2016

The Effect of Simulation Training on Nursing Students' Content Exam Scores

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COLLEGE OF EDUCATION

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MSN/MBA, University of Phoenix, 2006

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Doctoral Study Submitted in Partial Fulfillment

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Doctor of Education

Walden University

April 2016

Abstract

Simulation training has been implemented at a small nursing school in the eastern United States to improve the currently low content exam scores in nursing courses. With the guidance of Kolb's experiential learning theory, differences in 8 course content exam scores were investigated for students who received simulation training in the content area before the exam and students who received simulation training after the exam, using a quasi-experimental, comparative design. Archival exam scores from 424 content exams, 212 completed by students who received simulation training before the exam and 212 completed by students who received simulation training after the exam, were used in a multivariate analysis of variance. The difference of the group means was not statistically significant ($p = .69$) for the pediatric assessment, meningitis, respiratory deviations, and gastrointestinal nursing content exams. However, there was a significant difference, F (4, 47) = 5.192, $p = .00$; $\lambda = .694$; $\eta^2 = .316$, for the postpartum and neonatal assessment, preeclampsia, and cardiovascular nursing content exams. The results are split, which may be due to inconsistency in the conduct of simulation training across the 8 content areas. The varied outcomes led to the development of a white paper with policy and implementation recommendations for simulation training. Positive social change may occur in the planning of simulation training to promote consistency and best practices, enhancing students' ability to perform safely and competently at the patient's bedside and thus supporting improved patient outcomes.

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Section 1: The Problem

Introduction

The goal of simulation in nursing education is to replicate crucial facets of the clinical situation so that students can learn in a nonthreatening environment. Simulation training in nursing education is adjunctive to the clinical learning that takes place in hospitals, long-term care facilities, or outpatient clinics. Simulation allows nursing students to provide nursing care to a simulated patient. A mannequin or an actor (standardized patient) symbolizes the patient, depending on the simulation experience. Mannequins help nursing students practice and develop psychomotor and critical thinking skills, and standardized patients can be used to improve nursing students' communication skills (Hodge, Martin, Tavernier, Perea-Ryan, & Alcala-Van Houten, 2008).

Three mannequin fidelity categories—low, medium, and high—were used in this study. Simulation mannequins can be either static or computerized. Static, low-fidelity mannequins are typically used for nursing students to practice certain skills, such as injections and urinary catheter insertion. Medium-fidelity mannequin simulation provides a more realistic approach to student learning, as this type of mannequin can simulate heart, lung, and bowel sounds, in addition to low-fidelity features (Jefferies, 2012). High-fidelity mannequins are the latest technology in simulation. High-fidelity mannequins have more realistic features than low- and medium-fidelity mannequins. High-fidelity mannequins can blink their eyes and perform biological functions, such as sweating and crying, providing a realistic experience (Broussard, 2008).

Components of simulation training include the nursing instructor, simulation staff, nursing students, and simulated environment (Jefferies, 2012). Nursing instructors facilitate simulation training to meet the learning needs of nursing students. Simulated training involves nursing students in a lifelike clinical situation that they might not be able to participate in with an actual patient. Additionally, simulation training can replicate an actual clinical experience. Through simulation training, nursing students can perform psychomotor skills, problem solve, and critically think through a lifelike situation at their own pace. Nursing students are required to prepare for simulation training just as they would for their hospital clinical experience. Preparation requires nursing students to have basic knowledge of the simulation scenario. Nursing students assume the role of a registered nurse and are required to wear their nursing uniforms during simulation training to add to the realism of the simulation scenario. Another component of simulation training is videotaping. Recorded simulation training sessions allow nursing students to watch themselves afterward and reflect on their strengths and weaknesses. By following certain ground rules, nursing students are more likely to achieve the learning outcomes of simulation training (Felver et al., 2010; Jefferies, 2012; Nickerson & Pollard, 2010):

- Students should be self-directed and motivated.
- Part of the learning process is acknowledging mistakes.
- All simulation training should have clear objectives.
- The learning environment should mimic a real-life clinical experience.

- Students should be challenged by incorporating opportunities for students to problem solve during the simulation experience. However, the outcome should be attainable.
- Each simulation training concludes with debriefing (reflection) and evaluation of the experience.

Definition of the Problem

The problem investigated by this study was low content exam scores for the pediatric and neonatal exams in a parent-child health (PCH) nursing course. In the spring of 2013, faculty at the nursing program reviewed these grades because the average score for these exams was below passing. The review of grades revealed that 61% of nursing students failed the pediatric assessment content exam and 52% of nursing students failed the neonatal assessment content exam. A further investigation into exam scores revealed the following failing percentages of content exams at the nursing program over the last 3 years (see Table 1).

Table 1

Percentages of Exam Failures at the Nursing Program, 2011-2013

	2011	2012	2013
Neonatal assessment	51	50	52
Postpartum assessment	43	44	42
Cardiovascular nursing	52	53	50
Pediatric assessment	60	60	61
Respiratory deviations	35	34	35
Gastrointestinal nursing	50	51	52

Note. Adapted from Blackboard Learn® at the nursing program.

The methods of instruction at a 2-year diploma registered nurse program that was the site for this study (referred to as *the nursing program*) included theoretical instruction in classrooms, hands-on clinical experience, and simulation training with mannequins. Simulation training was introduced into the nursing program in 2011 with the goal of promoting nursing students' content mastery by providing additional opportunities to facilitate linking classroom theory to practice. Researchers (Gates, Parr, & Hughen, 2012; Glidewell & Conley, 2014; Stefaniak & Turkelson, 2013) have found that students who receive simulation training before taking a content exam achieve higher scores than students who do not receive simulation training before the exam.

The discovery of low content exam scores prompted a faculty discussion that highlighted that the current method of simulation training scheduling had no relation to the timing of the presentation of course content in the classroom. For example, approximately half of the nursing students received simulation training before each content exam, whereas the other half received simulation training after each content exam. This method of simulation scheduling led to a more general discussion of whether simulation training had an effect on student exam scores.

According to an internal report issued by the study organization, faculty members agreed that the nursing program needs to confirm the effective use of simulation training to ensure that all nursing students receive the same benefits from this type of training. One way to investigate the effectiveness of simulation training is to explore whether there is a difference in exam scores between students who receive simulation training before the content exam and students who receive simulation training after the content exam.

The exploration of the effect of simulation training on content exam scores will provide information to guide decisions about the optimal implementation of simulation training, which may affect nursing students' content mastery.

Rationale

Evidence of the Problem at the Local Level

Nurses have a direct effect on patient outcomes (Kirwan, Mathews, & Scott, 2013). Therefore, nursing educators must make sure that the nurses have the necessary skills before entering the profession (National Advisory Council on Nurse Education and Practice, 2010). Nursing schools have the responsibility of preparing students to become safe and competent practicing nurses by providing students opportunities to have diverse clinical experiences. Simulation training has been implemented at the nursing program to provide hands-on practice to promote content mastery. The rationale for investigating this local problem was that it would be possible to determine whether simulation training had an effect on student mastery of the content as measured by eight content exam scores.

Evidence of the Problem From the Professional Literature

Nursing is a practice discipline as defined by the National Council State Boards of Nursing (NCSBN; 2005). The clinical aspect of any nursing program is vital to students' ability to integrate their theoretical knowledge and apply it at the patient's bedside (Donnelly & Wiechula, 2012). Nursing education has traditionally relied on clinical placement in a health care setting to provide students with hands-on clinical instruction. Hands-on clinical instruction with live patients helps nursing students meet expectations

regarding program outcomes. However, this practice may pose a threat to patient safety (Brewer, 2011).

Due to the medical complexity of patients, nursing students often take on an observational rather than hands-on role in the clinical area (Meyer, Connors, Qingjang, & Gajewski, 2011). When nursing students become passive learners, they are denied the opportunity to practice and apply the knowledge they received through didactic learning. This lack of application of knowledge can have an adverse effect on nursing students' content mastery (Thomas & Mackey, 2012). Many nursing schools have incorporated simulation training into their curricula as an adjunct to hands-on clinical instruction to provide deliberate practice with the goal of promoting patient safety and providing consistent content mastery opportunities.

Current research shows that simulation training enhances content mastery by providing repetitive practice and feedback (Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005). Additionally, the National Advisory Council on Nurse Education and Practice (2010) supported the use of simulation training to prepare future nurses to be able to provide safe nursing care in today's healthcare system. The purpose of this study was to investigate whether there was a difference in exam scores between students who received simulation training before the content exam and students who received simulation training after the content exam. The course content areas that were analyzed were pediatric assessment, neonatal assessment, postpartum assessment, pediatric meningitis, preeclampsia, pediatric respiratory deviations, cardiovascular nursing, and gastrointestinal nursing. I examined the content exam scores among nursing students

who received simulation training before the content exam and nursing students who received simulation training after the content exam.

Definitions

The following terms are used in this study to describe the preparation of nursing students to be successful in the nursing program in which they are enrolled and be able to enter into professional practice as safe and competent nurses.

Clinical: The actual or simulated physical assessment and nursing care of patients and their families in a variety of healthcare settings. Learning that takes place in this clinical environment provides the opportunity to link theory to practice in the areas of skills, knowledge, and attitudes (Meakim et al., 2013).

Competence: Is obtained when an individual is able to meet a required standard in skills, knowledge, and attitudes that are vital in the promotion of quality patient care and safety (Meakim et al., 2013).

Critical thinking: A way of thinking that involves reasoning, analysis, and skepticism that promote decision making to achieve a conclusion (Zori & Morrison, 2009).

Deliberate practice: Involves the repetition of psychomotor and cognitive skills, along with the opportunity for learner feedback, with the goal of enhancing skill performance (Issenberg et al., 2002).

Fidelity: The degree to which a simulated event mimics reality (Jefferies, 2012).

Hands-on clinical instruction: Time spent in the clinical area where the student is involved in patient care while observed by a qualified faculty member (NCSBN, 2005).

Patient acuity: The level of nursing care required for the patient (Hughes, 2008).

Simulation: An event that mimics reality by promoting participant engagement in the learning process. Reality can be mimicked through the use of simulation mannequins, computer games, case studies, and role playing (Hope, Garside, & Prescott, 2011).

Significance

This study is significant because it addressed the effect of simulation training on content mastery as evidenced by exam scores in a nursing program. Determining whether simulation training had an effect on exam scores will help the nursing program's faculty to determine whether the nursing students who receive the simulation training before content examination are best prepared for their professional life and the necessary exams. The results of this study can be used to help determine the optimal use of simulation training throughout the curriculum so that the school provides a consistent academic and simulation training program experience for all nursing students enrolled in the program. Consistent simulation training can support changes in the way in which simulation training is implemented in the nursing program so that nursing students can be successful in the program and become competent and safe practicing nurses, ultimately benefitting the patients they encounter during their professional career.

Research Question

This study was guided by the following research questions:

Research Question 1: Is there a significant difference in eight exam scores for students who received simulation training in the content area before the exam and

students who did not receive simulation training in the content area before the exam, as measured by eight separate multiple choice content examinations?

*H*1$_0$: There is no difference in exam scores between nursing students who received simulation training before the content exam and nursing students who did not receive simulation training before the content exam.

*H*1$_a$: There is a significant difference in exam scores between nursing students who received simulation training before the content exam and students who did not receive simulation training before the content exam.

Research Question 2: Is there a difference in content exam scores between students who had simulation training versus those who did not receive simulation training when controlled by nurse entrance test scores?

*H*2$_o$: There is no significant difference in content exam scores among students who had simulation training versus those who did not when controlled by nurse entrance test scores.

*H*2a: There is a significant difference in content exam scores among students who had simulation training versus those who did not when controlled by nurse entrance test scores.

Review of the Literature

In this section, I discuss Kolb's experiential learning theory (ELT) and its application to simulation training. In addition, I provide a critical analysis of peer-reviewed articles on simulation training for nursing students in the areas of exam scores, teaching strategies, content mastery, transfer of learning, critical thinking skills, and

patient safety. I searched the online databases CINAHL, MEDLINE, OVID, EBSCO, and ERIC for articles and peer-reviewed studies published between 2004 and 2014. I also used foundational books from Kolb and Jefferies as theoretical references. The search terms included *simulation and knowledge acquisition*, *simulation and experiential learning theory*, and *simulation and knowledge retention*. I achieved saturation when modifying the Boolean operator *and* to *or* did not produce any additional useful articles regarding the topic of simulation and nursing students.

