The Role of Simulation in Nursing Education

AMERICAN SENTINEL
UNIVERSITY

The use of simulation in education and training dates back centuries. Simple forms of simulations were used to teach skills of various sorts at least as far back as the Middle Ages (Skalsky, 2019). Today, simulations are often used to train professionals in aviation (flight simulators), engineering, information technology, nuclear energy, law enforcement and the military in addition to nursing, medicine and a variety of other fields (Kinkaid and Westerlund, 2009). As in military training, flight instruction, and other educational contexts, one of the primary motivations for employing simulation in healthcare education is a concern for enhanced public safety (Lateef, 2010).

Defining Simulations

Generally speaking, a simulation can be defined as a lifelike model of a process or system. In nursing, a simulation has been defined as "an activity or event replicating clinical practice using scenarios, high-fidelity manikins, medium-fidelity manikins, standardized patients, role playing, skills stations, and computer-based critical thinking simulations" (*American Journal of Nursing Reports*, April 2018, p. 17).

Virtual or computer-based simulation is thus one of several types of simulations used in nursing education. The recent literature review on virtual simulations by Verkuyl and Mastrilli (2017) defines virtual simulation as a computer-based simulation that includes: a) a realistic client case study; b) an activity requiring knowledge application; and c) learner engagement in the role of care provider. The International Nursing Association for Clinical Simulation & Learning (INACSL) Standards Committee (2016) determined that computer-based simulation empowers learners to "complete specific tasks in a variety of potential environments, use information to provide assessment and care, make clinical decisions, and observe the results in action" (p. s40). Virtual, computer-based simulations are the types of simulations developed at American Sentinel University.

The Effectiveness of Simulation in Nursing Education

At the present time, nurse educators are probably most familiar with the simulations associated with the medium-

and high-fidelity manikins often used in pre-licensure nursing education. As noted by the *American Journal of Nursing* (2018), the landmark National Council of State Boards of Nursing (NCSBN) study on the use of simulation in pre-licensure nursing education (Hayden et al., 2014) "found no statistically significant differences in clinical competency or comprehensive nursing knowledge between students who had undergone traditional clinical experiences and those who had either 25% or 50% of their traditional clinical hours replaced by simulation." This study also found "that nursing programs could substitute up to 50% of traditional clinical practice with simulation" (AJN Reports, 2018, p. 17).

Though effective, Verkuyl and Mastrilli (2017) note that there is a significant downside to medium- and high-fidelity simulation laboratories – namely, "the cost to create, operate and maintain them can be prohibitive" (p. 40). Faculty training for effective facilitation, debriefing and evaluation as well as maintaining realistic and outcome-focused learner experiences are additional challenges with patient simulation labs and standardized patients.

One of the primary motivations for employing simulation in healthcare education is a concern for enhanced public safety.

The Rise of Virtual Simulation

Though medium- and high-fidelity manikins have become commonplace in nursing education, as the *American Journal Nursing* (AJN) has observed, "virtual simulation courses – which replicate real-life scenarios in virtual clinical environments" – are gaining ground on the more familiar forms of simulations. Furthermore, according to AJN, "One recent literature review of 12 studies published between 2008 and 2015 found that online virtual simulation is at least comparable or even superior to traditional simulation methods." ("The Value of Simulation in Nursing Education," *AJN Reports*, April 2018, p. 18.)

As noted by Aebersold (2018), simulation "has become a large part of the undergraduate curriculum." It is "an evidence-based, effective learning technology. Use of simulation offers a safe space where students can learn skills they need to be comfortable and competent before entering the clinical site."

Verkuyl and Mastrilli's (2017) scoping review of the recent research on virtual simulation in nursing education is particularly relevant to the types of simulations developed by American Sentinel University. After reviewing the available research literature (22 studies in all), the authors came to the following conclusions:

· Learners were largely very positive about their virtual experiences

· Outcomes were comparable to or better than those obtained with traditional simulation activities

· Virtual simulations have the potential to eliminate geographical boundaries, provide a safe learning environment, and offer a teaching strategy familiar to today's students.

Duff, Miller, and Bruce (2016) also found that online virtual simulation shows promise as a teaching and learning tool for healthcare education.

Similarly, Padilha, Machado, Ribeiro, Ramos, and Costa (2019) concluded that virtual clinical simulation contributes to the improvement of knowledge retention and increases student satisfaction. The results of their research showed that virtual clinical simulation has the potential to be an effective pedagogical strategy to develop clinical competences in healthcare providers.

