Nearly a decade ago, Alberto Vasquez was working at the University of Texas Health Science Center in San Antonio, TX, as a research engineering associate, where he used his ability to solve technical problems during clinical trials. Like many healthcare technology management (HTM) professionals, Vasquez worked alongside a mix of other health professionals, including those in nursing and medical training programs.

Vasquez noticed a couple things. The first was that many new HTM professionals needed to work on their communication skills while on the hospital floors, particularly in terms of interactions with other healthcare staff. Second, Vasquez observed that education models for other health professionals accounted for the development of these skills during training programs, whereas those for HTM professionals did not.

“I was always impressed with how medical students are turned into doctors. Medical students start with rigorous theory and then slowly start integrating that knowledge with soft skills as they enter internships and residencies,” said Vasquez, who is now an associate professor at St. Philip’s College in San Antonio, TX, which offers several associate degrees and advanced skills certificates in HTM disciplines. Earlier in his career, Vasquez was a clinical engineer for the Texas Department of State Health Services, where he launched a pilot program to create a model for clinical engineering at the state hospitals.

“Once I became an educator, I knew that’s the kind of model that I wanted our program to be like,” he said.

Upon becoming director of the St. Philip’s College biomedical engineering technology program, Vasquez made it a priority to modernize the way in which students learned clinical and communication skills. This was done by getting them “out of the shop” and into field through the use of simulation training and early experiences on hospital floors.

Today, the biomedical engineering program at St Philips is in the process of moving from the college’s electronic systems technology department to the health sciences and nursing department. The change signifies that HTM is officially taking its place alongside the clinical team to further patient care.

Challenge

Before becoming an educator, Vasquez worked with many HTM students and new hires who would come onto the hospital floor—and freeze. The reason, he found, was not because they lacked technical proficiency. It was that their communication skills were not at the level where they should be. Ultimately, HTM students, trainees, new hires, and even more experienced staff were anxious about interacting with clinicians.

“They’d come to my hospital and couldn’t take care of a simple scenario; they were so afraid of being on the nursing floor,” Vasquez said. “They would take the equipment and bring it back to the shop and work on it there. Then, they’d return it to the floor once they were done. That took a lot of time and would slow us down quite a bit. We’d end up being hidden as a department.”

When Vasquez became an educator in 2009, he assembled an advisory group of HTM directors in his area. They agreed that improving communication skills was one of the areas of greatest need for biomedical equipment technicians (BMETs). Unfortunately, the school’s HTM program curriculum didn’t emphasize those skills.

“Every other director told me the exact same thing, ‘We need to build up the students’ communication skills.’ And they were seeing the exact same things I saw,” Vasquez said. “Of course, it was a no-brainer for me. I told them, ‘OK, I know exactly what to do.’”

Solution

Vasquez and other staff members at St. Philip’s College worked to reshape the HTM educational curriculum by utilizing the AAMI “body of knowledge,” which includes guidelines from AAMI Credentialing Institute.
certifications (e.g., Certified Radiology Equipment Specialist, Certified Biomedical Equipment Technician [CBET]), certification study guides, and National Fire Protection Association regulations. These and other resources were leveraged to ensure that graduates could go straight from school to a BMET I–level position.

The updated program, which uses content from the CBET exam as an exit exam, also seeks to provide students with a mechanism for learning the fundamentals of healthcare technology—working on actual equipment rather than trainers—and learning in tandem with students who are studying for clinical fields.

“We knew that we needed to build up their knowledge of HTM and medical terminology from the beginning. To help them practice communication skills, we started getting students to do presentations. They got comfortable doing that within HTM and their classmates. Then, we started having them present to our nursing staff,” Vasquez said.

The next step also meant ensuring that HTM students had access to many of the same tools as those used by clinical students. Namely, by bringing them into the college’s human patient simulation center via scheduled, interdisciplinary clinical exercises, BMET and clinical students worked and learned side-by-side, just like they should in a healthcare facility.

The Dr. Frank Bryant Jr. Simulation Center, which opened in April 2009, has two bays with 12 beds each, eight individual patient rooms, a labor and delivery room, two adult intensive care unit (ICU) rooms, and a neonatal ICU. Thanks to the design efforts of Joyce Turner-Ferrier, MSN, a former staff member, the simulation center is a fully functioning medical facility that is built up to hospital codes and has functioning medical gases and support. The main difference is that the patients are simulated.