Theoretical Foundation

Kolb's experiential learning theory (ELT) provides the theoretical foundation for this project study. The definition of *experiential learning* is a "process whereby knowledge is created through the transformation of an experience" (Kolb, 1984, p. 38). Adult learning is most effective when the learner is both participating and interactive in the environment (Rauen, 2004). Studies have shown that adult learners lose interest in an educational experience that does not permit active involvement (Jeffries, 2012). Simulation training allows the active participation of students in their learning by physically conducting the clinical techniques they learn about in the classroom.

Nursing students are expected to provide safe and competent care throughout their education, as well as when they enter the nursing profession as licensed registered nurses. Nursing students must be able to apply the knowledge they have gained through didactic learning to become safe and competent practitioners. One way this can be achieved is with experiential learning strategies through the use of simulation training.

Experiential Learning Theory

Experiential learning can be considered the "adult learner's living textbook" (Merriam, Caffarella, & Baumgartner, 2007, p. 161). In other words, adult learners acquire knowledge by doing. Kolb (1984) stated that experiential learning theory embodies a holistic perspective on learning by combining "experience, perception, cognition, and behavior" (p. 21). Kolb further stated that the learner initiates the action of learning through experience by assigning meaning to the experience. Based on this premise, learning through experience has been connected with constructivist theory (Rutherford-Hemming, 2012). "Concrete experience, reflective observation, abstract conceptualization, and active experimentation" are the four stages of Kolb's experiential learning theory (Kolb, 1984, p. 198).

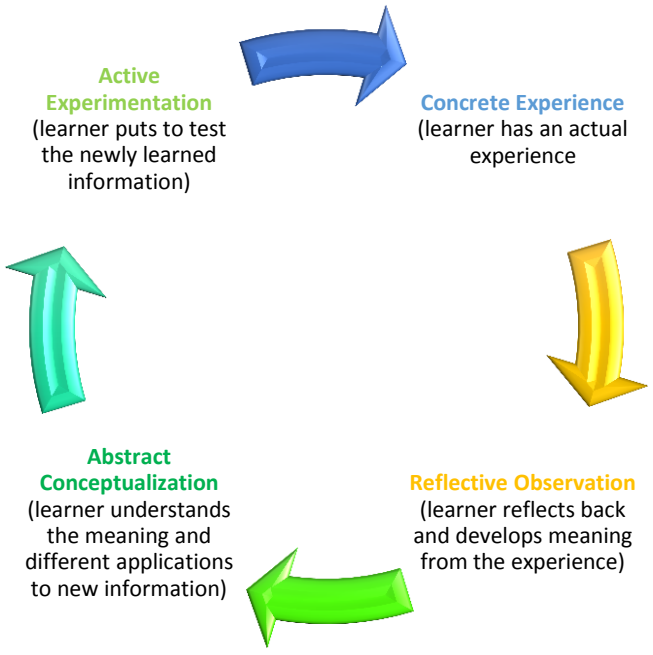

Figure 1. Kolb's stages of experiential learning theory. Adapted from "Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education," by A. Y. Kolb and D. A. Kolb, 2005, *Academy of Management Learning and Education, 4*, p. 198.

During the stage of concrete experience, learners have an experience. The second stage, reflective observation, begins after the learner has an experience and then reflects on the experience. After reflective observation, the learner interprets the events of the experience and tries to understand the relationships among them. Lastly, the learner takes what he or she has learned from the experience and puts it into action.

Rutherford-Hemming (2012) stated that experiences that provide learning opportunities are not isolated. Learning occurs when a connection is made from new knowledge to past experiences. Kolb (1984) stated that learning is ongoing, and the creation of understanding occurs when learners transform the experience, changing the way in which they think and behave. Experiential learning theory begins with the learner having an experience and ends with the learner applying the newly learned information.

Experiential Learning Theory and Simulation

Kolb (1984) stated that active learners achieve deeper learning when compared to nonactive learners. Nursing students can benefit from learning through lifelike simulated experiences rather than memorizing information learned in the classroom (Dearmon et al., 2013). Nursing students learn the factual content of nursing education through didactics. However, the clinical skills that a nurse needs to develop are better learned through practice and experience (Buykx et al., 2011). In the clinical setting, nursing students provide nursing care to actual patients. The time that is available for students to develop clinical skills in the clinical setting is limited because patient safety is a high priority. The healthcare concerns of the patient take precedence over a learning opportunity for the nursing student. Hence, concern for patient safety may lead to

nursing students missing out on opportunities to apply their knowledge at the patient's bedside.

Simulation training provides the nursing student with opportunities for active involvement in learning without causing harm to patients in the clinical area. Simulation training enables nursing students to gain new knowledge and build upon previous skills (Beckem & Watkins, 2012). Simulation training also provides self-paced learning and affords nursing students the opportunity to make mistakes and learn from them, which cannot be accomplished in the clinical setting (Felver et al., 2010). Currently, learning that takes place in the clinical setting is limited by the patients who are in the hospital. Therefore, nursing students may learn about a disease process and never have the opportunity to provide nursing care to patients with that condition. Lack of application may limit the nursing student's ability to learn and develop the necessary skills to be a safe practitioner (Powell-Laney, Keen, & Hall, 2012). The creation of simulation scenarios for any disease process will provide an opportunity to present nursing students with the experience. As a result, simulation training can provide standardized learning experiences to all nursing students by enabling active experience.

Applying Stages of ELT to Simulation

The following paragraphs address how all of these stages relate to nursing students' simulation training. The first stage of the experiential learning cycle is *concrete experience*. This stage incorporates a student having an experience through doing and feeling (Dearmon et al., 2013). The simulation scenario provides concrete experience for a nursing student. One of the simulation scenarios conducted at the nursing program

involves providing nursing students an opportunity to identify a cardiac dysrhythmia. In addition to identifying the dysrhythmia, nursing students use psychomotor and cognitive skills to provide appropriate nursing interventions.

The second stage is *reflective observation*. Nursing students achieve reflective observation through a part of the simulation training called *guided debriefing*. This part of the simulation training is called *guided* because the nursing instructor guides the active participation of the nursing students through a conversation with the goal of discovering and closing any gaps in the nursing students' knowledge and skills (Boulet et al., 2011). During debriefing sessions, nursing students reflect on the simulation scenario in which they have just participated, and within a small group they discuss appropriate and inappropriate interventions. Through reflective observation, nursing students make sense of the concrete experience (Lisko & O'Dell, 2010). Nursing students can learn from each other's correct and incorrect actions. For example, if a nursing student had difficulty during the scenario in identifying the cardiac dysrhythmia, the nursing instructor can take time to review the concepts involved in identifying cardiac rhythms. Additionally, if a nursing student performed an incorrect intervention, the debriefing can focus on why the intervention was incorrect and what the appropriate intervention is and why.

The third stage is *abstract conceptualization*. During this stage, nursing students can process what they have learned during and after the simulation. Nursing students can accomplish abstract conceptualization during or after the guided debriefing session. During abstract conceptualization, the nursing student is provided an opportunity to

understand what they have learned and determine how they will apply their learning to a similar or different situation.

The fourth stage is *active experimentation*. During this stage, nursing students use what they learned in the actual clinical setting or during classroom examination (Buykx et al., 2011). Nursing students achieve active experimentation if the nursing instructor observes their application of knowledge from the simulation training in the clinical setting. Nursing students can also obtain active experimentation through pre- and posttesting of the simulation scenario.

Simulation and Exam Scores

Most of the research on simulation has focused on the affective and psychomotor domains of learning**.** Only a few research studies have addressed the cognitive learning domain with a focus on the timing of simulation training in the nursing curriculum. For example, Glidewell and Conley (2014) found that nursing students who took a renal and cardiac content exam immediately after receiving simulation training scored significantly higher than nursing students who took the exam before simulation training. The participants in this study were 184 nursing students who were considered to be homogenous. All nursing students received the renal and cardiac course lecture. One group of students completed the content exam before receiving simulation training while the other group completed the exam immediately after their simulation training in the areas covered by the exam. Analysis of variance showed that students who received simulation training scored significantly higher, $F\ (2, 368) = 63.02$, $p < .01$, than students who took the content exam before simulation.

Similarly, Stefaniak and Turkelson (2013) and Zendejas, Cook, and Farley (2010) found that students who attended the simulation training before receiving the lecture content scored significantly higher on the multiple choice exams than students who received the lecture material before simulation training. Although these research studies indicated that students who received the simulation training before receiving instruction achieved higher scores on exams, the relatively small number of studies in this area suggests that there is little research on the timing of simulation training and education.

Simulation as a Teaching Strategy

Research supports the use of simulation in nursing education. Currently, nursing education is taught in two separate entities: the classroom and the clinical area. Nursing students are expected to apply classroom theory to hands-on clinical instruction in the healthcare setting. During hands-on clinical instruction, nursing educators facilitate the nursing student's application of theory. However, the healthcare setting is sometimes not perceived to be the optimal environment for nursing students to learn (Alfes, 2011).

Many nursing schools around the United States have difficulty gaining access to healthcare settings. Due to this lack of access, nursing schools need to develop alternative educational strategies for clinical learning. Currently, the nursing instructor-to-student ratio for hands-on clinical instruction varies by state. Some nursing programs have a 1:6 ratio, whereas other programs have a 1:12 ratio (NCSBN, 2006). The National League of Nursing (NLN) found that 50% of nursing faculty identified that supervising nursing students in the clinical area is a major challenge in addition to providing timely and meaningful feedback to students (Ironside & McNelis, 2010). Further, not all hands-

on clinical opportunities provide nursing students with a positive learning experience because nursing staff sometimes become frustrated and resent having nursing students on the clinical units (D'Souza, Venkatesaperumal, Radhakrishman, & Balachandran, 2013). Due to the challenges faced in the health care setting, simulation provides nursing students with opportunities to acquire experience with a broad range of patients, including those they might never experience in the clinical setting.

The Canadian Association of Schools of Nursing found that nursing students who learn through simulation may have an advantage over nursing students who learn strictly at the patient's bedside (Crookes, Crookes, & Walsh, 2013). Sinclair and Ferguson (2009) found that nursing students who received simulation training in addition to lecture expressed greater satisfaction in their learning than those who learned with lecture alone. Furthermore, Garrett, MacPhee, and Jackson (2010) concluded that nursing students valued the real-time changes in the patient's status during simulation as a positive learning experience. In contrast, Nevin, Neill, and Mulkerrins (2013) found that nursing students felt that simulation was not an efficient method of content delivery. A survey of 87 nursing students regarding their experience with simulation training revealed that more than half of the students stated that they would have preferred a lecture or clinical skills tutorial on the postoperative care of an abdominal hysterectomy patient.

There continues to be debate among nurse educators regarding the value of simulation in the nursing curriculum. Some educators state that simulation promotes clinical learning without having adverse effects on patients while other educators argue that simulation training distracts from the learning that takes place through hands-on

clinical instruction (Elfrink-Cordi, Kirkpatrick, Nininger, & Schubert, 2010). Hauber, Cormier, and Whyte (2010) found a correlation between knowledge and performance in simulation training among senior nursing students learning about congestive heart failure. In contrast, there was no correlation between knowledge and performance in simulation training among freshman-level nursing students learning basic nursing skills. These results imply that there is less ability to transfer skills when there is a lack of implementation of clinical reasoning in the nursing course. Additionally, one of the arguments for simulation training is that it promotes patient safety and provides a safe learning environment for nursing students. However, Ganley and Linnard-Palmer (2012) found that some nursing students did not feel safe during simulation training. Students experience safety in academia when they can perform without fear of negative consequences. These nursing students expressed that they felt incompetent if they did not perform assessments or interventions correctly during simulation training. Feeling incompetent can lead to increased stress and anxiety during simulation and can interfere with nursing students' learning. Overall, some research supports simulation training in enhancing learning. However, nursing students need to feel safe while they are learning to gain the most from their experience.

