theoretical and practical foundation. It is a concept that warrants exploration, particularly if the push to online-only courses persists beyond the pandemic as a means to facilitate or simulate engaging classroom experience from a distance.

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- Dr. Atkins, Dr. Charles, and Dr. Adjanin have been working with creating 360VR experiences in different documentary and film contexts over the past four years and are continuing to develop and refine different types of virtual experiences. Dr. Aaron Atkins is an assistant professor of Digital Media in the Communication Department at Weber State University in Utah. Dr. Franklyn Charles is an assistant professor in the Department of Strategic Communication at Slippery Rock University in Pennsylvania. Dr. Nina Adjanin is a graduate assistant at Ohio University's Patton College of Education.*

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