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Virtual reality - real learning

For college students, distractions come from all angles in the form of buzzing text messages, chattering classmates and constant social media notifications.

But what if you could block out the noise and create an engaging, immersive educational experience through virtual reality? How could it be used, and what sort of learning outcomes would it create?

Once confined to science fiction, VR technology is now more accessible than ever before. As its costs continue to decline while its potential uses grow, many colleges — including St. Scholastica — are increasingly embracing it to create interactive learning experiences.

Exploring new possibilities

St. Scholastica's faculty members are working closely with the Information Technology department's Innovation Team to explore ways to effectively utilize VR in the classroom.

Chief Information Officer Ben Adams said each project begins with key conversations with faculty members on how VR might optimize students' learning.

"We start with, 'What's the educational purpose, what are you trying to teach? What are the outcomes that you're trying to measure against and prove?'"

The Innovation Team currently has 50 virtual reality headsets, which it uses for two main classroom functions: an app about the heart, called Cor, that's used in Physician Assistant and Physical Therapy classes, and an anatomy program used in anatomy classes.

Studying the heart through Cor

Cor was developed by Information Technology Applications Specialist Greta Jenkins, who was hired directly out of the College's [computer information systems program](#). The VR program uses a three-dimensional heart model that gives a close-up look at a normally functioning heart along with five different heartbeat irregularities (arrhythmias). Students can also study the electrocardiogram (ECG) charts associated with each arrhythmia, helping them to recognize and diagnose heart problems.

The initial heart model was purchased from a physician and 3-D heart modeler in India. Based on faculty feedback, that same modeler was commissioned for the additional arrhythmias. The entire user interface was designed by Jenkins. It took several months to develop, with a steep learning curve since this was her first such project. She first shared it with a friend who works in cardiac care, then sent it to faculty members for their thoughts. The Innovation Team was particularly interested in helping faculty illustrate concepts that are challenging to teach without visual aids.

"The faculty are really helping guide and choose what they want to see," said Eric Mistry, Instructional Technologist and Digital Media Specialist.

Classroom collaborations

VR is never a substitute for faculty instruction, he said. For instance, a typical class session incorporating the Cor program would include a lecture overview along with a VR lesson conducted in groups or pairs.

"One person wears the headset, and the other guides the experience with a worksheet developed by faculty," Mistry said. "Not only are we using VR, but we're also using really active learning and collaborative teaching ... all these things that we know are really innovative and good teaching techniques."

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Using the headset, students virtually enter a hospital room — complete with a St. Scholastica logo on a television screen — to view a graphic representation of a heart. Using a handheld device, they can zoom in or rotate the heart to get a rare, interactive close-up look at cardiac functionality. It's much more engaging than other methods such as flashcards, Adams said.

Positive feedback

Dave LaBore, assistant professor of [Physician Assistant studies](#), said his students love the interactive learning tool.

"Here they get to see what the heart is doing, the electrical activity beating through the heart at the same time, so they can correlate the electrical activity with the ECG," LaBore said. "This gives them a deeper sense of what's going on in the heart other than just seeing a piece of paper."

He is already thinking ahead to possible future applications, such as using a VR learning experience to teach students what heart valves actually sound like. This is important for the diagnosis of heart murmurs, he said, and is notoriously difficult to demonstrate in the classroom.

The Cor VR program was used for the first time last fall, and the Innovation Team was encouraged by the results.

"Data seems to indicate that students liked it and found it useful, which is what we're hoping for," Jenkins said.

Student seal of approval

First-year PA student Megan Berger said the program offered a unique hands-on learning experience that would've been impossible otherwise.

"I learn so much better by experiencing something versus reading the material or being lectured at, so I really absorbed the information that was taught using the VR program," Berger said. "ECGs are one of the hardest subjects to grasp for many students, so being able to see the virtual heart beating in different rhythms while the ECG was reading the rhythms really helped solidify many concepts and it really stuck in my brain."

First-year PA student Sophie Titus concurred.

"It was an easy, interactive way to learn about something very complex," Titus said. "The program offered great visual aspects that flashcards or a textbook cannot offer."

"I am a visual learner, so I really enjoyed seeing the heart 'in action,'" said first-year PA student Deviney Benson. "I was able to connect and visualize the concepts that we learned in class. This activity really helped reinforce the material."

Evidence-based research

Mistry is encouraged by the fact that he's already received faculty requests to repeat the VR sessions in future classes.

"In the academic technology world, that is a good victory to have," he said.

But the team wants more than just anecdotal evidence of success. The PA and PT faculty members who used the Cor model in their classrooms will review the unit material in May. One group of students will use the VR model and another group won't and both will be quizzed.

"We'll see how well they retain the material as a result of using the technology," Adams said. "Not only are we advancing the innovative teaching techniques, but we're also advancing scholarship and research."

An enhanced learning experience

VR is also being used in undergraduate anatomy labs. The Innovation Team started using a third-party anatomy app in classrooms last summer. That led to another research project that will measure the effectiveness of the VR technology; only two sections of the course will utilize the VR app, and their test scores will be measured against those of their classmates who didn't use the app in class. To ensure fairness, any student enrolled in anatomy or physiology will be able to check out the headsets if they want to.

Adams said they anticipate that final test scores might be similar, but that students who used the VR app in class will spend less time studying for the same results.

Mistry said the VR learning experience is a powerful, enriching one.

"It's interesting how long 15 minutes can feel," he said. "You're completely immersed in it. You're forced to focus and think about exactly what you're seeing, and there's not a bunch of distractions popping up."

Team-building opportunities

VR is also useful outside the classroom. For departmental training and team building, the Innovation Team has been using a VR game called "Keep Talking and Nobody Explodes." One person wears a VR headset, which shows a "bomb," while teammates review manuals and diagrams and try to provide verbal instructions on how to defuse the bomb. It underscores the importance of communication and goal-setting, Adams said.

"It's a wonderful tool to teach the fact that even when the goal in a group is crystal clear and unambiguous, communication can get in the way and trip you up," Adams said.

"It translates to all kinds of different disciplines," Jenkins said, "or any time when you have a goal and everybody is trying to achieve it, but how you get there might be a little different."

IT Manager of Innovation Peg Ocel said the game provided valuable training for Help Desk staff members. It helps them understand where clients are coming from, learn how to better describe what they're seeing on their screens and give clear instructions, she said.

"It's good for them to see how difficult it is to describe what you're seeing as a customer," she said.

The game has been used by the residential life team, a group of nursing students in St. Cloud, various faculty members and the Information Technology Department.

Future applications

The Innovation Team has other VR projects in the works. In a partnership with Career Services and the Physician Assistant program, a series of VR experiences are being created that will provide virtual "job shadowing" for students interested in the PA field. Because of privacy restrictions in the healthcare realm, it's often difficult for students to get these kinds of exposures.

Team members are also interested in using the existing frameworks they built for the Cor app to provide a three-dimensional look at other subjects, particularly for healthcare classes. For instance, faculty members have suggested that ears might be a good future topic.

Adams feels that VR technology is on its way to becoming a teaching tool as common as laptops and tablets. The headsets now being used by the College are under \$200 each.

"If we can get the student using it in three to five classes, it will be the cheapest textbook that they buy," Adams said. "Not only that, but you can also watch Netflix on it."

The Duluth News Tribune recently ran an [article about virtual reality applications that featured the College's new innovations](#).

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