Simulation and Content Mastery

Studies have provided support for the assertion that simulation aids in nursing students' content mastery. Gates, Parr, and Hughen (2012) found that nursing students' posttest scores on pulmonary embolism and gastrointestinal bleed quizzes significantly increased after exposure to simulation, compared to no exposure to simulation. Dearmon

et al. (2013) found that nursing students who received a simulation-based orientation to prepare for hands-on clinical instruction scored significantly higher on a posttest knowledge assessment as opposed to students who received only lecture-format preparation for hands-on clinical instruction. However, the knowledge assessment was a 12-item multiple choice test created by faculty, and there were no reliability or validity data for this assessment. Kaplan, Connor, Ferranti, Holmes, and Spencer (2012) found that 95% of nursing students who completed a postsimulation survey on emergency preparedness stated that simulation helped to increase their knowledge of handling an emergency. Furthermore, Tawalbeh and Tubaishat (2014) found that nursing students who received simulation in advanced cardiac life support (ACLS) in addition to presentation and demonstration using a static mannequin scored significantly higher on posttest scores than students who did not receive the simulation. Furthermore, 3 months after training, the nursing students who received simulation training were able to retain knowledge. Lewis and Ciak (2011) found that there was a significant increase in knowledge from pretest to posttest on the Nursing Care of Children and Maternal Newborn tests created by Assessment Technologies Institute (ATI) after the nursing students attended eight simulation scenarios. However, there was no control group for this study. Lindsey and Jenkins (2013) found that both the control and experimental groups improved test scores from pretest to posttest. However, the nursing students who received the simulation intervention scored significantly higher on the posttest. Additionally, Ackermann (2009) and Kardong-Edgren, Lungstrom, and Bendell (2009) revealed that students who received simulation training were able to retain their

knowledge 3 months later when compared to the control groups. These studies demonstrated that simulation training aids in student knowledge acquisition. However, there are mixed findings on knowledge retention.

Elfrink-Cordi, Kirkpatrick, Nininger, and Schubert (2010) found that nursing students had an improvement of knowledge during simulation. However, these students were not able to retain their knowledge between the simulation and final exam. Lo et al. (2011) found that students who received high-fidelity advanced cardiac life support simulation scored higher on posttest scores than students who received traditional training for ACLS. In addition, 1 year later both groups of students took the same test and there was no statistical significance between the groups.

Simulation training can provide opportunities for nursing students to play different roles during a scenario. One role is when the student plays the primary nurse for the patient. As the role of primary nurse, the student is actively involved in assessing and performing interventions during the scenario. Another role a student can assume during simulation training is the observer. Kaplan, Abraham, and Gary (2012) found that there was no statistical difference in student test scores following a simulation scenario between students actively involved in the simulation and students who observed the simulation. This study indicated, regardless of the role the student played during the simulation, all students received the same benefit.

In contrast, some studies indicated that simulation does not promote knowledge acquisition. The NCSBN (2009) found that nursing students' exposed to simulation achieved lower knowledge test scores. Akhu-Zaheya, Gharaibeh, and Alostaz (2013)

concluded that there was no statistical difference in knowledge acquisition between students who received a basic life support simulation in addition to traditional lecture and demonstration and students who did not receive the simulation. Additionaly, Schlairet and Pollock (2010) found that there was no statistical difference in knowledge between students who received simulation and students who had traditional clinical experiences. Most of the research support that nursing students who experience simulation training gain more knowledge when compared to nursing students who do not receive simulation training. However, the research also found that there was no retention of knowledge over time.

Simulation and Transfer of Learning

Transfer of learning is an important goal in nursing education. One of the outcomes of simulation training is a *transfer of learning*. Transfer of learning means that nursing students should apply knowledge they learned, either in a clinical setting or on content exam testing. The Nurse Executive Center (2010) found that 90% of nursing faculty believed that graduating nursing students are competent to provide safe and efficient nursing care when entering the profession. In contrast, only 10% of hospital and health administration personnel agreed that recently graduated RN students were sufficiently equipped to provide safe and effective care (Ashcraft et al., 2013). Kirkman (2013) found that nursing students' respiratory assessment skills improved at the patient's bedside over time. Nursing students were evaluated by faculty in the clinical area using an evaluation tool at three points, before lecture, one week after lecture, and one week after simulation. Students' performance increased after each point, with the most

significant increase after simulation training. Coffman (2012) researched the nursing students' perceptions of learning with high- and low-fidelity simulation during a maternal-child skills lab. These students expressed that this type of simulation allowed them to learn the "what, when, how, and why" of psychomotor skills (p. 339). These same students experienced a high-fidelity simulation on the care of a child with a ruptured appendix. The simulation took place 1 week after the students attended the low-fidelity simulation. Students' perceptions of the high-fidelity simulation were that they were able to apply what they learned in the low-fidelity simulation to the high-fidelity scenario.

Furthermore, Fraser et al. (2009) found that medical students can acquire and retain clinical skills with cardiorespiratory simulation training. However, the authors also found that these same students had trouble transferring these skills to other patient problems. Blum, Borglund, and Parcells (2010) found that faculty observed increased competence in health assessment in students who had traditional laboratory experience compared to students who had a simulation enhanced laboratory to practice assessment skills. Overall, there is a lack of research that documents students' transfer of knowledge following a simulation experience.

Simulation and Critical Thinking Skills

Critical thinking skills are vital for a nursing student to become a successful thinker and practice as a competent and safe nurse. Content exams in nursing programs require more than recall of information. Nursing students are also required to use the information they have learned in a new situation and interpret a variety of data and the

interrelationships among the ideas presented in the question. Nursing students must "translate, interpret, and determine implications and consequences of information" (Nugent & Vitale, 2012, p. 10). Goodstone et al. (2013) found that there was no statistical difference in student test scores on the California Critical Thinking Test between nursing students who received weekly case studies and students who received weekly simulation training in their health assessment course. Wood and Toronto (2012) also found that there was no statistical difference in critical thinking scores between students who received traditional health assessment skills practice and students who received simulation training to practice skills.

Currently, there is a debate on when the introduction of simulation training should occur in a nursing curriculum. Blum et al. (2010) concluded that advanced students can integrate more concepts into the simulation, therefore, receive the most benefit. However, some research is suggesting that simulation should be implemented earlier in the students' learning to provide the most benefit. Burns, O'Donnell, and Artman (2010) found that first year nursing students' knowledge had increased on posttests after exposure to simulation. Additionaly, Sullivan-Mann, Perron, and Fellner (2009) found that freshmen-level nursing students' critical thinking scores on the Health Sciences Reasoning Test improved after students were exposed to diverse clinical simulation scenarios when compared to the control group. Furthermore, Hauber, Cormier, and Whyte (2010) found a positive correlation between knowledge and performance in simulation training among students in their Adult Health I course. In contrast, there was no relationship between knowledge and performance in simulation training among

nursing students in their Fundamentals course. These results showed the diminished ability to transfer skills when there was a lack of implementation of clinical reasoning in the nursing course. Fundamentals is a nursing course that focuses mainly on factual information and lacks application of knowledge. Overall, the literature supports the benefit of simulation training for both the beginning and advanced nursing student.

Simulation and Patient Safety

In response to the Institute of Medicine report on Health Professions Education (2003), an initiative called the Quality and Safety Education for Nurses (QSEN) has been instituted in many registered nurse programs across the United States (Beischel & Davis, 2013). This initiative seeks to prepare nurses adequately to provide the safest bedside nursing care possible. The NCSBN has responded to this initiative by increasing the amount of questions on the registered nurse licensure exam related to patient safety from 19% to 23% of the exam (NCSBN, 2013). Content exams at the nursing program, the site for this study, are blueprinted to match the licensure exam, which necessitates that up to 23% of the content exams contain questions related to patient safety.

Pauly-O'Neill and Cooper (2013) found that nursing students in the clinical area only spent a small amount of time directly focused on patient safety, with only 36 minutes out of 210 minutes observed in the clinical area. The use of simulation training allows nursing faculty to focus on patient safety in a controlled environment. Most of the medical errors that jeopardize patient safety are preventable (Blum & Parcells, 2012). Since nurses spend more time at the patient's bedside than any other healthcare professional, they play a significant role in ensuring the patient's safety. During

simulation training, mistakes do not cause physical harm to patients. Also, errors during simulation can provide teaching moments. Henneman et al. (2010) included the use of simulation as an opportunity to study errors committed by student nurses. The goal was to identify the types of mistakes that nursing students made to inform teaching strategies. Henneman et al. found that student nurses failed to identify the correct patient and communicate accurate information to the healthcare provider. These nursing students also performed incorrect or delayed nursing interventions during the simulation. Additionally, Riley et al. (2011) conducted a quantitative study to determine whether simulation team training helped improve perinatal patient outcomes. Riley et al. found that there was an improvement in perinatal morbidity when labor and delivery healthcare staff participated in didactic and simulation training as opposed to healthcare teams who received didactic training only. Furthermore, Sears, Goldworthy, and Goodman (2010) found that nursing students who received simulation training had fewer medication errors than students who did not receive the simulation. Among the students in the control group, 24 out of 30 committed errors, compared to only 7 out of 24 from the experimental group. Current research provides evidence that simulation training can help increase patient safety in the clinical area.

Implications

An implication for practice that might emerge based on the findings of the project study would be to provide evidence to support whether the nursing program should move to "*high stakes*" simulation training and assessment. High stakes testing means that the students would need to pass the simulation satisfactorily to be successful in the nursing

course or program. Currently, the NLN is in discussion regarding requirements for high stakes simulation. The use of simulation training is solely as a teaching tool in the nursing program. Findings from this study could eventually support the school in moving towards using simulation to determine student competency.

The investigation of the study's hypotheses—is there a significant difference in eight exam scores for students who received simulation training in the content area before the exam and students who received simulation training in the content area after the exam, as measured by eight separate multiple choice content examinations—could lead to a positive social change at the individual level. Redesigning the curriculum at the nursing program to provide all nursing students the opportunity to receive simulation training before the content exam may lead to positive social change.

The majority of research on simulation in nursing education is descriptive and subjective (Shinnick et al., 2012). The implication for positive social change from this study would be to provide evidence-based support for an optimal simulation training schedule and enhance the students' ability to perform safely and competently at the patient's bedside. Since simulation equipment and training are already in place, nursing programs, and their students will benefit from timing the use of the equipment so that it is most effective in supporting content mastery on exams.

Summary

A review of current literature outlines the benefits of simulation in nursing education. Simulation ties in with experiential learning theory, which is used to support the nursing students' development of cognitive, psychomotor, and critical thinking skills.

All of these skills are vital for all practicing nurses to possess. The role of all nursing education programs is to facilitate students' development of these skills so that they can practice competently and safely within the healthcare field.

Patient safety is a high priority in the clinical setting, potentially providing a barrier for some students to develop these skills in the clinical area. Current research indicates that simulation training enhances learning, critical thinking, and patient safety. However, research is lacking that addresses the problem in the nursing program. There is limited peer-reviewed research that addresses the objective measure of student learning.

The purpose of this study was to investigate whether there was a difference in exam scores between nursing students who received simulation training before the content exam and students who received simulation training after the content exam. The course content areas investigated were cardiovascular nursing, gastrointestinal nursing, postpartum assessment, preeclampsia, pediatric assessment, neonatal assessment, and pediatric meningitis. The following section will address the research design and approach, setting and sample, instrumentation, data collection and analysis process, and protection of participants for this study.

Section 2: The Methodology

Introduction

In the review of the literature on simulation training, the majority of the study designs were experimental. During experimental research, participants are randomly assigned to groups and treatment conditions are manipulated for one or more of the groups (Creswell, 2012). In my study, I examined archival data containing eight content exam scores for nursing students grouped according to the school simulation schedule before collecting data. Based on the nature of the research questions, lack of random assignment and manipulation of the independent variable, a quasi-experimental, comparative design was used.

Quantitative Research Design and Approach

A comparative research design is used to examine differences between two or more groups of individuals. Comparative research is conducted in an attempt to identify any similarities or differences among the groups with the goal of developing generalizations centered on any recognized similarities or differences through analysis of data (Mills, van de Bunt, & de Bruijn, 2006). For this project study, the two comparative groups consisted of nursing students who received simulation training before the content exam and students who received simulation training after the content exam.

