The Development of Evidence-Based Clinical Simulation Scenarios: Guidelines for Nurse Educators

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ABSTRACT

Clinical simulation has been recognized as a teaching method using learning exercises that closely mimic real-life situations. The development of evidence-based clinical simulation scenarios and guidelines for nurses is an important step in redesigning nursing education. These scenarios are created for students to learn in a safe environment. Simulated clinical experience requires immersing students in a representative patient-care scenario, a setting that mimics the actual environment with sufficient realism to allow learners to suspend disbelief. The purpose of this article is to discuss the Bay Area Simulation Collaborative’s development of guidelines for effective evidence-based scenarios for use in hospitals and nursing schools. Six scholarly articles were reviewed and evaluated to determine whether evidence-based guidelines for scenario development exist and whether consensus in the literature regarding best practice is evident.

Health care professionals have been using simulation for more than 15 years (Gaba, 2004). Clinical simulation has gained significant attention over the past 5 years. The military has been a leader in the use of high-fidelity simulation as a teaching technique for prehospital and trauma care. High-fidelity simulation is defined in this article as high-technology, lifelike manikins that breathe, talk, blink, have heart and bowel sounds, and are used for training purposes. Anesthesiologists were early champions for integrating simulation into clinical training education and have been using simulation routinely since 1994 (Gaba, 2004). Historically, both the airline and nuclear industries have used simulation to train and respond to crises with potentially serious consequences (Beyea, von Reyn, & Slattery, 2007) that sometimes result from human error. In addition, clinical simulation is recognized as a teaching method using learning exercises that closely mimic real-life situations using lifelike high-fidelity manikins. They provide a high level of interactivity and realism for learners (Jeffries, 2007). Although it has been used in medical education, aeronautics, and the airline industry for decades, high-fidelity simulation is a relatively new mode of learning for nursing education.

The nursing community is now integrating simulation into its curricula as a new method of educating nurses. Simulation education involves many components using both low-fidelity and high-fidelity manikins, skill and task trainers, virtual reality trainers, computer-based simulators and scenarios (Jeffries, 2005), as well as standardized patients. Nurse educators should write an objective-driven scenario to set the stage for each training module or simulation experience to facilitate students in achieving learning outcomes. A number of research studies are in progress to study the effects of manikin-based high-fidelity simulation on learning out-
comes for nursing students. The literature review for this article specifically focused on the development of evidence-based clinical simulation scenarios and guidelines for nurses.

Simulations are completed using prewritten clinical scenarios geared to the experience level of the learner. The process of writing scenarios has evolved during the past 5 years in both medicine and nursing education, and today, equipment vendors sell prewritten evidence-based scenarios. Schools and hospitals, lacking the time or desire to write their own scenarios, can purchase these for their use. There are several advantages to this model: Nursing faculty do not need to invest the time or energy to write scenarios. They can feel confident that the prepackaged scenarios have been validated, tested, and are evidence based. Disadvantages include the lack of customization of the scenario and an inability to share. Although the prewritten scenarios are somewhat flexible, they do not always meet an individual school’s needs related to curriculum or clinical availability and cannot be shared with other schools or hospitals. Therefore, until there is a critical mass of scenarios developed, tested, and available in a shared format and database, the local, regional, and statewide development of clinical simulation scenarios needs to continue. As simulation continues to expand in the practice setting, in all areas, a need will emerge to share scenarios across disciplines. With interdisciplinary teams in hospitals responding to patients’ needs, medicine, nursing, and allied health can train together using simulation.

In the increasingly high-tech environments in which nursing and health care professionals practice, and with the looming nursing shortage, traditional methods of teaching may no longer be effective (Jeffries, 2007). Traditional teaching methods such as lecture, discussion, role-play, and laboratory practice may no longer be effective in meeting the current demands of education and practice, with the ultimate goal of meeting the employing organization’s patient safety goals. In areas such as pediatrics or obstetrics, where hospital clinical experiences can be difficult to find (Lambton, 2008), simulation training can provide students with deliberate, guaranteed clinical experience in a safe, controlled environment with no risk to patients.