The HTM program uses portions of the simulation center for biomed-specific learning, and HTM students also participate in multidisciplinary simulations with nursing and other clinical students to, for example, troubleshoot the equipment they’re using. The simulation center is

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**At a Glance**

**SUBJECT**
St Philip’s College

**LOCATION**
San Antonio, TX

**SIZE**
40–50 students each year

**STAFF**
Four core team members

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Students from healthcare technology management and clinical healthcare training programs gain real-world experience together through simulated exercises at St. Philip’s College in San Antonio, TX.
Example Scenarios Encountered by HTM Students at the St. Philip’s College Patient Simulation Center

- **Atlas needs repair.** Nurses claim the Atlas cannot be powered and that they were previously having problems printing. "It would feed, but nothing was printing."
- **Infusion pump recall notice.** Hospira recalled Plum A+; device is currently in use on a patient. Urgent recall notice has been issued due to undersized diaphragm, resulting in alarms and delay or interruption of therapy. Unit is to be removed from until serviced by Hospira field service technician.
- **HillRom 1000 malfunction.** The bedside patient remote has stopped functioning.
- **Philips V60 Ventilator recall.** Recall issued for V60 ventilators with version 2.20 software installed. Tech service menus will have to accessed, and software verification needs to be performed.

designed for all of St. Philip’s healthcare education programs, but the role of HTM is special—the faculty and student manage and maintain all the technology within it.

The program helps bring HTM professionals out of the “biomed shop” and integrates them with the clinical team. This solution works on two levels. The first is that technicians move out of their comfort zone and work in a patient care area to help solve problems. The other key aspect is that clinical students get to learn more about the technology they use during patient care.

“This way, when they get out to the hospitals, our HTM students are comfortable talking to nurses, and the nurses are comfortable talking to our technicians,” Vasquez said. “That’s so different from what I used to see in hospitals—not just an unwillingness to communicate with one another, but a fear both sides have of saying the wrong thing.”

A typical scenario starts off in the classroom, where an HTM student receives a work order. Then, they have to locate the device and communicate using the proper procedures when the device is attached to a patient (in this case, a simulated patient). They practice repairs, recalls, scheduled maintenance, and more.

“We throw any little thing that they might encounter at them,” said Roy Ruiz, an instructor in the program and a biomedical technician. “For example, if it’s a simulated biohazardous environment, and the device is attached to the patient, then they are tested on following the right infection control procedures, as well as repairing the device. We’re simulating a biohazardous environment, a patient being in the room, the device attached to a patient, and then following the right infection control. A major part of that is for them to learn to communicate with the charge nurse or the person responsible on the floor, to help them prepare for what they’ll face in the hospital. And then we score them on all those levels.”

In addition, HTM students learn how to communicate better with patients.

“Our students learn the same bedside manner in the simulation center as the nursing staff,” said Jemal Nelson, an instructor and BMET. “We’ve heard a lot of positive feedback about our students once they enter the clinical sites. It’s pretty rewarding for the direction that we’ve been taking the program.”

**Results**

The first tests in the simulation center took place in 2010, using students who spent the first year of their curriculum in the previous education program. There, Vasquez saw the benefits brought on, even among top students, through just a change in environment.

“I had fantastic students who could spit out every standard and do the equipment tests without hesitation. In the classroom, they were so smooth. But then I tried doing a final exam in the simulation room—only the environment changed—and some of my best students choked,” Vasquez said. “That told me that the environment change itself provided a huge amount of training.”

Combining those results and continuous feedback, Vasquez began introducing simulations at increasingly earlier points in the curriculum. This has helped decrease students’ fears—now, when they go to the actual hospital floors in their second year, they perform well. Many students have been offered jobs at clinical sites while they’re in the middle of rotations. In addition, the feedback from advisory committee members at those sites has been positive.

“I’ve heard back about how impressed hospitals were about the preparation of our
students. They don’t buckle under the pressure of being in a clinical environment,” Ruiz said. “They just seem to be more prepared, more comfortable, more confident in the work that they’re doing when they’re starting their practice.”

Conclusion and Next Steps
The success of St. Philip’s revamped HTM education program has led to additional resources for the school at a time when many education funds are being cut back. Students work on biomedical equipment from collaborations and partnership with several education programs in the San Antonio area, and Vasquez has been working to expand partnerships with clinical programs that his college doesn’t offer, such as dental.

“It takes a long time to develop that trust to gain those relationships,” Vasquez said. “We now have plenty to work with, and we use those opportunities to prepare our students for a wide variety of careers.”

Many of the graduates of St. Philip’s biomed programs perform hospital rounds, walking the floors with confidence and having conversations with clinician staff to identify areas that they anticipate may need to be addressed by HTM staff. That’s the culmination of the work of all the educators and students—ensuring that HTM professionals become part of the clinical team.

“We want clinicians to look at us for professional advice when it comes to medical devices and patient care. That’s taking us, and the field, to the next level—where I think we should be—with HTM really being part of the clinical team,” Vasquez said. “We always should have been there.”

Call for Nominations
AAMI’s annual “Bright Ideas” program recognizes the best and brightest examples of innovative healthcare technology management (HTM) departments that are implementing creative solutions to today’s challenges.

AAMI’s Technology Management Council (TMC) is seeking specific examples of HTM initiatives that have enhanced patient safety, reduced costs, and/or improved hospital processes. This is your chance to showcase your HTM department’s outstanding work!

To nominate your department, complete the online form at www.surveymonkey.com/r/BrightIdeasSubmission and answer the following three questions:

1. What challenge did your department face?
2. How was the problem solved?
3. What was the positive result?

Questions can be sent to Danielle McGeary at dmcgeary@aami.org. The deadline is Oct. 5.