To date, the majority of research on simulation has used experimental designs. However, a quasi-experimental, comparative research design was the most appropriate design for this study because I needed to accommodate to the current educational practices at the study site regarding the scheduling of simulation for each nursing student

during instruction. In other words, nursing students at the nursing program were already assigned to the comparative groups as part of ongoing educational programming, meaning that nursing students received simulation training either before or after content exam testing.

Setting and Sample

A 2-year RN diploma program located in the eastern United States was the setting for this study. The RN program commences each year in the fall. Each school year consists of two 16-week semesters (fall and winter), followed by one 6-week semester during the spring. Each nursing course of the program implements simulation training. For students to receive a diploma in nursing, they must complete 45 semester hours in nursing and 33 semester hours in college-level courses. The school of nursing has a collaborative agreement with a 4-year college that offers an associate's degree in applied health sciences for nursing students. Faculty employed at the nursing program teach the nursing courses, while faculty from the collaborating 4-year college teach the college-level courses. The school's student population ranges from 90-120 individuals. Currently, the ratio of female to male students enrolled in the program is three to one, and students' ages range from 18 to mid-50s.

I used archival data representing eight content exam scores and school records that indicated the timing of simulation training (before or after content exam testing) for all enrolled in the program during the 2014 calendar year. Based on the inclusion criteria, a census sample was used because I collected archival data from the entire nursing student population, rather than from a sample of nursing students. Lodico et al.

(2010) stated that this method of sampling is used in quantitative research when the realistic population is not too large.

In quantitative research, the researcher needs to determine the minimum sample size or number of observations for the study. According to Cohen (1992), three factors affect the sample size or number of participants. These three factors are significance, power, and effect size. A significance level (*p)* of .05 is common in this kind of research. A *p*-value of .05 indicates that 5 out of 100 times, the results would be due to chance, assuming the null hypothesis is true (Creswell, 2012). The second factor is the power that will be needed to avoid a Type II error, which is the incorrect rejection of the null hypothesis. The power is usually set at .80 (Cohen, 1992, p. 156). Lastly, the effect size identifies the strength of the relationship between variables. The effect size determines the needed minimum sample size for the study to have acceptable power to be able to support correct rejection of the null hypothesis. The effect size is usually set at .20 (small), .50 (medium), or .80 (large). For this study, I set the effect size at .25, a medium effect size, due to the amount of available nursing student exam scores. Considering these factors and variables, Cohen's table (1992, p. 158) shows that the minimum number of exam scores required for this study is 128. There were 424 available exam scores.

Instrumentation and Materials

All nursing students enrolled in the nursing program are administered the same 60-question content exam in the separate content areas. I obtained the dependent variables for this study, content exam scores from eight different exams, from student records. I analyzed eight content exams because these exams evaluated knowledge of

course content addressed during simulation training throughout the 2014 calendar year. The dependent variables represented scores from the following eight content exams from the 2014 calendar year:

- Pediatric assessment
- Neonatal assessment
- Postpartum assessment
- Pediatric meningitis
- Preeclampsia
- Pediatric respiratory deviations
- Cardiovascular nursing
- Gastrointestinal nursing

Students enrolled in the nursing program are required to take content exams during their course of instruction. The exams that are used to evaluate students' content mastery are teacher-made tests. The nursing instructors who taught the content were responsible for developing the questions for the content exam. Content validity assures that an assessment measures the intended learning outcomes (Gareis & Grant, 2013). The content exams at the nursing program were peer reviewed for content validity by an instructor in the same nursing course before the date of examination. The peer reviewer was responsible for reading the content exam questions and assessing the questions for congruency with the objectives of the lecture and learning outcomes of the course. Additionally, the peer reviewer was responsible for asking the following questions about the questions on the content exams:

- Does the question make sense?
- Is there only one right answer, unless it is *select all that apply*, to the question?
- Is the response to one question found in another question?
- Are there any typographical errors or unfamiliar terms included in the question?
- How has the question performed in previous tests?

Feedback from nursing students contributes to the content validity of nursing exams in the nursing program. Nursing students have the opportunity to review the content exam after receiving their grades. At this time, the nursing students can provide verbal feedback regarding the question.

Item analysis of the content exams provides the exams' reliability. During the 2014 calendar year, the nursing program used ParScore from Scantron® and ExamSoft© to provide statistical analysis of the content exams. Kuder-Richardson (KR20) provides the internal consistency of the content exams. The KR20 estimates the reliability of the content exam based on the consistency in how the nursing students respond from one question to the next. The KR20 ranges from 0 (*no reliability*) to 1 (*perfect reliability*). The higher the number, the stronger the reliability of the exam and the probability that nursing students who took the content exam again would achieve the same exam scores. Faculty should be skeptical about any content exam with a KR20 below 0.50. All of the eight content exams at the nursing program had a KR20 greater than 0.50 (Schroeder, 2013). The KR20 ratings for the eight content exam scores at the nursing program appear

in Table 2.

Table 2

Content Exams KR20 for Study Site

	KR20
Pediatric assessment	0.69
Neonatal assessment	0.69
Postpartum assessment	0.70
Pediatric meningitis	0.60
Preeclampsia	0.63
Pediatric respiratory deviations	0.60
Cardiovascular nursing	0.67
Gastrointestinal nursing	0.64

Note. Adapted from ParScore from Scantron® and ExamSoft©" by the nursing program.

Item discrimination is another method of ensuring the reliability of each exam. Item discrimination is measured by the point biserial. The point biserial ranges from -1 to +1. The higher the number, the better discrimination of the nursing students who mastered the content from the nursing students who did not master the content (Schroeder, 2013). The point biserial for the eight content exams ranged from 0.20 to 0.52.

The content exam grades are calculated using the raw score point system. Each question on any content exam is worth one point. Then the raw score points are converted into a percentage. An example of this formula is as follows (see Table 3).

Table 3

Sample Raw Score Point Conversion to Percentage

	Points on exam	Points students achieved	Percentage
Exam 1	30	25	83
Exam 2	50	35	70
Exam 3	15	12	80
Exam 4	25	23	92

Note. Adapted from the nursing program's *Registered Nurse Program: Student Handbook, 2014-2015*.

The independent variable for this study was simulation training. Some nursing students had received simulation training before the content exam on material covering that content, whereas other students received simulation training after the content exam. The simulation training schedule (school records) in the nursing program provided the data to measure the independent variable. I then compared the simulation training dates to the content exam dates. I stored the data for the dependent and independent variables on a password-protected computer to which only I had access to ensure confidentiality of data for this study.

Data Collection and Analysis

I obtained permission from the director of the nursing program to receive the nursing students' exam scores, simulation training, and content exam schedules for the 2014 calendar year. Once I obtained access, I created an Excel spreadsheet. I created a binary nominal variable "simulation," coding with a value of 1 for no simulation and 2 for simulation. I used an interval scale of measurement for the dependent variables, eight content exams. I then entered the content exam scores and simulation coding into the Statistical Package for the Social Sciences (SPSS) software.

I performed data cleaning of the data in SPSS by analyzing the data for frequencies. I was able to determine that all of my data were entered into SPSS correctly after analyzing the data for frequencies. I also discovered that there were missing data for two students for two content exams. I coded the missing scores as 999 so that SPSS was able to recognize these data as missing. I reviewed the raw data that were available and made the decision not to include students who repeated a nursing course in order to help eliminate any resulting bias of content exam scores. After data cleaning, I ended up with a resulting $N = 424$ (212 archival exam scores in the no simulation group and 212 archival exam scores in the simulation group).

The descriptive statistics provided below include the mean, range, and standard deviation for each variable (see Table 4). The overall mean for all eight content exam scores was 82. The overall mean score for students who received simulation training before was 83, and the overall mean score for students who received simulation training after was 80. The scores for the group that received simulation ranged from 18 to 46 points. The exam score range for the group of students that did not receive simulation was 18 to 54 points.

Table 4

Descriptive Statistics for Archival Content Exam Scores for Year 2014

Content exam	*N*	*M*	Range	*SD*
Neonatal assessment				
No simulation	24	74.22	31.25	9.98
Simulation	29	82.97	37.50	10.81
Postpartum assessment				
No simulation	24	77.08	25.00	7.47
Simulation	29	83.33	25.00	6.30
Preeclampsia				
No simulation	24	84.52	31.67	6.91
Simulation	29	84.71	21.66	5.84
Cardiovascular nursing				
No simulation	24	77.46	18.18	7.15
Simulation	29	82.29	18.18	4.91
Pediatric assessment				
No simulation	29	74.54	53.85	15.26
Simulation	24	74.68	46.16	10.99
Meningitis				
No simulation	29	91.88	20.00	7.85
Simulation	24	92.55	20.00	6.76
Respiratory deviations				
No simulation	29	84.43	20.00	5.91
Simulation	24	84.16	18.34	5.91
Gastrointestinal nursing				
No simulation	29	77.87	25.00	8.11
Simulation	24	81.60	41.67	10.71

Before performing a multivariate analysis of variance (*MANOVA*), I analyzed the raw data, according to the assumptions of *MANOVA* analysis (Leech, Barrett, & Morgan, 2011). One assumption is that there is no relationship between observations in each group. For this project study, I asked the following question: What is the difference in content exam scores among students who received simulation training versus those who did not? To answer this question, I analyzed the content exam scores for eight different content exams for the 2014 calendar year. The archival data reflected that all students in

this study sample received simulation training at some point during the calendar year. Due to the current method of simulation training scheduling in the nursing program, some students received simulation training before the content exam while other students did not. I established two data sets to group data according to the provision of simulation training, before or after content exams, to meaningfully analyze the archival data. I performed the *MANOVA* analyses on two separate data sets so that there would be independence of observations. One data set included the pediatric assessment, meningitis, respiratory deviations, and gastrointestinal nursing content exam scores. The second data set included neonatal assessment, postpartum assessment, preeclampsia, and cardiovascular nursing content exam scores.

The second assumption of *MANOVA* is that there are no univariate or multivariate outliers (Field, 2009). To look for outliers, I performed descriptive statistics and analyzed the boxplots from the SPSS output. SPSS classifies any data points that are more than 1.5 box lengths away from the edge of the boxplot as outliers. The data points are illustrated as circular dots and labeled with their case number in SPSS. Additionally, SPSS classifies any data points that are more than three box lengths away from the edge of the box plot as extreme outliers. An asterisk next to the case number represents the extreme outliers (Figure 2). The boxplot analysis showed that there were outliers for the postpartum assessment, preeclampsia, pediatric assessment, respiratory deviations, meningitis, and gastrointestinal nursing archival exam scores. I reviewed that raw data to determine whether any of the outliers represented were due to data entry error. However,

after examining the raw data, I concluded that I had entered all of the archival exam scores correctly.