For hospitals, schools, or other groups who want to write and share their own scenarios, the task can be time consuming. It is best to have a template or guideline to ensure that the scenario has integrity and is aligned with the simulation standards of practice. The development of clinical scenarios for use with high-fidelity simulators currently receives significant attention. To be effective, scenarios should be evidence based and written to address predetermined learning objectives (Seropian et al., 2004; Jeffries, 2007). Evidence-based scenarios are essential because learning activities that build skills in clinical nursing practice must be accurate and based on sound research evidence and best practice.

**LITERATURE REVIEW**

There is little research in the literature about developing guidelines for scenario writing and use of templates. However, the literature does support that guidelines are needed to write scenarios. For the purpose of this article, six articles were reviewed in the Cumulative Index to Nursing and Allied Health Literature database using the key words nursing, simulation, education, scenarios, and evidence-based. Jeffries (2007) and Bremner, Adudell, Bennett, and VanGeest (2006) discussed how simulation is being used in nursing education and stated that learning objectives are a key component in assuring the scenario’s reliability. Training in a simulated environment is different from using traditional methods, and the clarity of objectives for each scenario is essential. In both articles, the authors discuss the need for scenarios, but they do not provide guidelines. Using the Nursing Education Simulation Framework (Jeffries, 2007) (Figure), it is evident that without a clear simulation design, the outcomes of learning, critical thinking, self-confidence, performance, or satisfaction cannot be achieved. As one can see within the framework, properly designed scenarios are key to promoting optimal student learning outcomes.

Seropian et al. (2004) suggested that the only limitation in creating a simulation scenario is one’s own lack of imagination. First, before a scenario is written, the faculty member or clinical educator must identify the corresponding learning objective, which, drives the entire scenario. For example, the scenario could be written for objectives targeting communication, assessment, or patient education. Jeffries (2007) and Childs and Sepples (2006) discussed using the nursing process to guide simulation scenario design, as it is relevant and widely used. Using the components of the familiar nursing process, which include assessment, diagnosis, planning, implementation, and evaluation, one can design a scenario that is appropriate and complete.

In an effective scenario, learning objectives are clear, concise, and relevant. Bremner et al. (2006), Cioffi (2001), and Gaba (2004) confirmed the importance of scenarios, but a description of essential components and directions for writing scenarios is lacking. The literature supports that the most important component of simulation scenarios is the identification of learning objectives. The teacher must be clearly focused on the learning objective to be achieved throughout the scenario for this new methodology to be an
effective learning strategy (Jeffries, 2007). As simulation becomes more popular and is used more often as a teaching method, it is important for academic and clinical educators who choose to write their own simulation scenarios to understand the factors of developing and guiding a clinical simulation scenario.

**ANALYSIS**

On the basis of the literature review search and results, it would be beneficial to the nursing community to publish scenario guidelines that can be shared with other health care professionals. Simulation needs to be more widely instituted in schools as an effective teaching tool, along with guidelines to help educators implement this new methodology. Technology should not drive the scenario or the simulation—the learning objectives should. Simulation is a vital methodology in educating nurses for the complexities of nursing. In addition, the increased focus on patient safety, increased patient acuity in the hospital setting, and the lack of clinical site availability make simulation essential to deliberate clinical learning experiences. Many schools of nursing and hospitals are riding the wave of simulation and delving into simulation without proper training or understanding of how to use it most effectively. Simulation is a strategy, a methodology that nursing faculty should use appropriately as a means to educate the next generation of nurses. On the basis of this literature review, the Bay Area Simulation Collaborative (BASC) agreed that a template was needed to write evidence-based scenarios for their members.

**The BASC**

The BASC is a group of more than 100 member schools and hospitals, totaling more than 600 faculty and hospital educators from both service and academia in the 10 counties of the San Francisco Bay Area. The California Institute for Nursing & Healthcare (CINHC) in Berkeley, California, leads the BASC, funded through a grant from the Gordon and Betty Moore Foundation. This 2-year project is designed to train and educate nursing faculty and hospital educators in the concept of simulation. It is also designed to develop clinical simulation scenarios for use within the BASC. Finally, the project implements a research and evaluation agenda to demonstrate that simulation makes a difference in the critical thinking skills of nursing students.