The Proliferation of Simulation in Nursing Education

Simulations have become an integral part of nursing education and virtual simulations in particular can be an engaging and effective way to teach broad but essential skills such as critical thinking, teamwork, and interprofessional communication. They can also be used to teach healthcare-specific skills, such as population health, prioritization of care, patient management and delegation, nursing quality indicators, infection prevention and control, and telehealth.

> Virtual simulations have the potential to eliminate geographical boundaries, provide a safe learning environment, and offer a teaching strategy familiar to today's students.

The American Journal of Nursing attributes the proliferation in simulation in nursing education to two primary factors:

1. Increased competition for clinical placement sites. This is due to an increasing demand for nurses and a consequent rise in the number of undergraduate nursing programs.

2. Concern for patient safety. This has led to a trend towards a reduction in the number of nursing students allowed on a patient unit at one time. Simulation offers students the kinds of experiences they need to safely transition into practice.

AACN/CCNE Perspective on Simulation

From the perspective of the American Association of Colleges of Nursing (AACN) and the Commission on Collegiate Nursing Education (CCNE), patient care experiences with actual patients form the most important component of clinical education. AACN and CCNE do recognize, however, that simulations can form a valuable part of nursing education. According to AACN:

Laboratory and simulation experiences provide an effective, safe environment for learning and applying the cognitive and performance skills needed for practice. Reality based, simulated patient care experiences increase self confidence in communication and psychomotor skills, and professional role development. (*The Essentials of Baccalaureate Education for Professional Nursing Practice*, p. 34)

Simulations can also form an important part of graduate nursing education. (See AACN's *The Essentials of Master's Education in Nursing* (2011), p. 30.)

Simulations, Practice Experiences and Direct vs. Indirect Care Activities

It is important for nurse educators to understand that simulations are considered to be a type of experiential learning or practice experience. As noted in the AACN white paper, "Expectations for Practice Experiences in the RN to Baccalaureate Curriculum" (2012), in nursing education, experiential learning is frequently called "practice experience." In RN to BSN programs, practice experiences "involve a variety of activities that include direct care and indirect care experience" (p.2). Whereas direct care experiences include the "provision of nursing care directly to patients," indirect care "refers to nursing

> CCNE encourages innovative practices, including the use of simulation, so long as there are also direct-care clinical practice experiences.

decisions, actions, or interventions that are provided through or on behalf of patients." The AACN white paper also explains that simulations can be considered a type of experiential learning and that clinical practice experiences may be augmented by simulation experiences. According to the white paper: "Simulation experiences are one type of experiential learning that may be used to augment . . . practice experiences" such as those provided by working in an actual healthcare setting (p. 6). In other words, though simulations cannot completely replace clinical experiences, they are a form of experiential learning that can be used to supplement or augment clinical experiences.

> Though simulations cannot completely replace clinical experiences, they are a form of experiential learning that can be used to supplement or augment clinical experiences.

In late 2017, in response to erroneous information that was circulating regarding the Association's stance on the use of simulation in nursing education, AACN published the following Statement on the Use of Simulation in Nursing Education:

> It has come to our attention that misinformation about AACN's position on the use of simulation in nursing education has been circulating within our community of interest. To set the record straight, we would like to clarify that AACN does not prohibit the use of simulation in offering quality clinical learning experiences. In addition, none of AACN's current task forces are working on statements that would curtail the use of simulation. Further, the Commission on Collegiate Nursing Education (CCNE), AACN's autonomous accrediting arm, encourages innovative practices, including the use of simulation, so long as there are also direct-care clinical practice experiences (all experiences cannot be replaced by simulation). Some state boards of nursing regulate the number of clinical learning hours that can be completed via simulation in schools of nursing within their states. Some national certification bodies additionally require a minimum number of direct-care clinical hours for exam eligibility purposes

> "To set the record straight, we would like to clarify that AACN does not prohibit the use of simulation in offering quality clinical learning experiences."

How Much Simulation is Appropriate?

Nurse educators often want to know, "how much simulation is appropriate in a nursing program?" Simulations should be seen as a valuable supplement to, rather than a replacement for, patient care in a clinical setting. According to AACN's *Baccalaureate Essentials*, "Simulation experiences augment clinical learning and are complementary to direct care opportunities" (p. 34). Similarly, according to AACN's *Master's Essentials*, "simulation is an adjunct to

prelicensure programs could be replaced with simulation to equal or improved readiness for practice (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014).

