Innovative Teaching Strategies with Simulation Technology in Nursing Education

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Abstract

Developing innovative teaching methods by using simulation technology in nursing education requires the improvement of strategies and a shift from teacher-centered to student-centered learning. Using simulation technology promotes critical thinking and clinical reasoning skills in nursing education. Although most nurse educators value student-centered learning, they often rely on familiar teaching strategies and methodologies that are focused on teacher-centered learning. Identifying the challenges with simulation in nursing education can lead to the development of a framework for the design and implementation of newer methods to improve learning outcomes. Evaluating these methods will validate the effectiveness of simulation technology.

KEY WORDS: *simulation technology, teaching methods, student-centered learning*

The function of a simulation experience in nursing education is to use innovative teaching methods to create a shift from teacher-centered to student-centered learning. According to Scheckel (2012), activities that are learner-centered encourage the student to participate in the design of learning tasks while acquiring the knowledge and skills needed to meet the curriculum outcomes. Teacher-centered learning is a form of passive learning, where information is presented to the student in a lecture format and evaluated using formal testing (Schaefer and Zygmont 2003; Scheckel 2012).

Simulation technology is a teaching method based on student-centered learning activities, where the learner is allowed to function in an environment similar to the real world of healthcare (Scheckel 2012). As nursing faculty integrate simulation technology into the curriculum, the advantages and challenges of this approach are considered to evaluate whether learning outcomes are being met. Thus, this article seeks to (1) identify challenges with simulation technology in nursing education in achieving learning outcomes; (2) discuss innovative teaching methods using simulation technology to promote student-centered learning; and (3) explore methods of evaluating the efficacy of student learning in a simulated environment.

Nurse educators use patient simulation as an innovative teaching method to reinforce healthcare concepts and adaptation to technology. The goal is to transform nursing pedagogy by moving away from traditional methods of teaching to active learning that is student-centered (Jeffries and Clochesy 2012). Simulation provides an opportunity for the learner to think critically and problem-solve using clinical reasoning in an environment that is non-threatening. The teaching and learning methods used in the simulation lab are intended to improve student learning outcomes and patient safety in the clinical setting (Jeffries and Clochesy 2012).

There are various types of simulators, ranging from low fidelity simulators with body parts, such as an arm, to learn intravenous insertion, to high fidelity human patient simulators with technologically advanced interactive

mechanical simulation mannequins (Campbell 2010). In, February 2014, Bermuda College opened the Patient Simulation Lab to provide a sophisticated means of practice-based instruction using high fidelity mannequins to enhance student learning. The purpose of the laboratory is to provide for practice in a safe, non-threatening environment, where errors can be detected without harm to a client. Integrating simulation into the curriculum provides an opportunity for Bermuda College to be competitive in nursing education by demonstrating a working knowledge of current trends in the delivery of innovative teaching methods and active learning strategies.

Simulation as a learning activity in nursing education allows the facilitator to provide scenarios that mimic the reality of the clinical environment. Unlike the traditional classroom setting, where instruction is teacher-centered, simulation is student-centered, with the teacher in the role of facilitator in the student's learning process (Jeffries 2005). Simulation encourages the student to develop psychomotor, cognitive, and affective skills prior to entering the real-world clinical setting. The nurse educator becomes the facilitator and has the opportunity to assess and evaluate the student's skill level and ability to meet learning outcomes. Remediation of the student can occur almost immediately, potentially leading to decreased errors in the real world.

Scenarios can be developed by the nurse educator or purchased from a company that develops scenarios specifically for the human patient simulator. Scenarios provide an opportunity for the learner to implement psychomotor skills such as vital signs, health assessments, wound care, intravenous therapy, tracheostomy care, and so much more. The student is also exposed to cognitive and affective domains of learning such as patient safety, mental illness, therapeutic communication, documentation, grieving, death and dying. Depending on the type of simulation, the student may receive the scenario ahead of time to review and prepare for the simulation. The scenario will consist of a brief synopsis of the client's condition along with a list of objectives (Campbell 2010). The mannequin and the environment will complement the scenario, thus requiring the student to reflect on the patient holistically and not just focus on the diagnosis. To be successful, each student must be self-motivated and self-directed to learn during the simulation once the rules have been discussed. As stated, the nurse educator is the facilitator of learning and the responsibility for learning lies with the student (Jeffries 2005).

The framework utilised by Bermuda College for simulation includes the following:

1.   Preparation stage, when the simulation begins with a discussion of the scenario, a review of the roles of each student, and review of the skills the students need to perform during the simulation.

2.   Implementation stage, when the student completes the scenario by performing the skills and achieving the objectives.

3.   Debriefing, a crucial stage, where the facilitator provides an opportunity for guided reflection of the simulation (Campbell 2010).

Evaluation of the simulation has multiple components, as each phase from design to debriefing must be reviewed to ensure that the simulation reflects the students' performance, is effective, and that learning outcomes have been met (Campbell 2010; Jeffries and Clochesy 2012). When evaluating students, it is important to assess whether learning has taken place, and assess the students' ability to demonstrate critical thinking by identifying the knowledge and skills needed to achieve the objectives during the scenario.

