

Robot patients are helping train nurses

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Lifelike simulators at UNC Charlotte's School of Nursing give students hands-on practice; 'they experience bringing that patient back to life'



UNC Charlotte nursing students can monitor vital signs on a "high-fidelity patient simulator." (Photo courtesy of UNC Charlotte)

By Michael J. Solender

Early in nursing educator Melinda Pierce's teaching career, her students practiced administering injections into the flesh of an orange instead of a patient.

Today, Pierce's teaching tools don't involve citrus. Leading the way are high fidelity patient simulators, life-sized robotic patients that present her students with symptoms. They have a pulse and can breathe, bleed and urinate. They can even simulate giving birth.

Pierce oversees the School of Nursing's Simulation Lab at UNC Charlotte and works with a team to develop simulation scenarios and situations nurses are likely to face in real-life hospitals and other healthcare settings. The high-tech lab and state-of-the-art tools are part of an ongoing emphasis at UNC Charlotte to explore new ways to incorporate safe, high-impact experiential learning into nursing education and beyond.

“Historically, nursing students have been taught by experienced nurses relaying knowledge through lecture and presentation,” Pierce said. “High fidelity patient simulators are computer-controlled. They generate heart, lung and abdominal sounds, can be given medications and IV fluids and react physiologically like a live human being to whatever interventions nursing students give them. Here, students experience taking care of the full body patient simulators just like they would take care of live patients in the hospital.”

With more than 500 students (330 undergraduate, 220 graduate students), the School of Nursing together with Public Health Sciences, Social Work, and Applied Physiology Health & Clinical Sciences comprise the university's College of Health and Human Services (CHHS). In fall 2021, CHHS had the third-largest number of majors on campus and is home to more than 170 faculty.

High impact education practices

“We are very invested in high impact education practices and work to make sure students have experiential learning,” said professor and dean of CHHS, **Catrine Tudor-Locke**. The college has more than 800 agreements with community partners, which offer students internships and hands-on learning.

State-of-the-art training tools are part of that strategy, Tudor-Locke says. Last summer, the university purchased an Anatamage Table, one of the most technologically advanced 3-D virtual dissection and anatomy visualization tools on the market. The body-sized table looks and functions like a high-tech tablet and presents three-dimensional, life-

sized images of cadaver samples. UNC Charlotte is one of only five schools in the state that have one.

“I’ve never seen anything like this,” said UNC Charlotte simulation technician **Ashton Atmore**. “Students can dissect the body along any plane. The versatility of the interactive features encourages intuitive learning and allows for a precise understanding of the body’s complex, interconnected relationships.”

There are fewer than 100 of these tables in the U.S. and only 300 in the world, according to the university.

Dena Evans, the School of Nursing’s director, says the demand for skilled nursing in our region and nationally exceeds the supply, and the university works closely with clinical partners such as **Atrium Health, Novant Health, Caromont Health, Care Ring, Sanger Clinic, Mission Health**, the health departments of local counties and others to ensure the highest level of readiness for nurses at all levels.

Pipeline of international nurses

It’s not only the School of Nursing students that benefit from resources found at the Simulation Lab. The tools and programming are accessible to community partners and other programs at Charlotte’s College of Health and Human Services as well.

Evans said that last summer, UNC Charlotte teamed up with an international nurse recruitment agency, **Conexus MedStaff**, to provide access to the lab. That helps the region address a nursing shortage and ensure that nurses from other countries are familiar with practices at U.S. hospitals.

Not just nurses: Students in public health, veterinary science, chemistry and biology use the Anatomage Table in their curriculum, allowing the university to maximize the impact of this high-tech training tool. “Biology students benefit from the anatomy and physiology features,” Atmore said. “Regional scans show the lungs, which is useful for the respiratory therapy students. Microscopic images of tissues support students from the Department of Applied Physiology, Health, and Physical Sciences. Even if you’re not studying health sciences and you want to look at what cancer looks like in the stomach, this can provide tremendous educational value.”

Pierce shared the example of an emergency involving a heart attack. In the simulated experience, the student can work directly in a hands-on capacity, not simply observe.

“In taking care of a high fidelity patient simulator that is in cardiac arrest,” says Pierce, “the student performs CPR. If done correctly, the simulator responds to the interventions of chest compressions and manual ventilations. If they give the drugs correctly and in the right dosage, the patient simulator will respond. They can defibrillate, use electricity on the chest of the patient just like they would a human being. And if they do everything correctly, and if the scenario is designed for the patient to be resuscitated, they experience bringing that patient back to life and back to return of spontaneous circulation.”

Student reaction to the simulated experiences is validating for Pierce and her team.

She said: “Many students come back [from board certification testing] and tell me they had several questions on the patient that they had in simulation, and it was so easy to answer these questions because they’d taken care of that patient in the simulation lab.”

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