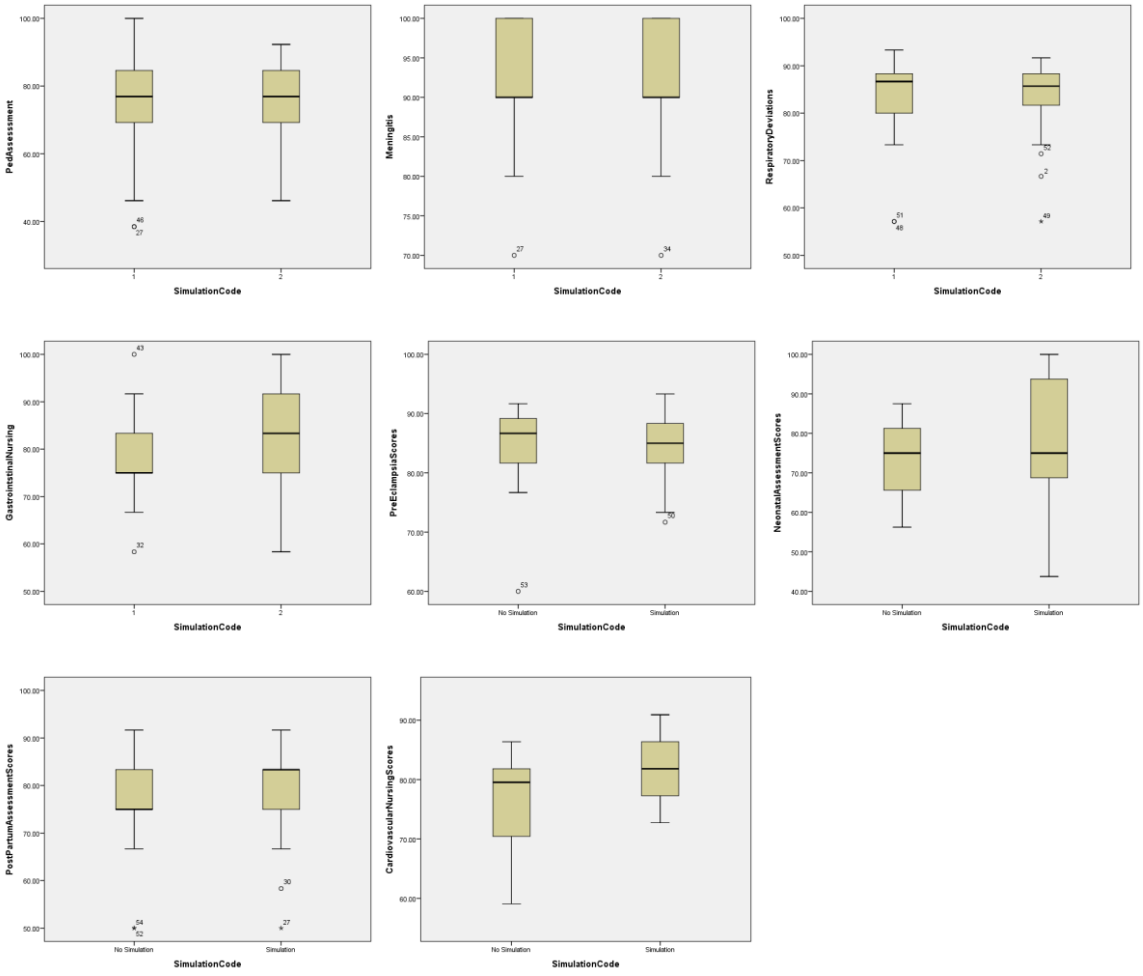

Figure 2. Boxplot output from SPSS.

Laerd (2013) stated that there are a few options for addressing the outliers. One is to keep the outliers. The second is to replace the outliers with the next most extreme value that is not an outlier. The last option is to remove the outliers. I prepared descriptive statistics including the outliers, with the replacement of the outliers with the next most extreme value that was not an outlier, and with complete removal of the

outliers. The values changed slightly between keeping the outliers and replacing them with the next most extreme value that was not an outlier. For example, the mean for the neonatal content exams with outliers was 74.74, while the mean was 74.22 when I replaced the outliers with the next most extreme value. The mean was 77.16 when I completely removed the outliers. A preliminary *MANOVA* analysis showed there was a statistical difference in content exam scores for the neonatal assessment, postpartum assessment and cardiovascular nursing scores among students who received simulation training and those who did not when with the inclusion of outliers and with the replacement of outliers with the next most extreme value that was not an outlier. However, when I completely removed the outliers, my sample size was decreased, which did not provide enough power for me to avoid making a Type II error. Therefore, I concluded that I would not eliminate the outliers from my data set and replaced the outlying values with the closest value that was not an outlier.

The third assumption of *MANOVA* is that the data are normally distributed (Leech, Barrett, & Morgan, 2011). To test this assumption, I interpreted the Shapiro-Wilk test, which determines the normal distribution of data. A Shapiro-Wilk significance value < 0.05 shows that data significantly deviates from a normal distribution (Laerd, 2013). Although there has been a violation of this assumption, I chose to continue with my analysis as the *MANOVA* is robust to violations of normality (see Table 5).

Table 5

Results of Shapiro-Wilk Test

Content exam	Shapiro-Wilk significance	Content exam	Shapiro-Wilk significance
Neonatal assessment		Pediatric assessment	
No simulation	.017	No simulation	.000
Simulation	.129	Simulation	.106
Preeclampsia		Meningitis	
No simulation	.000	No simulation	.000
Simulation	.051	Simulation	.000
Postpartum		Respiratory deviations	
No simulation	.001	No simulation	.051
Simulation	.000	Simulation	.008
Cardiovascular nursing		Gastrointestinal nursing	
No simulation	.001	No simulation	.003
Simulation	.033	Simulation	.035

Note. Adapted from SPSS Output Analysis.

The fourth assumption is to detect whether there is a correlation of the dependent variables with each other. To test this assumption, I performed a Pearson correlation to detect for multicollinearity. Laerd (2013) stated that there must be some correlation between the dependent variables for multivariate of covariance to be a suitable test. However, the correlation should not be too strong. A weak correlation should be < 0.4, and a strong correlation ranges between 0.3 and 0.9 (Mayers, 2013). There was no multicollinearity of the pediatric assessment, respiratory deviations, meningitis, and gastrointestinal nursing scores, as assessed by the Pearson correlation (r = -.109, p = .002). There was also no multicollinearity of the neonatal assessment, postpartum assessment, preeclampsia, and cardiovascular nursing scores, as assessed by the Pearson correlation (r = .365, p = .006).

The last assumption is that there are similar variances and covariances (Mayers, 2013). I tested this assumption with the Box's test of equality of covariance matrices. There was homogeneity of variance-covariance matrices for the pediatric assessment, respiratory deviations, meningitis, and gastrointestinal scores, as assessed by the Box's test of equality covariance matrices (p = .324). There was homogeneity of variance-covariance matrices for the neonatal assessment, postpartum assessment, preeclampsia, and cardiovascular nursing scores, as assessed the Box's test of equality covariance matrices (p = .354).

Data Analysis Results

To determine whether there were differences in content exam scores for research question 1, I performed *MANOVA* for each data set. The analysis of the pediatric assessment, respiratory deviations, meningitis, and gastrointestinal nursing scores revealed no statistical difference, F (4, 47) = .565, p = .69; λ = .954; η^2 = .046. To answer research question 2, I performed a multivariate analysis of covariance (*MANCOVA*) analysis of the pediatric assessment, respiratory deviations, meningitis, and gastrointestinal content exam scores with the nurse entrance test scores as a covariate. Analysis did not reflect a statistically significant difference between the groups, F (4, 47) = 1.043, p = .40; λ = .919; η^2 = .082.

For research question 1, the *MANOVA* analysis of neonatal assessment, postpartum assessment, preeclampsia, and cardiovascular nursing content exam scores revealed that there was a statistical difference between the content exam scores for group of students who received simulation and the group that did not, F (4, 47) = 5.192, p = .00;

λ = .694; η^2 = .316. *MANCOVA* analysis, for research question 2, of the neonatal assessment, postpartum assessment, preeclampsia, and cardiovascular content exams scores with the nurse entrance test scores as a covariate revealed no statistical difference, F (4, 47), = 2.248, p = .08; λ = .839; η^2 = .161.

After running the *MANOVA*, I wanted to determine which content exam scores were significantly different. I analyzed the tests of between-subjects' effects from the SPSS *MANOVA* output for both data sets. Analysis revealed that the neonatal assessment scores, F (1, 50) = 9.54, p = .00, η^2 = .160, postpartum assessment scores, F (1, 50) = 11.49, p = .00; η^2 = .187, and cardiovascular nursing scores, F (1, 50) = 8.67, p = .00; η^2 = .148 were statistically different between the groups of students who received simulation training and the group of students who did not (see Table 6). Analysis also revealed that the nurse entrance test scores were significantly associated with only the preeclampsia scores, F (1, 50) = 6.87, p = .01; η^2 = .121, (see Table 7).

Table 6

Results of Tests of Between-Subjects Effects for Content Exam Scores

	p	η^2	β
Neonatal assessment	.00	.160	.86
Postpartum assessment	.00	.187	.94
Preeclampsia	.88	.000	.05
Cardiovascular nursing	.00	.148	.82
Pediatric assessment	.98	.000	.05
Meningitis	.64	.004	.08
Respiratory deviations	.98	.000	.05
Gastrointestinal nursing	.13	.046	.33

Note. Adapted from SPSS Output Analysis.

Table 7

Tests of Between-Subjects Effects for Content Exam Scores With Entrance Test as Covariate

	p	η^2	β
Neonatal assessment	.15	.042	.31
Postpartum assessment	.09	.058	.41
Preeclampsia	.01	.121	.73
Cardiovascular nursing	.17	.037	.28
Pediatric assessment	.90	.000	.05
Meningitis	.19	.035	.26
Respiratory deviations	.28	.023	.19
Gastrointestinal nursing	.33	.019	.16

Note. Adapted from SPSS Output Analysis.

Results Summary

Research Question 1: Is there a significant difference in eight exam scores for students who received simulation training in the content area before the exam and students who did not receive simulation training in the content area before the exam, as measured by eight separate multiple choice content examinations?

$H1_0$: There is no difference in exam scores between nursing students who received simulation training before the content exam and nursing students who did not receive simulation training before the content exam.

$H1_a$: There is a significant difference in exam scores between nursing students who received simulation training before the content exam and nursing students who did not receive simulation training before the content exam.

The group means were statistically different ($p = .00$) for the postpartum assessment, neonatal assessment, preeclampsia, and cardiovascular nursing content exams. However, the group means were not statistically different ($p = .69$) for the

pediatric assessment, meningitis, respiratory deviations, and gastrointestinal nursing content exams; therefore, the null hypothesis cannot be rejected. The split results may be due to lack of consistency in simulation training. Lecture content was provided to all students by the same nursing instructor for each lecture content area. However, the instructors that taught the content lecture were not always involved in the simulation training for the students. For example, the instructors that taught the cardiovascular, neonatal assessment, and postpartum assessment lectures were involved in all of the simulation training for all of the students promoting consistency and continuity of material learned in the classroom. In contrast, the instructors that taught the lecture content for the pediatric assessment, preeclampsia, gastrointestinal nursing, meningitis, and respiratory deviations were not consistently involved in the simulation training. For example, up to four different instructors were involved in the simulation training in these content areas. This variation of instructors might have led to the split results.

Research Question 2: Is there a difference in content exam scores among students who had simulation training versus those who did not receive simulation training when controlled by nurse entrance test scores?

$H2_o$: There is no significant difference in content exam scores between students who had simulation training versus those who did not when controlled by nurse entrance test scores.

$H2_a$: There is a significant difference in content exam scores among students who had simulation training versus those who did not when controlled by nurse entrance test scores.

The nurse entrance test scores did not have an effect, F (4, 47) = 2.25, p = .08; λ = .839; η^2 = .161, on the postpartum assessment, neonatal assessment, preeclampsia, or cardiovascular nursing content exam scores. In addition, the nurse entrance test scores did not have an effect, F (4, 47) = 1.043, p = .40; λ = .919; η^2 = .082, on the pediatric assessment, meningitis, respiratory deviations, or gastrointestinal nursing content exam scores. Therefore, I cannot reject the null hypothesis and accept the alternative hypothesis. There was a medium positive correlation between the nurse entrance test and preeclampsia content exams, r = .370. There was a small positive correlation between the nurse entrance test and content exam scores, meningitis (r = .256); respiratory deviations (r = .116); gastrointestinal nursing (r = .100); cardiovascular nursing (r = .115); postpartum assessment (r = .177). There was a small negative correlation between the nurse entrance test and pediatric assessment (r = -.059) and neonatal assessment (r = -.169) content exam scores. In conclusion, the nurse entrance test scores were not significantly associated with content exams overall. However, the strength and direction of entrance test score correlations with individual scores differed among the individual tests.

The results of this study indicated that simulation training may have had an effect on content exam scores for three out of the eight content exam scores. However, these results do not provide evidence to reject the null hypothesis and accept the alternative hypothesis. Additionaly, since I examined archival data, there were many variables that I could not control for in this study. One variable was student preparation for the simulation training. Another variable was the use of multiple instructors in simulation

training. The use of multiple instructors could have led to possible inconsistencies in the conduct of simulation training. An example of this possible inconsistency is different teaching/learning methods implemented during simulation training from the variation of instructors involved. Based on the results, the students may be having different simulation experiences due to the possible inconsistent involvement of instructors. The results of this study were split and may be due to inconsistency in the conduct of simulation training. A logical outcome of the split results is the development of a white paper with policy and implementation recommendations to promote consistency in simulation training. The purpose of creating a policy is to make sure that simulation training follows best practices. Incorporating best practices into simulation training may promote consistency and help control extraneous variables that may affect student outcomes from the simulation training. After developing the policy recommendations, I will recommend that this study be replicated to help determine whether the different instructors are a factor that had an influence on content exam scores.