Simulation offers the nurse educator methods of instruction to meet the needs of the student by providing interactive, practice-based instructional strategies (Jeffries and Clochesy 2012). However, these methods can be a challenge to nurse educators who are not familiar with the design, implementation, and evaluation of the instructional strategies used to improve student learning outcomes. The challenges include (1) nurse educators relying more on teacher-centered learning methods; (2) difficulty with creating scenarios for simulation; (3) developing an appropriate framework for simulation instruction; (4) student perceptions of simulation; and (5) using an appropriate tool to effectively evaluate the instructional methods and student outcomes.

For simulation to be effective as a student-centred learning activity, nurse educators must adapt to this teaching style and instructional method. Schafer and Zygmont (2003) postulate that student-centered learning promotes independence in learning, problem-solving skills, critical thinking, and lifelong learning. The study compared current teaching methods to the nurse educators' philosophy of teaching. The participants included 187 faculty members teaching the Baccalaureate of Science in Nursing on average for 14 years. Analysis of the participants' written philosophy of teaching in the study reveals that although the teachers value the concept of student-centered learning, they actually employ more teacher-centred strategies. The implications for practice include providing interventions to improve the climate of learning, nurse educators sharing effective teaching methods that are student-centered, and balancing the faculty with educators, nurse clinicians, and researchers (Schafer and Zygmont 2003).

Writing, designing, and implementing clinical scenarios using complex technology are tasks unfamiliar to some nurse educators. Waxman (2010) proposes that clinical scenarios be based on researched evidence with clearly written objectives and guidelines using a template to help implement the teaching/learning methodology.

Thus, simulation is a vital teaching tool for educating nurses in the complexities of nursing practice. Additionally, the increased focus on patient safety and lack of clinical site availability make simulation a crucial resource for clinical education and learning (Waxman 2010; Berndt 2014). The design of the simulation scenario must be appropriate and support the goals, competencies, and outcomes of the course, with specific attention to objectives, planning, fidelity (authenticity), complexity, cues, and debriefing (Jeffries 2005).

Another challenge with using simulation is developing a framework design that will operate across the curriculum and meet the learning outcomes for each nursing course. The lower level course outcomes may require a basic health assessment, and the upper level course may require the student to analyse patient data to resolve a complex issue. Jeffries (2005) proposes a framework that includes the design, implementation, and evaluation of a simulation scenario. The student is responsible for the learning and the nurse educator remains the facilitator, providing a few prompts to maintain the momentum of the scenario during the implementation phase. Students are placed in roles as the registered nurse, part of the healthcare team, or a family member and must demonstrate psychomotor, communication, and critical thinking skills. Placing students in these roles may be a challenge for the nurse educator, who may not have the experience with evaluation of students during simulation.

To address the problem of nurse educators struggling to evaluate the effectiveness of simulation, Foronda et al. (2013) have undertaken an extensive literature review regarding mannequin-based simulations in undergraduate nurse education to provide evidence of student evaluation of simulation activities. Five themes emerged from this review: (1) anxiety, (2) interdisciplinary experiences, (3) satisfaction, (4) confidence/self-efficacy, (5) skills/knowledge. Students were satisfied with simulation as a teaching method for clinical education, stating it increased their confidence level. However, it also caused an increase in anxiety. Students noted the value for interdisciplinary experience and acquisition of knowledge and skills. A recommendation for evaluation is to use mixed methods when evaluating the effectiveness of simulation as an instructional method (Foronda et al. 2013).

When evaluating the students individually, there are various tools such as checklists, rubrics, rating scales, or any form of scoring that is used to align with the clinical outcomes. Video-recording or using a Smartphone video camera to record the simulation and for playback allow for immediate feedback regarding the students' actions, knowledge, and skills. Simulation software may allow the nurse educator to type comments and provide feedback as the scenario progresses, keeping track of the student's actions, which can be reviewed during debriefing (Campbell 2010).

Quantitative and statistical analysis and evaluation can include a pretest and post-test, asking the same questions prior to the simulation and after completion. Lewis and Ciak (2011) used this evaluation method with a diploma school of nursing using a pretest and post-test devised in conjunction with the simulation lab to measure changes

in knowledge in the cognitive domain. The tool was developed by the National League for Nursing (NLN) to assess student satisfaction with simulation as an education strategy and how confident nurses felt about applying the skills learned in the lab to the clinical setting. The results showed a significant gain in student knowledge, but there was no definite conclusion on critical thinking,

Simulation in nursing education is certainly an innovative teaching method used by nurse educators to inspire student-centered learning, while increasing the student's knowledge, skills, and abilities regarding patient care. Future implications for simulation will depend on evaluation and research methods to analyse statistical data to validate each phase of the simulation process from design to debriefing and how it impacts student learning outcomes. The results of the statistical analysis will assist in improving the standards for simulation in all nursing programmes and ultimately influence improvements in patient care and safety.

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