TECHNOLOGY MEETS MEDICINE: CROSSROADS OF COLLABORATION

by ANNETTE BAILEY CSE Software Inc.

The opportunity for collaboration is often right in our own backyards.

Recognizing opportunity is the key. CSE Software, a global leader in simulation development, has long been known for creative thinking in the technology field. OSF HealthCare is a forward-thinking entity looking for ways to incorporate simulation into its organization. With programs emerging in the biomedical field, simulation makes sense; collaborating on a simulated medical device together is a natural fit.

"It was wonderful to 'discover' a company with such a depth and breadth of resources in the computer simulation industry here in Peoria. The location, just a mile from the Jump Trading Simulation and Education Center on the OSF campus, was a real advantage to future collaboration," says Dr. John Vozenilek, chief medical officer for simulation at the Center, scheduled to open in the spring.

Learning Never Stops

The need to stay ahead of the curve on new tools and techniques is a must in the healthcare field. Like technology, it's a field that requires ongoing learning in order to stay abreast of new developments. Utilizing new technology for training and education makes sense for many reasons. "Simulation training allows physicians, nurses and healthcare professionals to practice new techniques and procedures without putting patients at risk," explains Renee Gorrell, vice president of CSE Software. "Simulation also allows organizations to enhance procedural efficiency." Gorrell outlines some of the key benefits for healthcare providers:

- **Immersive and interactive training.** Realistic tools and environments ensure that medical professionals learn the same techniques as they will use in a real-world medical situation. Actual equipment and tool components are replicated in order to provide a realistic interface for the user.
- **Training consistency.** Training every staff member in the same way is crucial. Simulation means each technique is spelled out and delivered with best practices no matter where the users are located. Staff at every off-site location or classroom gets the same training experience. Differences in instructors or how the instructors might train never come into play because the medical device simulation is consistent.
- **Meeting compliance.** Delivering a simulated training experience affords the ability to teach compliance regulations as well as process.
- **Safety awareness.** Training with a simulated medical device allows any mishaps to happen in the virtual environment. Users can practice as many times as needed to master proper sequences and techniques. When you create mind mapping by following the same sequences every time in the simulated envi-

ronment, the responses become automatic. This translates to a better trained team when moving to the real device.

Medical Device Simulation

Innovation abounds in the medical field, including the devices that deliver life-saving care to patients. The device OSF has chosen to simulate is called the Alaris Pump module. It's computerized and designed to deliver fluids, medications, blood and blood products to patients. A range of delivery methods can be used—intravenous, intra-arterial, subcutaneous, epidural, enteral or irrigation of fluid spaces—and up to four pump modules can be attached to a single unit, allowing four different infusions.

Because the pump has a built-in computer, it is constantly collecting and monitoring data, helping to improve patient safety and reinforce best practices. Through interactive simulation, training on the device is delivered consistently and efficiently to personnel. Doctors, nurses and support staff can familiarize themselves with every

»RESEARCHING TECHNOLOGY FOR PEORIA

CSE Software Vice President Renee Gorrell and Stacey Burris, New Business Development, had the opportunity to tour Lake Nona Medical City in December. Located in central Florida, the 7,000-acre, master-planned community plays host to a vast number of biomedical science and research facilities, including a children's hospital, cancer center, VA medical center, the University of Central Florida College of Medicine, University of Florida Research Institute and Sanford-Burnham Medical Research Institute. The two met with Michael Voll, owner of Dais Technologies at Lake Nona, a provider of next-generation technology, to discuss the latest advancements in simulation development and how it plays a role in biomedical research and development.

Lake Nona Medical City is a wealth of partnerships. Residents live in a *collaborative learning environment* and engage in real-time interactions with researchers, doctors and professors from around the world. The planned community contains housing, education for K through university-level, shopping, entertainment and green space with vast simulation used as part of the research and education community. In the next decade, it is expected that Lake Nona will become home to some of the nation's top hospitals, universities, research institutions and life science companies. Gorrell and Burris plan to meet again with Lake Nona officials to discuss further trends in simulation technology.

button, dial and screen and the workings of each key area before using the actual pump. In addition, process and procedures can be covered to help personnel get a full understanding of the device—or it can even be used for patient education.

"True to our roots in formation and assessment, we will look for the best placement of this tool within our system," adds Dr. Vozenilek. "Likely applications appear to be in support of further standardizing the orientation that medical and nursing personnel receive. We are very serious to our commitment to the highest quality in healthcare through sound educational practice."

Behind the Technology

To define the scope and objectives of a project, a CSE project manager follows a process known as 4D Methodology (*Define, Design, Develop* and *Deploy*). The project is divided into stages that include many different steps, and this process ensures it is delivered according to client requirements. It is CSE's job to make sure that bug-free software is ultimately installed, deployed and used by the client. Also key is recommending the *right* technologies for the project. Once the project's objectives and scope are defined, choices can be made regarding the platform and methods of deployment.

In regards to developing a simulation project, three main teams work together: 3D modeling, physics and 3D programming. In addition, multimedia development may have its hand in creating key graphic elements or parts of the tutorials. These teams work together seamlessly with the project manager and the client to develop the most realistic simulations possible, whether it is a tool, machine or business application. By following very specific methodologies, it ensures the project is developed and delivered to the client's specifications. "Setting milestones keeps the project on schedule and the client informed," shares Gorrell. "When dealing with a critical topic like medicine, following the methodology is even more significant because the project outcome impacts people's health."

Virtual Training, Real Results

Ultimately, it's the public that wins in a collaboration like this one. Better trained healthcare professionals mean benefits for all of us, including less chance of patient errors, cost savings from more efficient procedures, and the alleviation of equipment damage or misuse. "While it's clear that healthcare simulation has become more and more available to medical centers," says Dr. Vozenilek, "few are as focused as Jump is on creating tools for improving the safety and efficiency of healthcare through an engineering approach. With the pressures of the Affordable Care Act, it's important that we leverage these powerful tools to not just educate, but to transform." iBi

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»JUMP TRADING SIMULATION AND EDUCATION CENTER

OSF HealthCare is no stranger to collaboration. The organization has joined with the University of Illinois College of Medicine at Peoria (UICOMP) and Jump Trading to form the Jump Trading Simulation and Education Center on the campus of OSF Saint Francis Medical Center in Peoria. Housing the latest in simulation and training technology, the center will train physicians and medical professionals from across the region.

Simulation is an important part of the education and training process because it allows healthcare professionals to perform procedures in the safety of a life-like, yet virtual, environment to practice and prepare for triage, trauma or disaster scenarios. By practicing in a virtual environment, students and professionals can determine best practices and understand probable outcomes. "Our program has three pillars: education, performance improvement and innovation," says Dr. Vozenilek. "Respective to these areas, Jump will be advancing physician, nursing and inter-professional simulations; creating novel learning events to achieve a higher degree of patient-centered reliability, safety and efficiency; creating new technologies and processes; and evaluating the human factors in healthcare delivery."

OSF HealthCare is already an innovator in many ways. Its eICU program, for example, provides board-certified critical care physicians that remotely monitor hundreds of patients at rural sites. Jump Trading is partnering within OSF to advance this state-of-the-art program to increase its impact for patients through simulation. From a virtual Intensive Care Unit to a Skills Lab and beyond, simulation will offer opportunities for learning on many levels. The center is scheduled to open in spring 2013.