There are numerous suggestions in the literature for development of clinical simulation scenarios, and the BASC thought that clear guidelines were needed for the nursing community regarding the development of clinical simulation scenarios. A task force was formed within the BASC to design a template and a process for scenario development for use among its members. The task force agreed to design a template as a learning management strategy to distribute information to the students, faculty, and simulation staff. As a result, the preparation is standardized and consistent. The task force comprised clinical educators and nursing faculty from more than 10 hospitals and schools of nursing. The purpose of the task force, which met in early 2007, was to develop a template for writing, a process for validating, a process for testing, and a process for distributing the scenarios to members of the BASC. Ultimately, once the process was agreed on, any member of the BASC would be able to use the template to write scenarios. The design was intended to serve the needs of single disciplines, multiple disciplines, and interdisciplinary simulations.

Six core concepts were designated as integral to all scenarios developed by the BASC scenario development task force. These concepts are listed explicitly as a permanent element of the template. This ensures they are kept in the forefront of the collective minds of those involved in

![Figure. The Nursing Education Simulation Framework. Reprinted with permission from the National League for Nursing.](image)
scenario development and implementation. The six core concepts include patient safety, priority setting, leadership and delegation, communication, patient teaching, and cultural diversity.

The task force agreed on a template that was an amalgam of various best practice models. The scenario development template designed includes components from a variety of existing templates from the National League for Nursing, Laerdal Medical, Samuel Merritt School of Nursing, the Oregon Consortium for Nursing Education, and advice from the CINHC consultants, SimHealth, LLC. This amalgam template is outlined below.

**THE TEMPLATE**

**Learning Objectives**

*Primary—Suggested Maximum of Five Primary Objectives.* This level of objectives should be fairly broad based. Potential sources for these objectives are core competencies designated by a discipline's accrediting bodies, core competencies established by an academic or clinical institution, and performance criteria for a course's clinical practicum. The language used to construct all objectives should follow standard guidelines and criteria for educational objectives, including the cognitive taxonomy (Doyle, 2007).

*Secondary—Suggested Maximum of Ten Secondary Objectives.* This level of objectives should be more specific and include both technical (e.g., psychomotor skills) and nontechnical objectives. Nontechnical and cognitive objectives (e.g., communication, delegation, resource allocation, situation awareness) should be made explicit.

**Critical Elements.** Keypoints that must be observed during the scenario implementation to ensure that learning objectives are met should be listed here. Examples of keypoints include a checklist of critical actions and behaviors that promote patient safety, optimal sequence of critical actions that would indicate knowledge and skill competency, time frame to initiate critical actions, and duration of critical actions.

**Assessment Plan and Instruments**

The assessment instrument will vary for each scenario. A template for a scenario assessment instrument is not included as part of this document. The actual instrument designated for the scenario should be included as part of this scenario template. The title of the assessment, as well as an electronic link, if applicable, should be placed in the data cell for this section.

**Evidence Base for Objectives and Assessment**

Key references that serve as the theoretical foundation for the primary or secondary learning objectives and the assessment criteria for learner performance during the scenario implementation are listed on the template. Sources for the evidence base include standards of practice, core competency descriptions, texts, journal articles, and clinical practice guidelines.

**Prescenario Learner Activities**

This information is integral to the overall scenario development but should also be made available to learners. Psychomotor competencies are the technical skills that learners must possess prior to a simulation experience involving the scenario. The data placed in this section may be a list of requisite skills and a tutorial (e.g., a Web-based module), or a skills laboratory session that must be completed before participating in the simulation session.

Cognitive competency listings should include the following activities: independent reading (specific source), review of multimedia learning modules, completion of screen-based simulations, and attendance at lectures.

Case plan or preparation sheets may be allowed as cognitive aids for learners to use during a simulation session. If these materials are used, the actual document (usually an institution-specific form that can be completed beforehand and brought to the actual session) should be made explicit.

