

A Healthcare School Trains Using Advanced Visualization

The University of Toledo's Interprofessional Immersive Simulation Center uses advanced visualization systems to train healthcare professionals and students.

Improve Interdisciplinary Collaboration

The University of Toledo Interprofessional Immersive Simulation Center (UT – IISC) has, as part of its mission, goals to train students in virtual immersive environments in order to produce medical graduates who excel in clinical practice and medical research. To help meet these goals, the IISC incorporates clinical simulation scenarios and 3D visualization technology with the aim of preparing learners for the safest possible clinical care of real patients.

The UT-IISC is located on the school's Health Science Campus, which is home to 3,000 health care students and consists of three interconnected centers that have been purposefully designed to foster interdisciplinary collaboration. The desire to advance interprofessional education

– primarily, but not limited to healthcare providers — was one of the driving forces behind the center.

"There needs to be better collaboration between the disciplines, especially in healthcare, to improve patient outcomes," says Dr. Pamela Boyers, executive director of the IISC.

"Patients in this day and age are in the hospital a very short period of time and frequently move between teams," says Boyers. "So it's terribly important for us to address patient safety early in training. Learning to work in teams early and throughout their education helps achieve that goal."

"We made the very best decision. AVI-SPL has been phenomenal."



Another driving factor behind the UT- IISC is the need to evolve teaching methods that accommodate the exponential growth in medical knowledge.

For example, “Physicians are constantly adding more material to the curriculum,” says Boyers. “To passively assimilate content in classrooms isn’t necessarily the most effective way of teaching healthcare students to take care of patients.” Achieving competency through “hands-on” skill development is essential – as well as learning how to think through situations.”

To fully realize the IISC capabilities, the University of Toledo relied on the systems integration experts at AVI-SPL.

Interactive Systems Unlike Anything

AVI-SPL used the combined talents of its Advanced Visualization team, Medical Team, and Systems Integration Group to implement systems like IPTV, digital signage, collaboration rooms, and interactive video walls with detailed resolution. Many of these are powered by display solutions by Sharp and Cisco’s video collaboration solutions.

“We integrated all of these systems into one intelligent building,” says Bill Schmidt, AVI-SPL director of sales. That means different technology areas of the building are able to talk to one another and interact via Crestron control systems.

“We’re providing all the cameras and network infrastructure for the surgical suites,” says Schmidt. “Monitors then allow instructors to view what those cameras see.”

The jewel of the integration is within the first floor’s 3D and Virtual Immersive Reality Center. There, a five-sided iSpace Barco system projects images on the ceiling, floor and three walls, creating a futuristic holodeck-type environment. AVI-SPL is also tasked with making it possible to sync the system with one similar at Ohio’s Wright Patterson Air Force Base.

Also in the VIR Center is a curved CAD wall, which can accommodate up to 30 learners. As with the iSpace, participants wear 3D glasses with trackers that give each individual a customized view of projected images.

“These are the highest fidelity devices of their type on the planet,” says Schmidt. “You as a viewer are part of the application, with a fidelity level that is unlike anything else.”

The second and third floors have, respectively, the Advanced Clinical Simulation Center and the Progressive Anatomy & Surgical Skills Center. In both of these areas, cameras and displays are set up so that instructors can monitor learners. All three centers

At A Glance

Organization

University of Toledo IISC

Location

Toledo, OH

Market

Education, Healthcare

Solutions

Barco video walls

Crestron control systems

Cisco video conferencing

Sharp displays

Services

Integration

can communicate audio-visual content internally throughout the building as well as broadcast externally.

Digital signage outside elevators offers wayfinding information, displaying the layout of each floor and the events occurring throughout the IISC. A video wall in the lobby greets visitors, and provides information for anything the IT staff wants to share, including advertising and stories.

New Ways to Transfer Knowledge

The IISC opened in April 2014, introducing a 65,000-square-foot tri-center area that is considered unique in academia as well as highly advanced. Here, healthcare students and learners can be trained in virtual clinical environments with the overarching goal of reducing errors in patient treatment while improving the outcomes of healthcare.

“This center gives us an opportunity to transform traditional education by learning experientially,” says Boyers. “We also wanted to stimulate both learners and faculty by using disruptive technologies to discover new ways to transfer knowledge and create new research opportunities.”

