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VR Meets the Real World | Technology in Focus

By [Matt Enis](#) on  March 29, 2018 [Leave a Comment](#)

Virtual reality is fast reaching a mainstream tipping point, with libraries already facilitating next-generation learning environments that use it



In a remote Arizona cave system, there is an array of centuries-old Native American art so delicate that the location of the cave's entrance is kept secret. But last September, 15 students from the University of Oklahoma (OU) and the University of Arizona, Tucson, were invited on a guided tour. No special precautions were taken, and none were needed. All of the participants were miles away, using virtual reality (VR) headsets to explore the ancient ceremonial site with Doug Gann, preservation archaeologist and digital media specialist for Archaeology Southwest.

With VR, "We're giving ready access to objects that are inaccessible," explains Matt Cook, emerging technologies librarian for OU Libraries (and a 2015 *LJ* Mover & Shaker [M&S]), who hosted the university's participants at VR stations in the Bizzell Memorial Library's award-winning Innovation @ the EDGE Maker space and Innovation Hub VisLab.

"How are you going to give students, or the public, the benefit of [hands-on] access and knowledge surrounding those types of places, other than VR?" he asks.

Cook, whose work has helped make OU Libraries and its Oklahoma Virtual Academic Laboratory (OVAL) pioneers of VR in academic environments, takes a broad view of ways in which VR can provide access to otherwise difficult-to-explore resources.

"Libraries are known for providing access to information," he says. Via VR, "instead of accessing text... you're visiting a historic site, you're viewing a fossil that's been 3-D scanned, or you're accessing architecture in Europe—you're giving the public access to things that are far away, or too big or too small, or [otherwise] too hard to access."

Thanks to the library's efforts, VR has been catching on quickly at OU. OVAL registered more than 3,200 unique VR sessions during the fall 2017 semester alone, including coursework applications in classes from 15 different academic disciplines—studying chemical models, manipulating protein structures, exploring architectural sites, creating virtual sculptures, even re-creating the experience of browsing library book stacks in a virtual environment.

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UW HEARTS VR

Last fall, the University of Washington (UW) announced that it had received a \$25,000 National Leadership Grant from the Institute of Museum and Library Services (IMLS) to design and build UW's Health Sciences Library (HSL) a VR and augmented reality (AR) studio. Working with Pear Medical's Bosc software, the studio will enable faculty and researchers to analyze 3-D anatomical models in VR or even simulate heart surgery.

The new studio follows on the success of the library's Translational Research and Information Lab (TRAIL), which launched in December 2016, providing researchers access to a 4K data wall (including librarian and IT staff concierge support provided with every reservation), equipment checkout, clinical research support, consultation services on multiple topics such as data management, and more. The VR studio is being added to the space this year.

VR in the health sciences "is a rapidly changing world. Literally, week by week," Tania Bardyn, associate dean of libraries and director of HSL, explained during a presentation at the American Library Association's (ALA) Midwinter Meeting in February. HSL hadn't originally envisioned VR as a use for TRAIL, Bardyn says, but just a few months after launch, the library discovered that UW's "Center for Cardiovascular Innovation...is trying to see how [it] can reduce risk, reduce the cost, and improve the efficacy of heart surgery using virtual reality."

After conducting a survey of other large health sciences libraries, UW found that there were pockets of interest and even other universities on the cusp of building VR labs for medical researchers, "but nobody had quite yet done it," Bardyn says. The use case was so new that she applied for the grant aiming for TRAIL to do "the foundational work that can be used by academic health sciences but also academic libraries to help them understand...what they should consider, especially around architecture, interior design, and space requirements," when designing a studio that may ultimately have teams of medical researchers collaborating in VR.

Bardyn adds that UW also plans to publish an open source primer later this year, documenting for the library community "what we did, how we went about it, and [any] golden nuggets we want to share."



NEW VIEW Sometimes you just have to see it for yourself. North Carolina State University's Peter Schreiner demonstrates an HTC Vive. Photo courtesy of North Carolina State University

PUBLIC PLATFORM

Public libraries are responding to the trend as well. Last year, in partnership with the California State

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Library and nonprofit consortium Califa, Facebook subsidiary Oculus VR donated 100 VR-ready PCs equipped with Oculus Rift headsets and controllers to more than 90 public libraries throughout California. As *LJ* has reported, these libraries are already using these VR stations for story times and introducing teens and adults to the technology with games and software that enable firsthand exploration of the ocean, the International Space Station, or historical events such as the Chernobyl disaster.

Following that program's early success, neighboring Nevada is now planning a similar rollout, using a portion of \$500,000 appropriated in 2017 by the state senate for the Nevada State Library, Archives, and Public Records (NSL).

"We are leveraging what's been done in California, and working with [immersive learning developer and VR project coordinator] XRLibraries and Califa...to advance curiosity about VR and AR as a learning platform," says Tammy Westergard, assistant administrator for library and development services for NSL and a 2016 *LJ* M&S. "We're putting together a cohort that will learn about the vital role of this emerging technology, especially as it relates to immersive education."



At press time, the program was still in its early stages, but Westergard says that NSL was aiming to provide the equipment to libraries that "think about how they can work with key partners to help advance those partners' instructional goals."

For example, she says, a Nevada public library might partner with a local high school biology class, offering a course segment in VR exploring blood cells. Another library might work with local businesses to provide VR workforce training.

"They could illustrate what working in an advanced manufacturing environment might really be like," she says. "It's so exciting, because in this way the library facilitates meaningful learning linkages between informal and formal environments."

