Introduction

Simulations have been used in medical and nonmedical settings for centuries. The more commonly known areas in which simulations are used are the military and the aviation industry. If one looks at the history of simulations in the military, documented use can be traced back as early as medieval times, with the use of chess and jousting as simulation games (Bradley, 2006). The use of simulations is widespread in fields other than the military and aviation; these fields include areas such as management and engineering (Aldrich, 2003). Although nursing and other health care professions have used various types of simulation over time, the use of simulations in nursing education is not as common as what might be expected of a practice profession.

The focus of discussion in this article will center on the evolution of simulations as they relate to advances in technology, accessibility, teaching and pedagogy, and research. The discussion will begin with the postwar years and continue to the present day. As much of the development and research surrounding simulation use has been conducted concurrently in both nursing and medical education, the generic term health care education will be used. Simulations are a dynamic way to teach students, and this article discusses how this teaching innovation has evolved in nursing education.

Postwar Years

Teaching clinical skills to nursing students is a core component of nursing education. The primary modality of teaching these skills has been “see one, do one, teach one.” This adage has long been the accepted method of teaching skills and still persists in many education and training settings (Henneman & Cunningham, 2005). Not surprisingly, this training methodology has drawbacks for both students and patients. The quality of training is only as good as the quality of that first or second experience, and patients suffer an unnecessarily high frequency of adverse outcomes at the hands of inexperienced practitioners (Henneman & Cunningham, 2005). Clinical skills and other psychomotor skills are key nursing activities that have been
part of nursing curricula since its inception (Johnson, 1994). Prior to the 1950s, most skills were taught in class but were practiced on the patients themselves (Heidgerken, 1946). It was simply accepted as a method of teaching. Attempts at simulating skills were made by practicing injections on oranges. This was realistic neither in terms of how it feels to administer an injection nor in terms of the patient’s response (Bradley, 2006). Although simulations were used for skills such as communication and interviewing, this was primarily done with “actors” who had scripts to follow. These were commonly known as standardized patients and are still used in medical and nursing education today (Bastable, 2003). The technology for anything more advanced was simply not available.

After the 1950s, several changes became evident. Technology was rapidly changing, affecting all areas of society. According to Bradley (2006), the use of clinical simulations significantly emerged during this time, and he noticed three distinct movements in the development of simulations. This article expands on these movements and relates them to the current landscape of simulation use in health care education.

The first movement began in 1958 with the creation of the Resusci-Anne manikin by Asmund Laerdal. With the introduction of the Resusci-Anne manikin, there was a significant technical change in what could be simulated. Laerdal was a toymaker with a thorough knowledge of soft plastics and had previously created other simulation equipment, such as imitation wounds for the military (Tjomsland & Baskett, 2002). The Resusci-Anne manikin was very well received in health care education, not only because of its realistic appearance and function, but also because of its affordability and thus accessibility. The creation of Resusci-Anne was pivotal and created a new mindset among medical and nursing educators, opening the way to the use of simulation manikins as a teaching methodology in health care education.

The second movement soon followed and included more technically advanced equipment. It seemed that educators began to be more aware of the benefits of using simulations, and the technology was becoming more readily available. During the 1960s, the use of computers and technology was rapidly transforming industry broadly, and there was an increased ability to simulate situations. Sim One, the human manikin created by Abrahamson and Denson in the late 1960s, was considered a fairly sophisticated manikin at that time (Bradley, 2006). It could breathe, had a heartbeat, and could respond to intravenously administered drugs and gases. The Sim One manikin was a torso apparatus with separate computerized software and was primarily used in anesthesia programs as a result, in large part, of its size and expense (Peteani, 2004). During this period, task trainers were developed in order to simulate one or two specific tasks. The creation of these manikins is considered the foundation in the development of more modern simulators (Bradley, 2006). Interesting enough, the manikins that are currently available are not entirely dissimilar from these first models. Even though computers became smaller and the manikins were created with more functionality, it is only within the past 3 to 5 years that any truly significant technological changes have occurred.

In the 1960s and 1970s, the largest issue that obstructed widespread acceptance of these manikins was not necessarily the manikins themselves but rather that using them to teach clinical skills did not seem essential to health care educators. Many believed that there were more effective ways to teach clinical skills (Gordon, 1974). While some accepted simulation as a beneficial teaching tool, the manikins were expensive and therefore inaccessible to the majority of education institutions. Research into using simulation as an approach to teaching and learning was in its germinal stages, and very little was known in this area. While early research indicated the usefulness of simulations, the expensive manikins could deliver only one or two scenarios without the need for reprogramming. Considering the limits of the technology, the cost of the manikin, and the perceived nonessentiality of simulators in health care education, simulation did not achieve the same sort of acceptance by health care educators as it did with the military. It was not until the late 1970s to early 1980s that the use of high-fidelity manikins was seen as a valuable teaching tool in nursing and health care education (Rystedt & Lindstrom, 2001).

During the 1970s, nursing and medicine placed more emphasis and value on technology and critical care skills associated with technology (Toman, 2005). A key factor to keep in mind when discussing simulations is the importance that nursing placed on acquiring more advanced skills during this decade. Transfer or delegation of functions and skills from medicine to nursing was becoming common (Toman, 2005). There was a perceived sense of personal importance in advanced skill acquisition, and the use of simulations and other technology was emerging as a useful learning tool to achieve this. While accessibility was still an issue, technical advances had been made, and new interest in teaching and learning approaches was being expressed.