**General Debriefing Plan**

The method may depend on the personnel available on any given implementation day. If this is the case, the information that will be helpful to the individual who decides the debriefing method used on the day of the scenario implementation should be listed.

Debriefing materials will vary according to the scenario. The observing learners in a scenario (i.e., those who will be viewing a scenario live during the actual simulation action) may or may not have a tool to guide their analysis of the scenario as it unfolds. If they do not, the presence of the “Observing Learner’s Tool” should be identified as necessary by placing a check in the box. Articles, handouts, or CDs that reiterate major teaching points for the learners may also be recommended for use during the debriefing session.

**Validation**

The task force agreed that all written scenarios must be validated through peer review, clinical expert review, evidence review, and the pilot testing process. The process for scenario validation was developed by the task force and guided by simulation experts and BASC consultants, SimHealth Consultants, LLC. The process required that each scenario specialty writing group meet to review their scenarios. The primary writer had 1 hour to present his or her scenario for review and feedback. It was recommended that the presenter bring references (e.g., textbooks, guidelines, journals) that support the outcomes, as well as basic nursing texts for additional reference. Scenarios were e-mailed in advance by the specialty group leader and each group member selected a scenario to review prior to the session. They then scheduled a meeting with the writer to validate the scenario using a checklist.

The group established a validation process, which included a checklist (Table 1). Based on the essential components listed, a validation checklist was developed to ease the laborious process. The checklist followed the flow
of the completed scenario to ensure no significant items were missed. To date, more than 40 scenarios have been written and half have been validated using the above criteria by the specialty writing groups.

**Testing**

The testing component is the final step in the development process. After the scenarios had been validated with the checklist, the task force agreed the scenarios should be tested on actual students before releasing them for general distribution. A notice was e-mailed to the schools of nursing and hospitals in the Bay Area to ascertain their willingness to allow their students to help test the scenarios. This experience was valuable, as not only the students enjoyed this new method of learning, but the faculty members were also able to hone in on their facilitation and debriefing skills. Once implemented, faculty had to rehearse a new simulation scenario and work out any areas of concern that became apparent. Rehearsing also helped set a realistic time line for the scenario (Horn & Carter, 2007). A testing of the initial scenarios with nursing students was completed in August 2007. Testing is now an ongoing process within the BASC as scenarios are written and validated.

**Facilitation**

The faculty role of facilitator during the scenario is a challenging but key role. As a teacher, facilitating is a different form of andragogy, straying from the traditional didactic or skills laboratory method. Prior to enacting the scenario with students, the faculty must thoroughly understand the clinical scenario and possible student responses or lack thereof. When the faculty has clinical mastery of the scenario, the facilitator will focus on observing the student's clinical performance. It is tempting to intervene personally when a student is not responding appropriately to the scenario. However, it is best to allow the student or team to discuss the situation and problem solve independently, allowing the scenario to progress and reflection to occur during the debriefing. The facilitator should cautiously and thoughtfully decide when it is necessary to interrupt the student's performance. This response could be beneficial when the student or team is performing inadequately or unsafely. Faculty should allow mistakes to occur without intervening so students can see the effects of their actions during debriefing, as this is where learning occurs (Yaeger, 2008). Guidelines for facilitators are essential to ensure consistency and safety in learning. The BASC is in the process of developing these guidelines.

Other pertinent issues regarding the facilitator role include timekeeping and determining when a scenario should be terminated. The faculty are accountable to manage the duration of time allowed for the scenario. Usually, scenarios last approximately 20 minutes, depending on the number of learning objectives, decision points, and skills required for completion. As noted, it is best to keep the scenario simple and the objectives clear. If the scenario becomes too complex, the students can become confused. It is sometimes helpful to begin with several short scenarios