In the 3D and Virtual Immersive Reality Center, learners can now immerse themselves in any environment, such as an operating room, and interact with any images projected on the iSpace walls. For example, they can

dissect a skull or immerse themselves in cells and organs, and fly through a heart or the whole human body.

“UT is among the first to apply 3D and VIR environments to train healthcare professionals,” says Boyers. “Students come to medicine, pharmacy, and nursing college already familiar with gaming concepts and visual technologies. They love this ‘Disneyesque’ world in which they can actually see and experience what is being taught. Our hope is that they will gain knowledge faster, retain it better and, working with the other available simulation technologies, be able to apply their knowledge and skills more efficiently and effectively for the ultimate benefit of their patients.”

In the second floor’s Advanced Clinical Simulation Center, robotic mannequins are part of a different kind of virtual environment, one that includes patient care facilities such as an operating room, trauma center, and birthing suites. Each space has human patient simulators that can be programmed to be patients with any kind of diagnosis. UT-IISC calls this the Elliptical Hospital, where students take care of their robotic patients and learn to work in teams. The clinical center is equipped with digital cameras that oversee and record student performance in these spaces so that instructors and learners can review how they perform during the simulations. From a central

control room, staff can actually “drive” the patient simulators through the course of an illness, manage the situation (ranging from routine to emergency care) while learners from different disciplines — anesthesia, surgery, nursing, pharmacy, respiratory therapy, physical therapy and so on – practice in teams to care for patients. These scenarios teach clinical competencies, team skills and good communication between team members – as well as with their patients.

The third floor’s Progressive Anatomy & Surgical Skills Center uses a very different kind of simulation. This center is run like a hospital and is where advanced learners like surgeons, radiologists, physician assistants, and surgical nurse practitioners can practice surgical procedures including operating-room protocols. Here, all healthcare professionals can partner with industry in research and development in the arena of surgical instrumentation. The goal of this center is to ensure that all doctors, nurses, and PAs can safely learn new surgical techniques and work together in these virtual OR settings prior to caring for real patients.

“The Interprofessional Immersive Simulation Center provides UT with the widest range of simulation modalities in the world in one building,” says Boyers. “The learners can move from one level to the next to maximize their experiences. They can learn about the heart in the virtual spaces, then they can take care of the patient in the Elliptical Hospital and, if necessary, advance their training on

the surgical skills floor. We even have a simulated home unit. The ultimate goal is to make sure they’re competent before working with patients.” Surgical training workshops for local, national and global surgeons can also be conducted in this center.

While especially designed for those in the health professions – doctors, nurses, allied healthcare professionals — the IISC is also available to those in other disciplines, such as arts, engineering and natural sciences. The IISC also works with industry to create new instrumentation, test products and study outcomes. Through its educational partnership agreement with Wright Patterson AFB, the center conducts medical training exercises. One goal is to connect the IISC iSpace with its counterpart at Wright Patterson in order to enhance military/industry/university collaboration, including training and research opportunities. Another business opportunity for the IISC is to develop medical content training modules for distribution.

“We have some marvelous faculty with great imaginations who are using their expertise to transfer their lectures into interactive learning experiences,” says Boyers.

Between 1,500 to 2,000 learners come to the center each month, and the response

has been very positive.

“The students love it; they absolutely embrace it,” says Boyers.

That kind of reaction is a validation of the work AVI-SPL put into this ambitious project to give the University of Toledo what it wanted.

“We made the very best decision,” says Boyers. “AVI-SPL has been phenomenal. We’ve worked with a great group of people at every level. They’ve been responsive. They’ve been thoughtful. They’ve gone out of their way when we needed special help.”

About AVI-SPL

AVI-SPL is the world’s leading integrator of communication and collaboration solutions that support organizations of all types. We design, build, integrate and support systems for video collaboration, digital media, advanced visualization, AV distribution, and intelligent building control. We also provide a wide range of remote and onsite support services, as well as cloud-based video conferencing.

Featured Partners





Fig 1.1



Fig 1.2



Fig 1.3



Fig 1.4



Fig 1.5

Images

Fig 1.1
The University of Toledo IISC is home to over 3,000 healthcare students.

Fig 1.4
Learners wear 3D glasses with trackers that give them a customized view of images.

Fig 1.2
Monitors enable instructors to see into training suites.

Fig 1.5
Doctors and students review recorded patient-care simulations.

Fig 1.3
Control systems allow different areas of the building to talk to one another.