Protection of Participants' Rights

To protect the participants from harm, I received approval of the proposal from the Institutional Review Board (IRB) from Walden University before collection of any data (IRB approval number 04-15-15-0298275). Additionaly, approval was received from the nursing program, as well as the parent institution to conduct this study at this facility. I currently work as a nursing instructor at the nursing program and my role is to enhance the students' content mastery through simulation training by developing and programming the simulated training experiences throughout the nursing curriculum. In

my role as a researcher, I protected the confidentiality of student records by removing student identifiers from my dataset and keeping the data in a secured, password-protected computer.

Assumptions, Limitations, Scope, and Delimitation of the Study

Archival records reflected that all nursing students had received simulation training during their enrolled semester and that records were accurate. Another assumption of the study was that all nursing students reviewed the content lecture and read the assigned readings before taking the content examination. A limitation of this study was the potential bias in content scores that may have resulted due to extraneous variables such as the amount of time nursing students prepared before taking the content examination. The study was limited in that there were no pretest content scores in the data set. To address this limitation, I included in the analyses a covariate, scores from a nurse entrance test administered to all students. All of the scores for student records were at least at the "*proficiency level*," indicating that students had demonstrated at least a moderate ability to be successful in the nursing program. Another limitation, archival records, did not allow for consideration of the possible differences in presentation of simulation training and course content that may have influenced the exam scores. A delimitation of this study was that I used only one nursing program and archival data used for analysis represented only one calendar year.

Conclusion

Quantitative research summarizes data with the use of numbers. The focus of this study was whether there was a difference in eight content exam scores of nursing students

who received simulation training before taking the exam and nursing students who did not receive simulation training before taking the exam. I used *MANOVA* and *MANCOVA* as the statistical test to analyze the archival exam scores to determine any significance of group differences. Findings of this study were split whereas some content areas were significantly different and others were not among students who received simulation training and students who did not. The students who received simulation training in these three content areas achieved significantly higher scores than the students who did not receive simulation training. I will address the development of the project, a policy recommendation in the next section.

Section 3: The Project

Introduction

The problem investigated by this research was low content exam grades despite the implementation of simulation training. Data analysis from this study indicated that simulation training had no effect on student content exam scores. In Section 3, I support the selection of a white paper as the project genre. In this section, I also provide a description of the project and its goals. I completed a literature review that focused on practical application for the use of a white paper and research on best practices for the use of simulation training as the basis for my recommendations in this project. I conclude this section with the local, state, national, and social implications of this project.

Description and Goals

The purpose of the white paper with policy recommendations is to educate the stakeholders of the nursing program about best practices for simulation training. Standards of practice are necessary for the quality and consistency of simulation training. High-quality, consistent simulation training can provide evidence-based policy that can contribute to students achieving curriculum outcomes (Rutherford-Hemming, Lioce, & Durham, 2015). The goals of this project are the following:

1. Communicate findings of my data analysis.
2. Increase awareness about best practices for the use of simulation.
3. Present policy recommendations based on research findings.
4. Repeat research after implementation of policy recommendations.

Rationale

This research study indicated that nursing students who received simulation training achieved higher scores on the cardiovascular nursing, neonatal assessment, and postpartum assessment content exams. However, it failed to show a significant difference in scores for meningitis, pediatric assessment, respiratory deviations, gastrointestinal nursing, and preeclampsia content exams. The lack of evidence to support that simulation training made a difference in these five content areas has provided the opportunity to review the current simulation policy and to construct recommendations based on the use of best practices during simulation training in the form of a white paper. A white paper is a method of providing facts based on research that can be used to make an informed decision (Graham, 2013).

I chose a white paper as the project genre after a review of the literature. White papers are educational materials that communicate ideas meant to persuade decision makers (Boktor, 2013). In addition, as Sakamuro, Stolley, and Hyde (2015) stated, white papers are used to provide an avenue to support the rationale for solutions on how to best handle a particular problem. In conclusion, the white paper is a useful genre to present research that can inform practice.

The project genre of a white paper with policy recommendations evolved from my data analysis for this study. The white paper can be used to communicate the problem and describe the results of the study to the stakeholders of the nursing program. In the white paper, I have articulated concerns related to the problem and the findings of the study.

A white paper with policy recommendations will provide a course of action with the intention of adoption of the policy by the nursing program. This policy stresses the importance of both faculty and students following best standards to ensure the achievement of student learning outcomes through simulation training. This policy recommendation can help to address the possible issue of lack of consistency during simulation training having an influence on content exam scores. The project is a potential solution to the problem because it will hold the faculty and nursing students accountable for the standards in the policy. Following the standards of the policy will lead to better consistency of teaching and learning methods during simulation training.

Review of the Literature

The purpose of this review of literature was to provide evidence to support my decision to use a white paper with policy recommendations to address the problem in the nursing program. In this review, I include how to structure a white paper and the benefits of the white paper in order to share information with the nursing program. The literature review supports incorporating the standards of best practices for simulation training to enhance student learning outcomes.

I searched CINAHL, MEDLINE, OVID, EBSCO, and ERIC online databases for articles and peer-reviewed studies published between 2010 and 2015. The search terms included *white paper*, *best practices*, *simulation*, *professional integrity*, *prebriefing*, *briefing*, *debriefing*, and *orientation*. I achieved saturation when modifying the Boolean operator *and* to *or* did not produce any additional useful articles regarding the topic of

simulation and best practices. There was a lack of scholarly articles on the white paper; therefore, I had to use a web search for references on the white paper.

White Paper History

The goal of the white paper is to provide useful information for the purpose of informed decision making (Hoffman, 2015). The term *white paper* originated in 1922 in a governmental report, the Churchill White Paper on Palestinian issues (Boktor, 2013). Since then, white papers have evolved into marketing tools and can be used to influence decision making for problems that need to be solved (Sakamuro et al., 2015).

White Paper Structure

Although standards are lacking in the creation of a white paper, the genre does follow a common format (Boktor, 2013; Stelzner, 2010). Hoffman (2015) stated that white papers should focus on informing and educating, not selling an idea or product. Both Sakamuro et al. (2010) and Parker (2013) stated that white papers should start off with presenting the big picture and then steer the audience to the suggested resolution of the problem.

For the writer of a white paper, it is important to identify the audience of the paper before writing so that the paper can be structured correctly. Hoffman (2015) and Mattern (2013) suggested that the title of the white paper should grab the audience's attention as well as advise the audience of the paper's purpose, such as by mentioning the problem in the title. Additionally, Sakamuro et al. (2010) and Graham (2013) stated that white papers include an introduction (executive summary), a description of the problem,

data that prove the problem exists, proposed solutions to the existing problem, and finally a conclusion.

Benefit of White Paper to Address Problem

Stelzner (2010) stated that white papers are powerful tools that can educate and influence decision making. Therefore, a white paper is an appropriate method to address the problem and share the policy recommendation with the stakeholders at the nursing program. I can use the white paper to promote change by educating the stakeholders regarding the problem and findings of my research.

The recommendations that I share in the white paper can influence change. However, for change to take place, the key stakeholders need to read my recommendations and then implement them. The literature on white papers offers a few suggestions to make reading more desirable for the audience. Creswell (2012) and Boktor (2013) suggested a summary of the results, possibly in a bullet-point format, as a quick and easy way to get the point across. In addition, they recommended avoiding the use of jargon, such as statistical terms. Furthermore, Boktor (2013) and Sakamuro et al. (2010) suggested that the use of visuals such as charts, graphs, or diagrams can promote reading.

There are also recommendations in the literature on how to persuade policy makers within a white paper. Mattern (2013) stated that white papers should include proof that the problem exists. In the white paper, I provide evidence of the problem by including statistics from my research. I also include research that supports the benefits of my policy recommendations.

Analysis of How Theory and Research Support Project Content

In the white paper, I present the findings of my research project. I also include my recommendations for a solution to the problem. The recommendations that I provide stemmed from the results of my project and my research on the use of best practices for the simulation to validate my recommendations.

Simulation and Exam Scores

Literature has shown that simulation training can have either an effect or no effect on exam scores. Corbridge, Robinson, Tiffen, and Corbridge (2010) and Kameg, Cozzo, Howard, and Perozzi (2013) conducted pretest/posttest studies on the effects of simulation training on knowledge. Both of these studies showed that there was no statistical difference in scores between the control group (no simulation) and the experimental group (simulation training). Additionally, Levett-Jones, Lapkin, Hoffman, Arthur, and Roche (2011) conducted a pretest/posttest study to determine whether there was a difference in exam scores between students who received medium-fidelity versus high-fidelity simulation training. The results of the study indicated that there was no difference in scores. Furthermore, Elfrink et al. (2010) found that faculty feedback during simulation training influenced the way in which students answered questions during an exam. Students scored lower on their posttests after the simulation. The faculty involved in this simulation found that their focus during the simulation prompted students to select the incorrect answer on the exam.

INACSL Standards of Best Practice: Simulation/Terminology

The International Nursing Association for Clinical Simulation and Learning (INACSL Standards of Best Practice: Simulation^{SM}) has developed standards of best practice to guide the implementation of simulation and the training of participants to use simulation. The first standard is standardizing the terminology that is used in simulation training to allow the participants to have better comprehension of the simulation experience. The use of consistent terminology will signify mutual beliefs among the participants and simulation curriculum planners. Additionally, having standard definitions of terms will promote clear communication among all stakeholders (Meakim, et al., 2013).

INACSL Standards of Best Practice: Simulation/Professional Integrity

The simulation learning environment should be one of mutual respect among participants and facilitator. Academic dishonesty in nursing has been a growing problem with the advancement of technology in education, and this includes simulation learning. Maintaining the integrity of a simulation scenario is difficult because nursing programs implement simulation learning over several days, allowing students to be "prepped" by students who have already received the simulation training (Pope, Gore, & Renfroe, 2013, p. 30).

INACSL Standards of Best Practice: Simulation stated that *professional integrity* refers to the confidentiality of the participant's performance and content of the simulation scenario, including the debriefing. Participants who share any confidential information can alter the simulation environment and a future participant's learning experience (Gloe

et al., 2013). However, Wiseman, Haynes, and Solicitor (2013) stated that professional integrity encompasses more than confidentiality; it should also consist of autonomy, commitment, and competence.

INACSL Standards of Best Practice: Simulation/Participant Objectives

The National Council State Boards of Nursing (NCSBN) have provided guidelines for simulation in prelicensure nursing programs (Alexander et al., 2015). One guideline stresses the importance of providing clear objectives before the simulation experience that also define the expected participant outcomes. Objectives are what drive the simulation experience and help to determine whether the participant has achieved the learning outcomes. INACSL Standards of Best Practice: Simulation stated that the objectives should include the following (Lioce et al., 2013, pp. 15-17):

- Learning domains.
- Relate to the level of the participants' knowledge.
- Be consistent with the outcomes of the program
- Promotion of evidence-based practice.
- Holistically view the patient in the scenario.
- Be achievable within a designated timeframe.

INACSL Standards of Best Practice: Simulation/Facilitation

Facilitation guides the achievement of objectives by engaging the students in the simulation learning experience. Facilitation before the simulation experience involves a briefing, sometimes referred to as *prebriefing*. A gap in literature exists on the practices of prebriefing. The majority of research to date has focused on the debriefing phase of

simulation (Chamberlain, 2015). INACSL Standards of Best Practice: Simulation stated that prebriefing should include orientating the students to the simulation laboratory, including how to use mannequins during the simulation experience. In addition, INACSL stated that briefing should also provide the ground rules that will maintain a safe environment for the learner. Within this safe environment, it is acknowledged that although mistakes will be made during simulation, mistakes are part of the learning process. Facilitation before the simulation experience also includes the development of a list of expected behaviors that should be performed during the simulation so that it can be determined whether the student met the learning objectives during the scenario. Lastly, facilitation prior includes when and what cues will be used during the simulation to support the students' ability to meet the objectives (Franklin et al., 2013).

Facilitation during the simulation consists of implementing cues when there is a need to redirect the scenario. It is important for the cues not to distract the learner; the cues should be used to guide the students to achieve the outcomes. Furthermore, facilitation methods should allow the scenario to progress without interruption (Franklin et al., 2013). Another method of facilitation after the scenario is debriefing, which is discussed later in this paper.

