Designing Simulation Labs
Educating future healthcare workers is more important than ever.

As the U.S. nursing and healthcare professional shortage continues and we face new challenges to our healthcare system, preparing future health providers remains paramount to our country’s ability to deliver care.

To help address the issue, many college and university campuses are investing in improving their health sciences education facilities in order to help attract students to their programs. Core to many of these projects is updating simulation labs to reflect today’s hospital, clinic and home environments. When expanding, updating or adding a sim lab, here are several factors to consider to ensure a wise investment.
By enabling learners to assess each other’s skills performance – rather than relying on one sole instructor – multiple trainings can occur simultaneously without sacrificing quality. In fact, nursing students who have practiced using peer learning techniques agreed that the feedback they received from their peers is more helpful than feedback from their clinical instructor.

“Why Peer to Peer Learning Sticks” – Laerdal
Determine Needs & Space Requirements

If your program is looking to greatly expand the size of your simulation lab or bring several disciplines together, do not assume the size of the new lab environments by basing them solely on your current environment’s usage. We often suggest starting any facility project with an in-depth look at the need and potential for your simulation labs. By understanding current utilization, seeking ways for cross-discipline interaction, growth and enrollment goals and any new initiatives (such as a research program), you can help guarantee you do not over or under plan for space.
Technology

The integration of technology into simulation environments is essential to the learning process that occurs within. Simulation labs often require sophisticated recording equipment, specialty mannequins, and clinical tools/equipment to create a realistic patient care environment. The level of technology provided should be based on expectations set by your team to support the learning and teaching processes for your program. Therefore, we suggest you begin with an analysis of your institution’s technology capabilities and staff expectations in order to understand the impact on your overall budget.

Ultimately, technology needs to support the teaching preferences of your educators. For example, observation techniques and options can vary greatly. Some educators find that while cameras allow for intimate access to the simulation and the students, they can be interpreted as too impersonal and “hands-off.” Identifying and acknowledging these preferences in the early planning stages will greatly improve the budgeting and design processes, and perhaps most importantly, the learning experience of your students.

← Marquette University’s Center for Clinical Simulation was designed to be at the technological forefront of nursing education, providing an environment that is as realistic as possible to the clinical environments that students will ultimately work in after graduation. The simulated hospital includes intensive care rooms, medical surgical rooms, a pediatric/neonatal intensive care unit and a labor and delivery suite. It also features provider offices, a home health/long-term care apartment, skills labs with various levels of technology and debrief rooms where educators can review video recordings of simulation exercises with the students. From its computerized patient mannequins to observation and debrief capabilities, the lab employs the latest technology.
Virtual Reality

In addition to high-fidelity simulation, many campuses are looking to virtual or augmented reality to offer additional opportunities for students to gain hands-on learning at a relatively low cost. Several schools around the country have embraced using VR headsets and software to provide students with additional opportunities to virtually experience with specific conditions or scenarios that may be cost prohibitive to create in a traditional simulation lab environment. In fact, a recent study concluded that “preparation for high-fidelity simulation using virtual simulation increases self-efficacy and allows students to engage in the simulation experience, thus achieving higher levels of mastery through deliberate practice.” The idea has become so popular in the medical field, the FDA has begun to assess the best evaluation practices for virtual and augmented reality in medicine.

While the concept of learning via technology is certainly not new in medicine, traditional methods such as simulation labs with mannequins require a large financial and time investment as well as maintaining highly sophisticated mannequins which have a limit to the number of students that can participate. Virtual reality, however, can enable greater numbers of students to participate and repeat simulated scenarios as many times as needed to be comfortable with the concepts taught within – at a fraction of the cost.

1 Mabry, Jennifer PhD, RN; Lee, Emily DNP, RN; Roberts, Toni DNP, RN; Garrett, Rebecca EdS. “Virtual Simulation to Increase Self-efficacy Through Deliberate Practice.” Nurse Educator, December 3, 2019.
Level of Realism

Increasing patient safety and reducing error for practicing healthcare providers is at the heart of simulation. An effective translation for students from the learning to the practice environment is paramount for future health care providers to minimize errors and risk to patients. Therefore, a highly realistic sim lab experience allows newly trained healthcare providers to go from the learning lab to the hospital, clinic or home setting with a minimized learning curve. Realism allows students to not only experience role play in various health care settings but practice in an environment that includes current technology and incorporates best practices for patient safety and interaction.

Because of this greater goal, it may be tempting to want the highest level of realism possible for your sim lab. Yet, creating a high level of realism not only requires an adequate budget, but also impacts the amount of space and technology required. There are several levels to explore. At a very basic level, a general skills simulation lab may contain four to eight beds, equipped with medium or low fidelity mannequins. To create a greater level of realism, simulation suites are often
designed to accurately replicate actual hospital rooms in order to allow scenarios for role play of real-life situations. For example, mock Labor and Delivery, ICU and ED Treatment rooms vary in size and may be equipped to provide enhancements in addition to the simulation technology, such as a bedside table, reclining chair, and even a bathroom to allow future healthcare practitioners to practice patient transfers. Regardless of level of technology incorporated, it is important to design the new center to allow flexibility for future growth and additional technology integration.