FREE TO EXPLORE

North Carolina State University (NCSU) has launched a VR and AR studio in its D.H. Hill Library featuring six to eight VR workstations (depending on configuration) and loans out to students and faculty VR and AR equipment, including Microsoft HoloLens AR head-mounted devices, Oculus Rifts, Samsung Gear VR headsets for specific Samsung smartphones, Google Cardboard devices for other smartphones, and 360° cameras for creating VR content.

Part of the goal, in these early stages, notes NCSU Libraries Fellow Peter Schreiner, is "simply giving people access to the technology."

VR-ready PCs are still priced somewhat out of range for the average home user. On its website, Oculus highlights a few lower-end VR-ready desktop computers that are compatible with its headsets, starting at \$800—not including the \$400 Oculus headset with controllers and sensors. (The competing HTC Vive headset with controllers and sensors currently costs \$600.) But realistically, libraries and consumers might currently expect to spend about \$1,800 for a well-functioning PC VR workstation with a headset.



Nevada State Library's Tammy Westergard enters the virtual world. Photo courtesy of Nevada State Library

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Given the typical rate of PC component depreciation, prices will almost certainly continue to fall, and consumers can probably expect VR-readiness as a standard feature for inexpensive laptops, desktops, and smartphones within a few years. But right now, “relatively speaking, the cost is low for an institution but still high for a consumer, so [libraries are] kind of in that sweet spot,” Cook says.

That’s one key reason why everyone interviewed for this article said that it is worthwhile for libraries to offer patrons access to current VR equipment, even if the primary plan is simply getting familiar with the technology.

“I’m kind of entrenched in VR [and] have been for a while, but I’m constantly reminded that others are brand new to it,” Schreiner says. “Simply [offering] open access to our students, faculty, and staff to come in and use tools that are cost prohibitive to a lot of people” helps these users understand a new technology that is rapidly approaching the mainstream. “You can describe VR—how useful it is, how immersive it is—but until you actually try it...you don’t have a full sense of what it can do.”

Westergard agrees, adding that libraries should also recognize that installing the equipment on-site offers continuing ed and professional development opportunities for librarians and staff, who will need to learn about VR as a platform in order to assist patrons as the technology evolves and finds its way into a growing number of applications, including educational ones.

“It’s not just about throwing the coolest-looking piece of gear out there and having the community figure it out,” Westergard says. “These kinds of things need facilitators and guides on the side so that people can have a good experience.... It’s all so new, but the saturation and adoption rate of this technology in our country is so fast.”

At NCSU, the open approach has already paid off. The studio’s weekly intro to VR workshops are proving popular, a group of students are working to develop and publish a VR game using the library’s equipment, students who have studied abroad are hosting VR presentations on their experiences, business school students are using VR for cultural competency training, and others are just spreading the word.

“There was a student-led project, in a social media course, and the student chose to look into VR gaming,” Schreiner says. “He brought his whole class into the [NCSU VR] studio to do his presentation and let all of his classmates try VR. It was great. But on top of that, the professor after the class told me that he had been a VR skeptic, probably just reacting to the hype and whatnot, but...he was blown away.”

PROOF POSITIVE

Firsthand experiences may win over individual VR converts, but some may expect more substantial evidence that the technology is worthwhile as an educational tool.

“The thing that I find really helps when working with faculty is the literature—the peer-reviewed journal articles that speak to the benefits,” Cook says. As early adopters and true believers, librarians at OU have been actively working to contribute to that body of literature. In 2017, Cook and others from OU Libraries made more than 20 conference presentations on VR, published the article “Visual Serendipity: Preserving Embodied Browsing Activity in the 21st Century Research Library” in the *Journal of Academic Librarianship*, and contributed a chapter to ALA’s new book *Beyond Reality: Augmented, Virtual, and Mixed Reality in the Library*.

Already in 2018, they’ve presented preliminary results of an ongoing research study focused on the impact of VR on student self-efficacy at the Association for Library and Information Science Educators conference in February and last month participated in the first of three IMLS-funded meetings on 3-D Collection Strategies, with Virginia Tech University Libraries and Indiana University Libraries.

“Right now, what we’re testing for anthropology, structural biology/biochemistry, [is] where you have documented...laboratory data that suggests that a certain set of tasks are benefited or supported with VR technology—specifically tasks that involve spatial perception and spatial analysis,” Cook says. “Can you compare the size of objects, compare the shape of objects, or analyze 3-D objects?”

“As it turns out,” he continues, “it’s been proven that you can do those things more efficiently in VR but that data hasn’t been taken and applied in the classroom until now. We’re using laboratory data or exploratory research and taking that information to faculty. Not only are we using it to build [VR] modules within curriculum, we’re also testing to confirm that we got the same benefits that they got in a lab.”

DEPTH PERCEPTION

Whether it involves the hands-on exploration of ancient artwork in hidden caves or objects inaccessible to the human eye, VR is undoubtedly presenting new opportunities for education, and libraries can be at the forefront.

Westergard offers a personal anecdote.

“I went into a pond in VR,” she says. “You start out on the water, and you go into the pond and see all of the organisms. And you can go into the organisms. I went into a plant, and then I went into a plant cell, and I saw the mitochondria.... I’m such a nerd, but it actually made my eyes well up, because I recognized what it was—going all the way back to sixth grade science. I remembered studying the cell, and I remembered the parts of the cell...and I saw it moving. I just thought ‘wow, how cool would it be to go back and learn basic things that I have learned in my education in this 3-D environment?’ Who knows what that would have sparked in me.”

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