INACSL Standards of Best Practice: Simulation/Facilitator

The facilitator is an essential component of the learning process. INACSL Standards of Best Practice: Simulation recommends that the facilitator be responsible for orienting the learner to the simulated experience and promoting and maintaining the fidelity of the simulation experience (Boese et al., 2013). Husebo, Friberg, Soreide, and

Rystedt (2012) stated that the facilitator is responsible for bridging the gap between the simulation and the real-life event that it mimics. INACSL also stated that the facilitator should establish an environment where the students feel safe to learn without fear of negative consequences of their performance during the simulation. Additionally, the facilitator provides feedback through debriefing and collects evaluations from the students for the simulation experience (Boese, 2013).

INACSL Standards of Best Practice: Simulation/Debriefing

Debriefing is considered the most important element of simulation training. However, the effectiveness of debriefing relies on the skill of the facilitator leading the debriefing session (Paige, Arora, Fernandez, & Seymour, 2015). INACSL Standards of Best Practice: Simulation stated that all simulation experiences must include a debriefing session that guides the student toward reflective thinking. Debriefing is learner centered with the goal of assisting learners to link theory to practice by promoting the transfer of knowledge, skills, and attitudes (Decker et al., 2013).

There are multiple methods of debriefing available, and the type used depends on the particular simulation experience. However, a common suggestion is that debriefing should take place after the simulation and preferably in another room away from the simulated experience (Mayville, 2011). The NCSBN suggested that nursing programs use a standardized debriefing method using a Socratic methodology (Alexander et al., 2015). In a Socratic method of debriefing, the facilitator uses a pleasant voice to ask open-ended questions to guide the participant to the clinical judgment of the facilitator (Maestre & Rudolph, 2015).

Use of video is another method of debriefing. Video playback of portions of the simulation training with a discussion is time-consuming; however, it allows for visual support of the experience. Chronister and Brown (2012) found that nursing students who received video-assisted debriefing had improved their skills in cardiopulmonary resuscitation when compared to a group of students who did not receive video-assisted debriefing. However, knowledge retention after the simulation was higher in the group without the video-assisted debriefing.

INACSL Standards of Best Practice: Simulation/Assessment and Evaluation

Formative and summative assessments of simulation experiences are supported by INACSL. A formative assessment provides feedback to students with the goal of developing ways in which students can improve their performance in the three learning domains: knowledge, skills, and attitudes. INACSL Standards of Best Practice: Simulation proposes that the criteria for providing formative assessment should be consistent and provide constructive feedback. A summative evaluation of a simulation experience is seeking determination of the achievement of objectives and outcomes. The recommendation from INACSL is that only trained objective raters should conduct the summative evaluation. When high stakes evaluation will be performed the simulation should be pilot tested and standardized in format and scoring methods with a valid and reliable tool (Sando et al., 2013).

INACSL Standards of Best Practice: Simulation/Simulation Design

Standardization of simulation learning experiences will provide consistent outcomes. INACSL Standards of Best Practice: Simulation advocates that a simulation

learning experience should be pilot tested to ensure that the student can meet the objectives of the scenario. Any parts of the simulation design that are missing or may be confusing to the student can be identified and addressed before the students' experience with the simulation scenario. The scenario should also be pilot tested with participants that are similar to the participants that actually would participate in the scenario (Lioce et al., 2015).

Implementation

In the white paper, I summarized my research findings. I also made recommendations on how the nursing program can implement best practices into simulation training to improve the consistency of simulation training for all nursing students. One objective of the white paper is to educate the stakeholders of the results of my project study and to consider these findings to support future decisions regarding simulation education. This section will outline the needed resources, potential barriers, roles and responsibilities, timetable for implementation of the project, and implications for social change.

Potential Resources and Existing Supports

One significant existing support is the director of the nursing program. I have been in constant contact with the director since I started to draft my proposal. The director is aware of the results of my research and the proposed project. Additionaly, the faculty was briefly made aware that the results of my research revealed students who received simulation training before taking the exam scored significantly higher for some but not all of the content exams. The faculty was also made aware that I will be

proposing policy recommendations for simulation training. Physical resources that I will need are a color copy machine and paper, so I can disseminate the white paper to the stakeholders. The faculty will receive the white paper at a faculty meeting that is scheduled to discuss the recommendations in the white paper. I will also need access to a projector so that I can present my white paper in a visual format to address different learning styles. A projector is currently available in the nursing program. Lastly, I will need access to the internet during the faculty meeting so I can present the white paper in a Prezi presentation. One downfall to using Prezi is the possible loss of internet connection the day of this presentation. My backup plan is to have my presentation in a PowerPoint file if the loss of internet occurs during the presentation.

Potential Barriers

One potential barrier is a lack of faculty buy-in to the policy recommendations. A potential solution to this problem is to create a strong white paper that will indicate the need for the policy recommendations. A second barrier is a need for consistent, trained personnel involved in simulation training. Currently, the nursing program uses faculty members that are assigned to be the students' clinical instructor in various roles during simulation, such as family member, primary care provider, or emergency response team. This current method of assigning roles in simulation does not provide for consistency. A solution to this problem is to use standardized patients for the simulation. However, use of standardized patients will require the nursing program to set aside funds to compensate the standardized patients. A potential solution to the problem of the cost of standardized patients is to investigate the possible use of standardized volunteer patients. The third

barrier to this project is the recommendation to pilot test the scenarios before using them in the simulation. This recommendation would require pilot testing of all new simulation scenarios with a group of participants before implementation of the simulation in the curriculum. The nursing program is only a 2-year program, which limits the availability of students to participate in the pilot testing. A potential solution to this problem is to find nursing students from a local nursing program, use recent registered nurse graduates, or faculty for the pilot testing. Although the knowledge base for new graduates and faculty will be different than nursing students, there still is the potential to identify any confusing or missing elements in the scenario.

Proposal for Implementation and Timetable

Once I receive approval for my project, I will schedule a meeting with the director of the nursing program to discuss the white paper and schedule a day when I can present the white paper to the faculty. When I present my recommendations to the faculty, I will encourage a discussion regarding the recommendations and either the faculty can accept my recommendations as is, or accept with changes. I will then type the recommendations in a policy and distribute the policy to the faculty for review via email. I will make a suggestion that this policy is voted on during our next monthly faculty meeting.

After the policy is accepted, I will meet with each facilitator of the nursing course to discuss the implementation of the policy recommendations during simulation training. Once this meeting occurs, I plan to have the policy recommendations implemented during the next nursing semester. After the implementation of the recommendations, I propose to repeat this study to determine whether the changes had an effect on content

exam scores. The timetable from the presentation of the white paper to completion of the project will take 1 ½ years.

Roles and Responsibilities of Student and Others

I am the sole person responsible for writing and distributing the white paper. I will also be responsible for answering the stakeholders' questions regarding the results of my study and my recommendations. The faculty will be responsible for reading the white paper and actively participating in a discussion regarding the policy recommendations.

The faculty will have the responsibility of voting on and accepting the policy recommendations. I will have the responsibility of working with the faculty members that are in charge of the nursing courses in developing the plan and implementation of the policy recommendations. After implementation of the policy recommendations, I will need permission granted by the director of the nursing program to access students' grades to test if these changes have made a difference in content exam scores. The responsibility of the nursing student is to participate in the simulation and adhere to the simulation policy of the nursing program.

The key stakeholders of the nursing program are the director of the nursing program, nursing students, faculty, and the community. The director of the nursing program will have the ultimate approval of any of the recommendations that may require a budget. The faculty will have the final decision on the adoption of the policy recommendations in the nursing program. The goals of the white paper are to communicate my research findings, increase the stakeholder's awareness of simulation

best practices, and present my policy recommendations based on suggestions from the literature.

Project Evaluation

I will use a goal-based method of evaluation for this project. A goal-based evaluation measures the degree to which the predetermined goals of the project were met (Isaias & Nunes, 2013). The goal of the evaluation is to determine if the faculty attained the goals outlined in the white paper. I can measure this outcome by asking the stakeholders if they have any questions or to make any comments regarding the white paper. The discussion that ensues from the questions and comments will help determine if the white paper served its purpose by communicating my research findings and alerting the faculty of the best practices for simulation. Furthermore, another measurable outcome will be whether or not the faculty accept my policy recommendations based on the literature presented in the white paper.

Implications Including Social Change

Local Community

The project will stimulate a discussion about the value and effectiveness of simulation among the stakeholders in the nursing program. It will open a dialogue on evaluating the current simulation practices and identifying areas that can be improved. The nursing students will benefit from this project because implementing best practices and consistency with simulation may improve student learning for all students. The repeat study can validate a need to implement best practices into simulation training at the program to enhance the simulation experience for current and future nursing students.

Far-Reaching

Simulation learning can enhance the newly graduated registered nurses' ability to perform safely and competently at the patients' bedside. Having a safe and competent nurse at the patients' bedside benefits the community and the health care institution that hires the new nursing graduates. Hiring a new graduate that has the necessary knowledge and skills has the potential of decreasing orientation time, which will benefit the health care institution's return on investment. Facilitating the new graduates' generation of knowledge and skills can be strengthened by simulation training (Kaddoura, 2010). The benefit of simulation learning to the community is that simulation learning has the potential of improving patient outcomes (Smith, Siassakos, Crofts, & Draycott, 2013).

Conclusion

White papers are effective means of communicating information with the goal of persuading decision making. Through a white paper, I will provide the stakeholders of the nursing program with the results of my study, information on the standards of best practice in simulation, and policy recommendations based on the literature for simulation. I will provide this information in an easy to read format, with the use of graphics to convey important information efficiently. My recommended policy recommendations will benefit the local nursing program as well as the community. Section 4 focuses on the project's strengths and limitations as well as a reflection of my personal growth.

Section 4: Reflections and Conclusions

Introduction

The problem investigated in this study was the effect of simulation training on content exam scores. The results of the study led to the development of a white paper on simulation and policy recommendations. This section provides the strengths and weaknesses of the project in solving the problem of declining content exam scores despite the implementation of simulation training in the nursing program. In this section, I discuss the importance of the work as well as provide recommendations for alternative solutions to the problem. I also discuss my reflections on what I have learned during this process. This section concludes with the project's implications for social change and recommendations for future research.

Project Strengths and Limitations

I sought to determine whether simulation training had an effect on content exam scores. After the analysis of data, I chose to develop a white paper as a method to communicate my research findings and recommendations for policy change. In this section, I discuss my reflections on the strengths and limitations of the project, and I address an alternative approach to the problem. I also reflect on my growth as a scholar, practitioner, and project developer.

Project Strengths

My search of the literature revealed the INACSL evidence-based practice guidelines that I need to communicate to faculty and stakeholders of the nursing program. Once faculty are knowledgeable about the guidelines, the faculty can then make a

decision on whether or not to adopt the guidelines as policy recommendations. The adoption of the policy recommendations will help to promote the optimal and effective use of simulation training in the nursing program.

The strength of presenting my research findings in a white paper is that it may provoke a discussion regarding the current simulation practices in the nursing program. A white paper is considered a powerful tool for providing information that will help to solve a problem. I based the policy recommendations on guidelines developed by INACSL's standards of best practice and the guidelines presented by the NCSBN. Developing my recommendations from best practices may make the faculty more willing to accept them.

Another strength of the project is the ability to use charts and diagrams in the white paper, which may appeal to visual learners. The use of charts and diagrams may make the statistics easier to understand for stakeholders who might not have a sound knowledge base in statistics. A final strength of the white paper project is that it will bring about awareness of best practices and guidelines for simulation learning among the stakeholders of the nursing program.

Project Limitations

One limitation of the project was the methodology. I analyzed archival data on only one cohort of students. By analyzing archival data, I was unable to control for any extraneous variables. Extraneous variables could include the method of delivery of simulation training, the method of delivery of the content, and students' preparation for

the exam. Additionally, the sampling method led to the failure to generalize the results of the study.