All nursing schools should confirm the exact percentage of simulation allowed by their state board of nursing and design their programs accordingly, as there is considerable variability in regulations from state to state. This includes variability in the definition of simulation; percent of clinical

Percentage Simulation	State – Program (if specified)
Up to 10%	CT, LA-PN
Up to 25%	CA-RN, IL, NV, UT, VA, VT
Up to 30%	AL, DC, OK
Up to 50%	AR, AZ, CO, DE, FL, IA, KY, LA-RN, ME, MI, MN, NC, NH, NM, SC, TN, TX, WA, WI, WV-PN
More than 75%	OH
Simulation is not addressed in statute, rule or policy	AK, CA-VN, GA, HI, ID, IN, KS, MA, MD, MO, MS, MT, ND, NE, NE-APRN, NJ, NY, OR, PA, RI, SD, WV-RN, WY

NCSBN 2018 Education Member Board Profile (p. 45)

the learning that will occur with direct human interface or human learning experience" (p. 30).

NCSBN's National Simulation Study expert panel determined that the quality of activities (clinical or simulated) in prelicensure programs was more impactful on preparation for practice than the quantity of hours completed. The study concluded that up to 50% of traditional clinical hours in

> Nurse educators often want to know, "how much simulation is appropriate in a nursing program?"

All nursing schools should confirm the exact percentage of simulation allowed by their state board of nursing and design their programs accordingly.

hours allowed to be replaced with simulation; ratio of simulation to clinical hours; and simulation educator requirements (Bradley et. al, 2019). The maximum number of clinical hours that may be replaced by simulation is summarized in NCSBN's 2018 Education Member Board Profile (see table above).

Conclusions

The increasing use of virtual simulations in nursing education can be attributed to a number of factors, including:

- Difficulty in securing clinical placement sites. As the demand for nurses has increased, class sizes and the number of nursing programs have also increased, leading to greater competition for clinical sites. The number of clinical sites available to nursing programs simply cannot meet the demand.

- Patient safety. Out of a concern for patient safety, many acute care facilities have decided to reduce the number of nursing students allowed on a patient unit at any given time. Though these decisions have been made based on appropriate and laudable concerns, they have contributed to the difficulty nursing programs are facing in trying to secure a sufficient number of clinical sites for their students.

- Accessibility. With rural hospitals closing at an increasing rate, students living and working in rural settings have fewer opportunities to access clinical sites. This creates geographic boundaries to learning experiences which can be alleviated at least partially by the incorporation of virtual simulations into nursing education programs.

- Cost. Though medium- and high-fidelity simulation labs have proven to be effective in preparing nursing students for the transition to actual patient care, the costs associated with establishing and maintaining these labs can be prohibitive.

- Proven effectiveness. Numerous research papers, including the landmark study conducted by the National Council of State Boards of Nursing (Hayden et al., 2014), have demonstrated that simulations are just as effective as traditional clinical experiences in pre-licensure nursing education. Additional research studies, such as the Verkuyl and Mastrilli 2017 scoping review, have confirmed that virtual simulations can lead to student learning outcomes that are comparable to those associated with the more-familiar types of simulation activities, such as high-fidelity simulation labs.

For many reasons, therefore, an increasing number of nursing programs are turning to virtual simulations to serve as effective supplements to clinical care experiences.

Research Results for Sentinel City® Virtual Simulation

Drs. Shelley Cobbett and Andrea Chircop, researchers at Dalhousie University, recently evaluated the effectiveness of Sentinel City®, a population health simulation created by American Sentinel University, as an alternative pedagogical strategy for teaching undergraduate population health courses. Their research compared three strategies for teaching population health courses: 1) clinical groups (students) randomly assigned to Sentinel City®, 2) clinical groups assigned to an agency, and 3) clinical groups assigned to an actual city neighborhood. According to their presentation on this research at the 2019 AACN Baccalaureate Nurse Education Conference, Cobbett and Chircop found that the clinical groups (students) assigned to Sentinel City® performed just as well or better on all population health course objectives as the students assigned to agencies or geographical neighborhoods. Further, the students assigned to Sentinel City® expressed the highest confidence that they were able to meet the course learning objectives (Cobbett and Chircop, 2019).

> Research studies have confirmed that virtual simulations can lead to student learning outcomes comparable to those associated with more-familiar types of simulation activities, such as high-fidelity simulation labs.

Sentinel City® and other American Sentinel simulations, such as Sentinel World® and Prioritization of Care®, have won awards from organizations such as the Western Interstate Commission for Higher Education (WICHE) Cooperative for Education Technologies (WCET). These simulations are licensed to other nursing schools and healthcare providers by Healthcare Learning Innovations. For more information on these award-winning virtual simulations for healthcare education, go to https://www.HealthcareLearningInnovations.com.

References

Aebersold, Michelle (2018). Simulation-Based Learning: No Longer a Novelty in Undergraduate Education. *OJIN: The Online Journal of Issues in Nursing*, 23 (2).

