

Can virtual reality play a role in veterinary education? Researchers think so

December 6 2022, by Anne Manning



A virtual reality game that simulates a veterinary clinic was displayed during a Department of Art and Art History expo on Sept. 14, 2022. Credit: John Eisele.

You're a fourth-year veterinary student, and it's Day 2 of your emergency clinic rotation.

Before you've had time for coffee, a lethargic German shepherd in respiratory distress is rushed through the doors. Under the supervision of your instructor, you make quick decisions: Intubate to help him breathe. Manage his pain with the correct doses of carprofen or methadone. Full body exam, ultrasound and X-rays. Listen to his heart and lungs. Does he need emergency surgery?

At a veterinary teaching hospital like Colorado State University's, scenarios like this play out in real life. But soon scenarios like this could also happen in a [virtual world](#), through the safe confines of a headset and software system.

For the last four years, a cross-disciplinary team of CSU researchers has sought to determine whether [virtual reality](#) has a role to play in veterinary education and training. And where better than one of the best veterinary schools in the world to find out?

Back in 2018, Clinical Sciences Professor Pedro Boscan and a small team received a grant from the American Veterinary Medical Association to create a proof-of-concept virtual reality prototype for an anesthesiology machine.

Two years later, the team received funding from the Office of the Vice President for Research to launch VetVR, a campus-wide initiative that includes clinicians, computer scientists, graphic artists and engineers and is aimed at developing and testing virtual educational tools for veterinary medicine. VetVR is focused mostly on veterinary applications, but its goals have expanded since its inception.

"While we are trying to validate virtual reality and its potential in higher education, we want to go beyond veterinary medicine," said Boscan, who heads the anesthesiology department at the James L. Voss Veterinary Teaching Hospital. "We want to learn what could be helpful, and what

may not be helpful. That's part of the research we've been doing: What are the disadvantages? How much does it cost? How difficult is it?"

At CSU, the VetVR team is among many virtual and augmented reality-based projects exploring future applications of the technology. For example, another group on campus developed a virtual reality program for teaching human anatomy. The Office of the Vice President for Research led the expansion of such efforts through a focused initiative that began in 2017, which has spawned other investments in teaching and research.

Over the last two years, Boscan and the VetVR team have been developing a virtual module for training veterinary students in anesthesiology basics: How to sedate patients, use an anesthesia machine, administer drugs, perform an emergency ultrasound and everything else that goes into real-life medicine.

Their goal is to create a virtual setting nearly identical to in-classroom and clinic rotation trainings. One day, such a virtual tool could complement classroom equipment, making training accessible to many more students, and across distances.

Their efforts are taking place at the same time as a holistic overhaul of CSU's DVM curriculum, along with expanded facilities. Major updates expected in the next several years include more hands-on experiences in surgeries, more focus on problem-solving and decision-making, and more robust training in increasingly complex medical systems.

The VetVR team thinks virtual reality has the potential to become part of the modernized suite of education tools, not only for veterinary medicine but for disciplines that require cognitive and manual skills to problem-solve complex situations.

Virtual veterinary anesthesia

At the end of the semester last spring, the VetVR team tested their latest VR tool by recruiting students to voluntarily take an anesthesiology exam within the virtual setting. These same students also took the exam in the traditional way in the classroom, evaluated in-person by their human instructors. A research team collected data on the students' experiences and compared their performances on the two types of exams.

Lynn Keets is a third-year DVM student who collected data from students who received anesthesiology training in the virtual setting. She presented those results at the International Veterinary Emergency & Critical Care Symposium in San Antonio in September, and more recently at the American College of Veterinary Anesthesia and Analgesia annual summit in Portland, Oregon.

Keets and the team found that VR increased cognitive load for the exam. Virtual reality was new to 70% of the students surveyed, so the learning curve was a factor in performance, and the virtual setting might've added some complexity to the material being tested. However, Boscan said, virtual reality eliminates the subjectivity of a professor administering the exam in real life. "What we know for sure is that professors are nice, and computers are not nice," Boscan said.

Keets said she thinks upcoming generations of learners may be more open to virtual technologies like the ones she and the team have been exploring. "I think it offers a novel approach, a different learning pedagogy system ... Not everyone is adapted to sit in a classroom, so in that way, it does add value," she said.

Research is helping bring into focus whether virtual reality might be a useful tool for educating veterinarians. In their next phase of work, the VetVR team will continue exposing student volunteers to the virtual

anesthesia module. This year, they plan to put their virtual tool to an even more rigorous test. "We'll train them in virtual reality, and we'll examine them with a real machine," Boscan said.

Moving into the gaming space

While working on veterinary and anesthesia projects, the team is dreaming bigger—and that goes back to the scenario of the dying German shepherd. In tandem with their research, the team has also brought in coders and developers to create a [virtual reality game](#) that allows players to "treat" a patient in a vet clinic, providing opportunities for complex decision-making and medical outcomes for patients.

The VetVR game will soon be available via SteamVR as part of a game studio the team has named Liekos. The researchers hope public attention will help them refine the software and improve it for later use in educational settings. Their plan is to release other products through Liekos Studio, such as a VR app for mental health.

Cyane Tornatzky, an associate professor in the Department of Art and Art History and a VetVR collaborator, is energized by the team's translational application of an emerging technology.

"In electronic art, we have this long history of things like interactive kiosks, websites as art forms, and this idea that video games can have serious content," Tornatzky said.

The team has also been able to hire some of Tornatzky's students, who have the necessary skills for translating electronic art into cutting-edge technology. "It's been fun, innovative and hard," she said.

The game was created so that anyone—not just veterinary students—can practice basic veterinary techniques, like examining a patient,

administering prescriptions, making diagnoses and ultimately, saving the dog's life. It's closer to the team's goal of creating a high-stakes emergency scenario to use in clinical education because it reflects the consequences of real decision-making.

Preparing veterinarians for the workplace

In an emergency, or even in an outpatient veterinary clinic, one wrong decision can lead to catastrophe. But that's exactly why Boscan and others think virtual training for veterinary medicine could help veterinarians be better prepared for the workplace.

"For a long time, I had been looking at how to recreate the stress of being in the clinics," Boscan said. "If you're in an emergency situation, you need to learn how to handle the stress and make important decisions."

In health care settings —both human and animal—students have traditionally been trained through rotations, carefully watched by mentors and thrown into real scenarios as they come through the doors. There's no substitute for the experience of working on a real patient, Boscan said, and that will continue.

But what if there was a way to closely recreate those experiences, outside the high stakes of real life? Virtual training could be the answer. It would also provide repeatability. A hundred different scenarios could be practiced 100 times by the same student. That kind of repeatability doesn't exist in real life, Boscan said.

The team is continuing their quest to explore, validate and innovate around virtual education. They've recently secured a grant from the High Plains Intermountain Center for Agricultural Health and Safety, in which they will develop a prototype training module for dairy farmers on using

proper personal protective equipment. Through their work, the researchers will continue their assessment of virtual reality and cognitive load: How much information a user can handle at a given time, and how to optimize learning.

To bring greater awareness to their work, and to inspire future veterinarians, the team will make their veterinary clinic application available for free at CSU's new Spur campus in Denver, which boasts a new virtual reality lab in the Vida building.

Work like this, and continued development of the anesthesiology and vet clinic training settings, will bring the team further insight into the evaluation of new technologies for the next generation of health care workers.

"We are starting with [veterinary medicine](#), but we think VR is going to be part of the future for education," Boscan said.

More information: Convention: iveccs.org/

Provided by Colorado State University

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