Today's Technology Advances Teaching

Lifelike simulations and virtual reality bring innovative modalities to local health care education.

BY SARAH ARENDT-BEYER | CONTRIBUTED PHOTOS

Students and staff at Mayo Clinic Health System in La Crosse use a simulation center as one of their education methods for training health care personnel.

Megan Smith, right, interim dean and associate professor with the College of Nursing and Health at Viterbo University, and Alison Dietz, simulation technician and interim clinical coordinator, use manikins like Apollo to provide realistic situations for nursing students in the university's simulation lab.

Apollo lies in the hospital bed, staring up at the ceiling. He's clad in a hospital gown and is surrounded by imposing monitors. He doesn't move, and the monitors are silent. He's not breathing.

Apollo isn't alive. He's an adult patient simulator—a manikin.

And he's not in a hospital room, though it feels exactly like one. He's in a classroom, part of Viterbo University's School of Nursing.

Apollo is one of several manikins used by Megan Smith, Ph.D., R.N. CNE, the interim dean and an associate professor with the College of Nursing and Health, and Alison Dietz, simulation technician and interim clinical coordinator, to train aspiring nurses.

Carley Buisman, manager at the Integrated Center for Education at Gundersen Health System, La Crosse

During a simulation, learners are placed in a lifelike scenario to practice their medical skills in a realistic yet safe environment. In the simulation, manikins can present with any number of woes. According to Dietz, Apollo "can do pretty much anything you want him to do. He can bleed, … we can fill him with urine so they can put a Foley catheter into his bladder, … he can also have seizures." From a control panel set behind one-way glass, Dietz can remotely operate Apollo, doing things like changing his cardiac rhythm strip to approximate a heart attack so the students can practice running through a full code.

Gundersen Health Systems' Integrated Center for Education (known as the ICE House) is home to 12 high-fidelity manikins, approximating different ages. "Our 5- to 7-year-old is one of our newer manikins and the most realistic," says Carley Buisman, manager at the Integrated Center for Education. "He will actually turn and look at you when you talk to him; you can check his blood sugar; you can do IOs on him; when he cries, his face moves. He's very realistic looking." (IO is short for Intraosseous cannulation: the placing of a sturdy needle into bone to infuse fluids and blood products into critically ill patients.)

INNOVATION IN TEACHING AND LEARNING

The manikins are just one part of a larger effort within health care to provide better training with the ultimate goal of improving patient outcomes.

At the ICE House, there are a variety of spaces for different learning opportunities. In one room, learners practice techniques on chicken legs. In another, staff listen attentively during an American Heart Association CPR training. It also houses a mock operating room and a skills lab where staff practice on everything from pigs' feet to the high-fidelity manikins to cadavers.

Mayo Clinic Health System in La Crosse also uses a variety of learning techniques to improve engagement and retention. "We're on the forefront of some different, fun learning modalities," says Barbara Reardon, MSN, R.N., the nursing education manager in La Crosse. "We've really done some fun things with escape rooms where they are given an assignment and have to either perform technical skills to get to the next clue or critically think about what's going on to answer a question."

Mayo is also exploring virtual reality technology that allows participants to experience what it's like as a patient, to practice working with a patient and to hone specific skills. "Mayo Clinic is taking an intentional scholarly approach to it, and studying it, and gathering

Ana Ehtemami, PhD, senior engineer, develops an augmented and virtual reality (AR/VR) application for enhanced medical training at Mayo Clinic in Rochester.

the data necessary to determine how it's best utilized, in what settings it's best utilized, for what kinds of competency development is it most appropriate, and for which learners," says Darcy Reed, M.D., Internal Medicine, dean of education for Mayo Clinic Health System.

A SAFE SPACE

"I think what's really important is that simulation is a safe place for our students to learn. While it's not a clinical replacement, it is a clinical *complement,* and they see things here that they may not see in the clinical space, or we can build upon what they've seen in the clinical space," says Viterbo's Smith.

Her colleague Dietz echoes the sentiment: "We always tell them, we want you to make mistakes; this is the place to make them," adding that students have shared that "if they make a mistake here, they never forget it."

At Gundersen, Buisman, too, notes that "whenever we have new learners, we make sure to let them know that [this is a safe space]. That if you're going to fail, this is the place to do it because you can practice again and again."

TEAMWORK

Another vital element is practicing as a team to cultivate skills like collaboration and effective communication. Mayo's Dr. Reed notes that "the performance of the team and the excellence that team delivers is more than the sum of those individual health care providers' competencies or skills … health care is a team sport, it's a team activity, and so the key is having that full team learning and working and practicing together." Reardon agrees. "I think whenever we can get a team together, practicing in that safe environment, that's when you really learn how to work effectively as a team and figure out what your gaps and barriers are, to perfect those."

Dr. Darcy Reed, dean of education for Mayo Clinic Health System

Barbara Reardon, MSN, R.N., nursing education manager at Mayo Clinic Health System in La Crosse

INVESTING IN THE FUTURE

All three institutions also work to encourage interest in health care careers. At Gundersen Health System, the operating rooms are live-streamed into a conference room in the ICE House, allowing visiting high school students to watch surgery in real time. According to Buisman, "the high school students love it. We work with the Health Science Academy, which is a two-year program, and they get to come once every year. They wish they could come more."

"We have events where we invite high school students here … and part of their rotation that they'll go through is simulation," says Viterbo's Smith. At one event, students could listen to a manikin's heart and lungs, check his "wounds" for infection and even give IV medication. "They all loved it because it felt like they were nurses, using actual needles and syringes and gloves and getting to give him medications," adds Dietz.

Mayo Clinic Health System in La Crosse also regularly invites high school programs to experience the Simulation Lab, Reardon notes, adding "we work very closely with all of our local colleges too, so we've got a lot of different programs who utilize the Simulation Center."

One thing is certain: even though Apollo is not alive, thanks to him, manikins like him and our health care providers' commitment to excellence, many more *real* patients will be. **CRW**

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