AJN Reports (2018). The Value of Simulation in Nursing Education. *American Journal of Nursing*, 118 (4), 17-18.

American Association of Colleges of Nursing (2017). "AACN Statement on the Use of Simulation in Nursing Education." https://www.aacnnursing.org/News-Information/News/View/ArticleId/20713/Statement-Simulation

American Association of Colleges of Nursing. Clinical Practice FAQs. Retrieved from https://www.aacnnursing.org/Portals/42/CCNE/PDF/Clinical-Practice-FAQs.pdf

American Association of Colleges of Nursing (2008). *The Essentials of Baccalaureate Education for Professional Nursing Practice.*

American Association of Colleges of Nursing (2011). *The Essentials of Master's Education in Nursing*.

American Association of Colleges of Nursing (2012). "White Paper: Expectations for Practice Experiences in the RN to Baccalaureate Curriculum." Retrieved from https://www.aacnnursing.org/Portals/42/News/White-Papers/RN-BSN-Expectations-White-Paper.pdf

Bradley, C. D., Johnson, B. K., Dreifuerst, K. T., White, P., Conde, S. K., Meakim, C. H., ... Childress, R. M. (2019). Regulation of simulation use in United States prelicensure nursing programs. *Clinical Simulation in Nursing*, *33*, 17-25. Retrieved from https://doi.org/10.1016/j.ecns.2019.04.004

Cobbett, Shelly and A. Chircop (2019). Population Health: Point of Care Education in a Virtual City. 2019 AACN Baccalaureate Nurse Education Conference presentation.

Cobbett, Shelly and A. Chircop (2019). A CITY Out of this World! OR IS IT? A Virtual Approach to Population Health Nursing Clinical Placement. Online Learning Consortium Annual Conference presentation.

Duff, Elsie, L. Miller, J. Bruce (2016). Online Virtual Simulation and Diagnostic Reasoning: A Scoping Review. *Clinical Simulation in Nursing*, 12, 377-384.

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., and Jeffries, P. R. (2014). The NCSBN National Simulation Study: A longitudinal, randomized controlled study replacing clinical hours with simulation in pre-licensure nursing education. *Journal of Nursing Regulation, 5*(2), S1–S64.

INACSL Standards Committee (2016, December). INACSL standards of best practice: Simulation SM Simulation glossary. *Clinical Simulation in Nursing, 12*(S), S39-S47. http://dx.doi.org/10.1016/ j.ecns.2016.09.012.

Kincaid, J. Peter and K. Westerlund (2009). Simulation in Education and Training. Proceedings of the 2009 Winter Simulation Conference.

Lateef, Fatimah. (2010). Simulation-based learning: Just like the real thing. Journal of Emergencies, Trauma and Shock, 3(4), 348. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2966567/

National Council of State Boards of Nursing. (2019). Education member board profiles. Retrieved from https://www.ncsbn.org/2018education.pdf

Padilha, J.M., Machado, P.P. Ribeiro, A., Ramos, J. & Costa, P. (2019). Clinical virtual Simulation in nursing education: Randomized controlled trial. *Journal of Medical Internet Research*, *21*(3).

Skalsky, Kristine. Simulation (2019).

Verkuyl, M.A. & Mastrilli, P. (2017). Virtual simulation in nursing education: A scoping review. *Journal of Nursing and Health Sciences*, *3*(2), 39-47.

About the authors

Dr. William Tammone is the Chief Academic Officer and Senior Vice President for Strategy and Innovation at American Sentinel University

Dr. Melissa Penner is Director of the Empowered Classroom and Associate Professor of Nursing at American Sentinel University

About American Sentinel University

American Sentinel University provides high-quality, innovative degree and certificate programs that enable students to enhance their professional and civic lives. Offering degrees at the Bachelors, Masters and Doctoral levels, its online programs are *focused exclusively on healthcare.* Approved to operate in all 50 states, American Sentinel is accredited by the Higher Learning Commission (www.hlcommission.org) and the Distance Education Accrediting Commission (www.deac.org). Its RN to BSN and MSN programs are accredited by the Commission on Collegiate Nursing Education (http://www.ccneaccreditation.org) and its DNP programs are accredited by the Accreditation Commission for Education in Nursing (https://www.acenursing.org)

About Healthcare Learning Innovations

Healthcare Learning Innovations, a division of American Sentinel University, is transforming nursing education with a portfolio of unique, immersive, gamified virtual nursing simulations that accelerate learning and improve critical decision-making. The organization's flagship products – Sentinel City® and Sentinel Town®, as well as a portfolio of virtual clinical nursing scenarios are developed in collaboration with expert nurse educators.