The third movement began in the 1980s and continues partly to the present day. Changes in teaching methods were emerging as educators were recognizing the role of simulations to meet the needs of students and other health care practitioners. Increasingly complex clinical skills were
required, and educators saw how using simulators in teaching could help students master those skills. This movement had less to do with technical advances and more with the evolution of teaching practices.

With improvements in technology, more tasks and clinical skills could be simulated. There was also a significant reduction in the cost of simulation equipment, making it more affordable. As simulators were becoming more widely used, more educators and researchers began to document their experiences with their simulators. In these early stages of research, publications were largely narrative accounts of how simulators were used. With medical and nursing programs beginning to purchase and use simulation equipment more extensively, the next question to arise was whether this technology actually helped prepare health care practitioners for practice.

Present Day

I would like to posit that we are currently in a fourth movement of simulation use in health care education. The first and second movements focused on the creation of the simulators and primarily technological advances. This extended from about 1958 to the mid-1980s. The 1980s saw the beginning of the third movement, which included affordable high-fidelity simulators and accompanying strategies related to teaching and learning in simulation use. Many schools and faculties of nursing began developing simulation centers and using simulation in their curriculum. This movement has continued to the present day and consisted of advances in accessibility, as well as beginning forays into the area of teaching and learning research. Some interesting events are now occurring that are dissimilar to what was previously encountered. It is because of these emerging differences that I put forward that we are in the fourth movement of simulation use in health care education.

It is apparent that using simulation in health care and nursing education has gone beyond the nuts and bolts of how to create a simulation center and has progressed to evaluation of teaching practices and scholarship. Many users of simulation technology are critically evaluating the teaching and learning literature and are merging this body of knowledge with the practices of conducting simulation. This is becoming more evident in the literature; Hawkins, Todd, and Manz (2008); Murray, Grant, Howarth, and Leigh (2008); and Wilford and Doyle (2006) are only a few examples of work in this area.

In early 2008, a systematic review of the literature on the use of high-fidelity simulations in health care education was conducted as background for this article. The results are not discussed in this article; however, from this review it became evident that the evolution of simulation use in health care education was going in a new direction. In looking at any literature that addresses simulation use in nursing, we see that nursing is now spending more time researching the process of teaching with simulation to address both the skill and the art of nursing.

The journal Clinical Simulation in Nursing was launched in 2008. Other journals have devoted entire editions to simulation research and articles. There is a literal boom in the amount of literature that is currently available in nursing and other health care journals. It is apparent that simulation use has gone beyond the initial stages of addressing technological issues and accessibility and is beginning to embrace the research opportunities that exist in this area.

Learning through simulation is consistent with the educational intent of contemporary theories of constructivism (Oliffe, 2002; Reilly & Spratt, 2007). This theory on how one learns and constructs knowledge can be used as a guide to learning as a simulation strategy. As scenarios are created with grounding in theory, they begin to be more than an activity and provide opportunities for rich, contextual, and multilayered experiences.

Authentic learning is concerned with developing approaches to teaching and learning that allow conceptual knowledge to develop contextually in settings that reflect reality (Herrington & Herrington, 2006). When properly developed, simulation use provides this contextual environment and assists with authentic learning. It is this intellectual background in educational theory that informs simulation-based learning (Reilly & Spratt, 2007). In the evolution of simulation use in nursing education, we are at the point of using theory to develop simulation scenarios. No longer is the focus strictly on the content of the simulation; the way the simulation is structured and delivered is also being discovered. For example, when high-fidelity simulators were first made more accessible, many users were unsure how to use the technology and were overwhelmed with the basic operation and maintenance of the equipment. As individuals became more familiar, contextual and social information was added, and learning was made more purposeful. It extended beyond performing psychomotor skills into being able to critically think through the learning opportunities presented. Combined with debriefing and reflection on the experience, the learner is better able to learn from the situation encountered. It is this integration of teaching pedagogies and the increase in research conducted in these areas that have contributed significantly to the evolution of simulation use in nursing education.

Conclusion

The evolution of simulation use in nursing education is not lengthy. It is really only in the past 50 years that we have seen any significant advancement in this area. Although teaching clinical skills is not an easy task, it can be improved by using simulation technology (Issenberg, McGaghie, Petrusa, Gordan, & Scales, 2005). It also requires planning and the purposeful use of technology. We
cannot put students in a room with a high-fidelity manikin and expect competency unless the experience is structured and deliberate. The advances in technology and accessibility have led to widespread use of simulations; however, continued research, as well as work in teaching and learning practices, needs to occur if we are to take advantage of these simulation experiences.

Technology is constantly changing and becoming more sophisticated. Significant technical advances have been made; however, there are now interesting developments in this area. Perhaps in part because of the increase in accessibility, a greater number of consumers are looking for changes and improvements to the technology. There are still gaps in accessibility as many of the smaller schools or institutions still cannot afford the expense of this technology.

Teaching and learning practices, along with research advances, have been the significant driver of this fourth movement. Little was done in these areas during the first three movements; however, the literature in simulation use has increased exponentially and will only continue to increase as more research is conducted. Simulation use in nursing has seen lurches and lulls in its evolution; this new stage will determine whether these simulation tools will enhance nursing education or be left in the corner to collect dust.

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References