Realistic room layouts for the various healthcare environments your curriculum requires could also include patient support elements such as medical gases, monitoring devices and lifts. Headwall configurations vary from practice to practice, and perhaps even from hospital to hospital in your own community. Planning for support areas that incorporate changing technology, including nurse charting areas, medication rooms and staff workstations should also be considered to ultimately prepare students for what they will encounter in real world situations.
The question remains, how realistic does your educational environment need to be? The answer might require that you ask yourself the following:

✓ What are you training students for?
✓ What are your future growth plans?
✓ Do most of your graduates work at local hospitals which require specialty training?
✓ Does your program have a focus on any particular specialty training that differentiates you from your competition?
✓ Would a “mock” surgical suite, home health or exam room environment enhance your program and make your graduates more valuable?
✓ Are you currently, or are you hoping in the future to offer continuing education courses for local health care providers as an additional source of revenue?
✓ Do these students require different resources?
With these questions answered, we recommend prioritizing your wish list. By reviewing your curriculum and your expected growth projections (or desires), you will be able to create a program that will help you determine which level of simulation would best allow you to meet your goals. A general skills lab, complimented by a multi-functional simulation suite to address specific curriculum requirements, may be a place to start and can be designed for future flexibility and expansion.

Additional space requirements for contemporary sim labs are also impacted by a desire to provide simulated or standardized patients (SP). If your programs adopt this type of learning, you may want to consider “on stage” and “off stage” spaces. This concept can minimize or, in some cases, completely eliminate the crossover of SP’s and students in the simulation environment, providing a much more realistic simulation experience. SP’s are often trained actors, which further enhances the role play for the students.
As previously noted, understanding your technology expectations or constraints impacts many decisions in sim lab design. Even the most basic labs integrate technology with the use of specialty mannequins, and nearly all incorporate cameras and microphones for student observation and documentation. The level of sophistication in monitoring systems will greatly influence instructor observation requirements. Additionally, when these tools are used, sound and lighting controls must also be considered.
An enclosed observation room, either at the foot of the bed or over the head, historically is the most common solution and helps to create the most realistic learning environment. These configurations rely more heavily on technology.

Regardless of the location of the observation room, we recommend that the design be flexible for multiple types of observation. This will allow students, who respond to different teaching methodologies as well as instructors who have various preferences to be easily accommodated in one environment.
Debriefing Rooms

Debriefing rooms are often overlooked when planning for a simulation lab. These spaces are equally important to the educational environment as the simulation rooms. They allow for in-depth learning – a space where instructors and student teams can critique the simulation and review a student’s and team's performance.

It’s important to plan for an adequate number of debrief rooms to support the sim lab environments. While a mock procedure may go very quickly, the debriefing for that simulation typically takes a significantly longer amount of time. Planning for additional debrief rooms, allows for maximal use of costly mock-up room spaces while allowing more spontaneous feedback and teaching opportunities. We recommend that the debrief rooms be located in close proximity to the lab itself for efficiency, and be designed as intimate spaces to allow for engaged learning.

Of course, technology integration has a major influence in debrief room design. It is very important to consider the amount of technology desired for these rooms. Cameras and video playback ability are critical for reviewing student performance. The timing and type of review, including whether instructors review students individually or as teams, during the simulation or after, will impact the sizes and configurations required for these rooms. Some universities have adopted web-based technology to allow students to review their performance outside of the classroom.
Home Health & Geriatrics

Over the past several years, many organizations, such as the American Association of Colleges of Nursing and the Hartford Institute, have taken great strides to create best practices for nursing schools and educators in the field of geriatrics. However, the facility response is often overlooked. While it is common for simulation environments to adapt to train for a variety of conditions, most environments focus on acute and inpatient care rather than the scenarios that students are likely to experience when caring for older patients in a home setting.

Home settings can be unpredictable, unfamiliar and potentially uncontrolled. Therefore, a very flexible simulation environment must be available in order to prepare students to safely practice in the home environment and minimize the stress of transitioning from the learning environment to the working environment. Consider acquiring residential style furnishings as well as mobile equipment to prepare students for the differing environments.

"The students indicated that the simulated home care visit in the apartment was a positive, eye-opening, and realistic experience that required them to look at the whole person, think critically, and communicate effectively."

"Using a Real Apartment House for Home Visit Simulations: An Eye-Opening Experience." Nursing Education Perspectives. September/October 2016, Volume 37 Number 5, page 293 - 29
Designing educational environments for flexibility and future needs is a process that must be considered no matter the environment. Planning a more flexible simulation lab can help anticipate change as your infrastructure ages and healthcare environments change. You may also want to consider impacts to planning imposed by future changes to your curriculum and growth plans. As your program grows or the curriculum is expanded, will there be required national testing, or might a research program be desired? The simulation environment should be planned for these types of future change.

Finally, do not underestimate how much storage you may need for your simulation environment. Gurneys, mannequins, medical devices, carts and electronic health record computers will require ample storage outside of the labs themselves to help replicate real-world scenarios. Understanding medical storage need is critical for these spaces to be designed appropriately.
In Conclusion

Regardless of the level of sophistication and realism required for your program, we suggest you use your simulation lab to showcase and celebrate learning. While educating the next generation of nurses and other caregivers, simulation labs can be used to attract new students, build staff enthusiasm and loyalty, and share your dedication to the future of health care education with alumni and other potential donors.
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Achieving Powerful Results.

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