

Research teams collaborate with microsoft on 'Earth-shattering' mixed-reality technology for education

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Case Western Reserve University Radiology Professor Mark Griswold knew his world had changed the moment he first used a prototype of Microsoft's HoloLens headset. Two months later, one of the university's medical students illustrated exactly why.

"There's the aortic valve," Satyam Ghodasara exclaimed as he used Microsoft's device to examine a holographic heart. "Now I understand."

Today, Griswold told tens of thousands of people how HoloLens can transform learning across countless subjects, including those as complex as the human body. Speaking to an in-person and online audience at Microsoft's annual Build conference, he highlighted disciplines as disparate as art history and engineering—but started with a holographic heart. In traditional anatomy, after all, students like Ghodasara cut into cadavers to understand the body's intricacies.

With HoloLens, Griswold explained, "you see it truly in 3D. You can take parts in and out. You can turn it around. You can see the blood pumping—the entire system."

In other words, technology not only can match existing educational methods—it can actually improve upon them. Which, in many ways, is why Cleveland Clinic CEO Toby Cosgrove contacted then-Microsoft executive Craig Mundie in 2013, after the hospital and university first

agreed to partner on a new education building.

"We launched this collaboration to prepare students for a health care future that is still being imagined," Cleveland Clinic CEO Delos "Toby" Cosgrove said of what has become a 485,000-square-foot Health Education Campus project. "By combining a state-of-the-art structure, pioneering technology, and cutting-edge teaching techniques, we will provide them the innovative education required to lead in this new era."

As Cosgrove, Case Western Reserve President Barbara R. Snyder and other academic leaders engaged more extensively with Microsoft, the more potential everyone saw.

"For more than a century, our medical school has been renowned for inventing and reinventing approaches to teaching and learning that take root nationwide," President Snyder said. "When we match that expertise with the interdisciplinary knowledge of our faculty, we create a rich environment to explore the educational potential of Microsoft's extraordinary technology."

After a small group including Griswold, engineering professor Marc Buchner and Cleveland Clinic education technology leader Neil Mehta first experienced HoloLens in December, the faculty returned to Cleveland to create a core team dedicated to exploring the technology's academic potential. In February, 10 members of the team—including Ghodasara—returned to Microsoft for a HoloLens programming deep dive.

Ghodasara already had taken the traditional anatomy class at Case Western Reserve, but it wasn't until he used the HoloLens headset that he first visualized the aortic valve in its entirety—unobstructed by other elements of the cardiac system and undamaged by earlier dissection efforts. Members of the Microsoft team were in the room when

Ghudasara had his "aha" moment; a few weeks later, the heart demonstration became part of the Build conference agenda.

Case Western Reserve is the only university represented during the three-day event, a distinction Griswold attributes in part to the core team's breadth of expertise and collegial approach.

"Without all of those people coming together," Griswold said, "this would not have happened."

When Griswold took the stage as part of Microsoft's opening keynote at the Build conference, Ghudasara, Buchner and Chief Information Officer Sue Workman also were in the audience. Back in Cleveland, three of Professor Buchner's undergraduates—John Billingsley, Henry Eastman and Tim Sesler—demonstrated some of the potential of the HoloLens technology live in the Tinkham Veale University Center.

Buchner, whose specialties include simulation and game design, believes Microsoft's innovation "has the capability to transform engineering education."

Because the technology is relatively easy to use, students will be able to build, operate and analyze all manner of devices and systems. "[It will] encourage experimentation," Buchner said, "leading to deeper understanding and improved product design."

In truth, HoloLens ultimately could have applications for dozens of Case Western Reserve's academic programs. NASA's Jet Propulsion Laboratory already has worked with Microsoft to develop software that will allow Earth-based scientists to work on Mars with a specially designed rover vehicle. A similar collaboration could enable students here to take part in archeological digs around the world. Or astronomy students could stand in the midst of colliding galaxies, securing front-

row view of the unfolding chaos. Art history professors could present masterpieces in their original settings—a centuries-old castle, or even the Sistine Chapel.

"The whole campus has the potential to use this," Griswold said. "Our ability to use this for education is almost limitless."

For now, however, the top priority is creating a full digital anatomy curriculum, a process launched with the advent of the Health Education Campus, and now experiencing even greater momentum. Among the key collaborators are a team of medical students and anatomy and radiology faculty who are already investigating the use of these kinds of technology. This team, led by Amy WilsonDelfosse, the medical school's associate dean for curriculum, and Suzanne Wish-Baratz, an assistant professor who is one of the primary leaders of anatomy education, fully expects to have a digital curriculum ready for the new Health Education Campus.

Also essential, Griswold said, has been the advice and assistance of Microsoft's HoloLens team and executives.

"It's been a joy to work with them. They have been so friendly, so collaborative, so willing to work with us on this," Griswold said. "We're going to do incredible things together."

Provided by Case Western Reserve University

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