### TABLE 1
Scenario Validation Checklist

<table>
<thead>
<tr>
<th>Curricular Integration</th>
<th>Scenario Script</th>
<th>Simulation Team Information</th>
<th>Debriefing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template completeness</td>
<td>Level of student appropriateness</td>
<td>Baseline simulator state data complete</td>
<td>Debriefing questions related to identified objectives or learner outcomes</td>
</tr>
<tr>
<td>Clear and concise learning objectives</td>
<td>Personnel resources required</td>
<td>Environment, equipment, essential props</td>
<td>Evidence of a clinical expert reviewer</td>
</tr>
<tr>
<td>Appropriate amount and level of prescenario reading and preparation for the participant</td>
<td>Contextual details provide cues based on desired outcomes</td>
<td>Evidence of a pharmacology reviewer as needed</td>
<td>Performance measures identified for feedback to learners</td>
</tr>
<tr>
<td>Origin and rationale</td>
<td>Type of simulator</td>
<td>Complexity of programming at simulation staff level</td>
<td></td>
</tr>
<tr>
<td>Critical thinking</td>
<td>Case summary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plausibility of the case</td>
<td>Confederate roles specified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence based</td>
<td>Patient or client profile gives sufficient medical record data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate data for the case</td>
<td>Performance measures designed to allow feedback to students and participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate medications for the case</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of complexity</td>
<td></td>
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January 2010, Vol. 49, No. 1
Debriefing

Debriefing is the most critical element in conducting a clinical simulation scenario. It is a focused, facilitated discussion that occurs immediately after the videotaped or observed scenario and is a unique opportunity to review one’s performance (Yaeger, 2008). The debriefing session should be approximately two to three times the length of the scenario itself. During an effective debriefing, students have the opportunity to delve into their own critical thinking, as well as investigate the reasons teams perform well or poorly. Many of the articles reviewed described guidelines for debriefing and stressed its importance. Because students are engaged and learn from the discussion even if they are observers in the actual scenario, it is of utmost importance for the debriefer to engage all students in the debriefing.

Debriefing a clinical simulation is different from the traditional postconference debriefing for nursing students. The session should be held in a safe environment outside of the simulation session. Most simulation laboratories have presimulation procedures in place for giving students permission to discuss real cases during debriefing without repercussions. Each participant in debriefing may additionally sign a confidentiality agreement. Debriefing facilitators must learn to step back, beginning the debrief session with the question, “How did it go?” and using open-ended questions to break tension (Yaeger, 2008). Open-ended questions allow debriefers to uncover the rationale related to decision making, specific to the objectives of the scenario. Care must be taken to use open-ended questions that are focused on specific cognitive, technical, and behavioral skills to promote a fruitful discussion from which all students can benefit. Open-ended questions also allow the instructor to gather a summary from the group’s responses. Instructors must remind all trainees that participation is confidential and mandatory to promote open and frank discussions and learning.

One of the advantages of simulation is the development of reflective skills in the student. Some simulation programs use reflective journaling to focus the student’s reflection on his or her own personal learnings and development after simulation. Others use deliberate observation tools such as Lasater’s clinical judgment rubric (Lasater, 2007) or have the student critique the video performance against performance indicators specific to the simulation scenario.
objectives. The BASC plans to develop an evaluation tool for its members’ use.

CONCLUSION

The technology of high-fidelity simulation presents realistic and interactive patient scenarios that provide an excellent platform to educate and improve health care providers’ skills, knowledge, and critical thinking abilities (Bremner et al., 2006). Clinical scenarios that are based on clear learning objectives and sound research evidence are important to the success of simulation. It is imperative to establish guidelines, given that little evidence currently exists to guide faculty using this teaching methodology. Given the lack of quality research, the BASC has taken components of various expert suggestions and developed an amalgam template for use. It is essential that these written scenarios be validated by peers, tested by students, and contain evidence-based literature to support them. Scenarios should be reviewed annually to ensure that current practice standards are reflected.

RECOMMENDATIONS

Nursing faculty and clinical educators must use evidence-based guidelines for developing scenarios for use in their area of practice. As many schools and hospitals are “riding the wave” of high-fidelity simulation, we must use guidelines and benefit from the experience of others before plunging into an unknown area. Research and education are crucial before incorporating these new methodologies into practice. Table 2 presents guidelines that exemplify what educators may consider when writing and implementing scenarios in their practice setting. More research is needed to identify which scenarios will yield the greatest learning for students.

REFERENCES