A limitation of the white paper is that the faculty and stakeholders may not have the time to invest in reading it. Additionally, the white paper may be written in a way that fails to engage the stakeholders. If the white paper fails to capture the attention of the stakeholders, they may not continue reading it. Stakeholders who do not read the white paper in its entirety will not be able to contribute to a discussion regarding the effective implementation of simulation in the nursing program. Another limitation is that faculty not involved in simulation learning may not view simulation as valuable in nursing education. Lack of involvement may lead to a lack of motivation of the faculty to read the white paper.

Recommendations for Alternative Approaches

An alternate approach to the problem would be to consider that the method of lecture content delivery had an effect on declining content exam scores. A study could have been conducted comparing content exam scores of students who received content through a lecture format only with content exam scores of students who received content through active learning strategies in addition to lecture. Active learning occurs by engaging students during class time. Means of engaging students include the use of case studies, role play, or problem-based learning (Critz & Knight, 2013). Everly (2013) found that students who achieved learning through active learning strategies scored significantly higher on standardized tests when compared to students who learned through a lecture format only. The solution to this problem would be faculty

development on how to implement active learning strategies. In addition, faculty development could include how a faculty member can evaluate student learning before assessing the student through the content exams. There are multiple approaches to evaluating declining content exam scores, which could lead to further research studies.

Scholarship, Project Development, and Leadership and Change

Since starting this journey, I have made strides in my scholarly writing. I also feel that the research I conducted will contribute to the viability of simulation learning in nursing education. I learned how the white paper can be an efficient way of communicating information that may bring about a resolution to a problem. In this section, I discuss what I learned about myself as a scholar, practitioner, and project developer.

Self as Scholar

Throughout this process, I learned how to conduct an extensive literature review that will achieve saturation. I also learned how to synthesize a research article and the importance of including different viewpoints regarding simulation learning. APA format has been my Achilles heel. Although I have made improvements in APA format in my writing, I still have room for improvement. I also have challenges in writing in active voice. I have a strong tendency to write in passive voice. To overcome this challenge, I have incorporated the writing center and Grammarly® into my writing.

The 2 ½ years that I have been submerged in my research topic have brought me feelings of elation and defeat. When my first and second chair accepted my first proposal, I had a sense of accomplishment. However, my proposal was not accepted by

the University Research Review (URR). The lack of acceptance led to my feeling of defeat. Upon reading the URR's comments, I realized that although my problem was clear to me, it might not be clear to someone reading my problem for the first time. I found writing the problem statement the most challenging aspect of this work. I have grown from this process, and I have brought this knowledge to some of my colleagues who are also in the process of writing their dissertation.

Self as Practitioner

The day that I started my journey toward gaining my doctorate in education, I thought that I would conduct qualitative research because statistics were a weakness of mine. However, my problem led to a research question that warranted a quantitative study. Although I had taken statistics in my previous coursework, I did not have any transfer of learning. Through this process, I learned statistics through online learning and tutoring. The one thing I do regret is not starting the process of learning statistics earlier. I did not begin learning statistics until I received IRB approval, and this lengthened the time frame for me in finishing the project study. I now feel more confident in my ability to conduct future research studies that require statistical analysis.

Although I am a novice researcher, I feel confident in my ability to conduct future research on nursing education. By conducting research on nursing education, I can add to the available scholarly writing with the goal of improving student outcomes. Throughout this process, I have also learned about the importance of implementing evidence-based teaching in my practice. I stress the importance of evidence-based practice in my teaching by asking students to think about the evidence that supports the nursing practice.

Self as Project Developer

I have learned that research findings guide the development of a project. When I defended my proposal, I had to discuss potential projects that would result from my research. I stated that the research findings would lead to a curriculum revision. Upon analyzing the results of my research, I realized that the first step is to make sure that the nursing program is implementing best practices for simulation learning.

I have also learned that change is more likely to occur if literature supports the recommendations. I have been in multiple meetings in which faculty were resistant to change. In developing the white paper, it was important for me to include the current literature on simulation learning.

Reflection on Importance of Work

Incorporating best practices into simulation learning takes time and commitment by stakeholders. I have learned that the nursing program is implementing some but not all of INACSL's recommendations for simulation training. I have also learned that there is a need to train more faculty on debriefing techniques. Currently, there are faculty members who conduct a debriefing with no training.

Currently, the nursing program is not collecting data regarding the effectiveness of the facilitator or the simulation experience. Without this vital information, it is not possible to determine whether the students are gaining effective learning opportunities through simulation training. I also learned that simulation scenarios should be pilot tested before implementation in the curriculum.

Implications, Applications, and Directions for Future Research

The white paper may lead to changes in the implementation of simulation training in the nursing program. Incorporating best practices into simulation training is important for the improvement of learning outcomes (Rutherford-Hemming, Lioce, & Durham, 2015). Improving learning outcomes at the individual level could lead to an increase in retention rates and NCLEX-RN pass rates.

Hayden, Kardong-Edgren, and Jefferies (2014) found there was no statistical difference in knowledge acquisition and clinical skills between students who had 10% or less of clinical time replaced with simulation learning and students who had up to 50% of clinical time replaced with simulation learning. Based on this study, nursing schools can now replace up to 50% of students' clinical time with simulation learning. Some of the concerns of the NCSBN are that nursing schools will substitute clinical time with simulation without incorporating the recommendations. Some recommendations are that the program should have the appropriate facilities to conduct the simulation, dedicated and trained faculty for simulation, and the necessary educational and technological resources so that students can meet objectives (Alexander et al., 2015).

Currently, there is a lack of quality clinical sites available to meet the needs of all nursing programs (Zulkosky, 2012). Due to this, some nursing programs need to use alternative strategies for clinical, such as simulation (McNelis, Fonacier, McDonald, & Ironside, 2011). The white paper has the potential to make stakeholders aware of the recommendations so that implementation of policy changes occurs before there is a need to substitute simulation training for a substantial amount of hands-on clinical time.

One of the benefits of simulation is repetitive practice. Kirkman (2013) found that simulation training leads to transfer of learning from simulation to the patient's bedside over time. The potential impact at the societal level is promotion of the transfer of learning to the patient's bedside and improvement of patient outcomes.

A recommendation for future research is to complete an experimental study with multiple nursing programs over time. Conducting this study with multiple nursing programs over time could add to the generalizability of the results to nursing education. The future of simulation in health care is expanding, and research will provide information on the effectiveness of simulation.

Conclusion

The goal of this research was to evaluate the effect of simulation on student learning. The outcome provided an opportunity to review current practices and develop a plan to incorporate best practices into simulation learning. The stakeholders will be made aware of the current simulation practices and the recommendations outlined by INACSL through the white paper. The stakeholders will have the opportunity to incorporate policy change that will have the potential benefit of improving student and patient outcomes. The ultimate goal of this project is that nursing students will be able to transfer their learning into their professional careers.

References

Ackermann, A. D. (2009). Investigation of learning outcomes for the acquisition and retention of CPR knowledge and skills learned with the use of high-fidelity simulation. *Clinical Simulation in Nursing, 5*(6), 213-222. doi:10.1016/j.ecns.2009.05.002

Akhu-Zaheya, L. M., Gharaibeh, M. K., & Alostaz, Z. M. (2013). Effectiveness of simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students in Jordan. *Clinical Simulation in Nursing, 9*(9), 335-342. doi:10.1016/j.ecns.2012.05.001

Alexander, M., Durham, C. F., Hooper, J. I., Jefferies, P. R., Goldman, N., Kardong-Edgren, S. . . . Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation, 6*(3), 39-42. doi:10.1016/s2155-8256(15)30783-3

Alfes, C. M. (2011). Evaluating the use of simulation with beginning nursing students. *Journal of Nursing Education, 50*(2), 89-93. doi:10.2202/1548-923X.1603

Ashcraft, A. S., Opton, L., Bridges, R. A., Caballero, S., Veesart, A., & Weaver, C. (2013). Simulation evaluation using a modified Lasater Clinical Judgment Rubric. *Nursing Education Perspectives, 34*(2), 122-126. doi:10.5480/1536-5026-34.2.122

Beckem, J. M., II, & Watkins, M. (2012). Bringing life to learning: Immersive experiential learning simulations for online and blended courses. *Journal of Asynchronous Learning Networks, 16*(5), 61-70. Retrieved from

http://olc.onlinelearningconsortium.org/publications/olj_main

Beischel, K. P., & Davis, D. S. (2013). A time for change: QSENinzing the curriculum. *Nurse Educator, 39*(2), 65-71. doi:10.1097/NNE.0000000000000020

Blum, C. A., Borglund, S., & Parcells, D. A. (2010). High-fidelity nursing simulation: Impact on student self-confidence and clinical competence. *International Journal of Nursing Education Scholarship, 7*(1), 1-14. doi:10.2202/1548-923X.2035

Blum, C. A., & Parcells, D. A. (2012). Relationship between high-fidelity simulation and patient safety in prelicensure nursing education: A comprehensive review. *Journal of Nursing Education*, *51*(3), 429-435. doi:10.3928/0148434-20120523-01

Boese, T., Cato, M., Gonzalez, L., Jones, A., Kennedy, K., Reese, C. . . . Borum, J. (2013). Standards of best practice: Simulation standard V: Facilitator. *Clinical Simulation in Nursing, 9*(6), 22-25. doi:10.1016/j.ecns.2013.04.010

Boktor, J. (2013). *White paper*. Retrieved from https://sites.google.com/site/hboktorportfolio/whitepaper

Boulet, J. R., Jefferies, P. R., Hatala, R. A., Korndorff, J. R., Feinstein, D. M., & Roche, J. P. (2011). Research regarding methods of assessing learning outcomes. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare, 6*(7), 548-551. doi:10.1097/SIH.0b013e31822237d0

Brewer, E. P. (2011). Successful techniques for using human patient simulation in nursing education. *Journal of Nursing Scholarship, 43*(3), 311-317. doi:10.1111/j.1547-5069.2011.01405.x

Broussard, L. (2008). Simulation-based learning: How simulators help nurses improve clinical skills and preserve patient safety. *Nursing for Women's Health, 12*(6), 521-524. doi:10.1111/j.1751-486x.2008.00386.x

Burns, H. K., O'Donnell, J., & Artman, J. (2010). High-fidelity simulation in teaching. *Clinical Simulation in Nursing, 6*(3), 87-95. doi:10.1016/j.ecns.2009.07.005

Buykx, P., Kinsman, L., Cooper, S., McConnell-Henry, T., Cant, R., Endacott, R., & Scholes, J. (2011). First2Act: Educating nurses to identify patient deterioration—A theory based model for best practice simulation education. *Nurse Education Today, 31*(7), 687-693. doi:10.1016/j.nedt.2011.03.006

Chamberlain, J. (2015). Prebriefing in nursing simulation: A concept analysis using Rodger's methodology. *Clinical Simulation in Nursing, 11*(7), 318-322. doi:10.1016/j.ecns.2015.05.003

Chronister, C., & Brown, D. (2012). Comparison of simulation debriefing methods. *Clinical Simulation in Nursing, 8*(7), 281-288. doi:10.1016/j.ecns.2010.12.005

Coffman, S. (2012). From static lab to simulation lab: Students reflect on their learning. *Clinical Simulation in Nursing, 8*(8), 335-340. doi:10.1016/j.ecns.2011.01.003

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159. Retrieved from http://www.apa.org/pubs/journals/bul

Corbridge, S. J., Robinson, F. P., Tiffen, J., & Corbridge, T. C. (2010). Online learning versus simulation for teaching principles of mechanical ventilation to nurse practitioner students. *International Journal of Nursing Education Scholarship, 7*(1), 1-9. doi:10.2202/1548-923X.1976

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Boston, MA: Pearson.

Critz, C. M., & Knight, D. (2013). Using the flipped classroom in graduate nursing education. *Nurse Educator, 38*(5), 210-213. doi:10.1097/NNE.0b013e3182a0e56a

Crookes, K., Crookes, P. A., & Walsh, K. (2013). Meaningful and engaging teaching techniques for student nurses: A literature review. *Nurse Education in Practice, 13*(4), 239-243. doi:10.1016/j.nepr.2013.04.008

Dearmon, V., Graves, R. J., Hayden, S., Mulekar, M. S., Lawrence, S. M., Jones, L. . . . Farmer, J. E. (2013). Effectiveness of simulation-based orientation of baccalaureate nursing students preparing for their first clinical experience. *Journal of Nursing Education, 52*(1), 29-38. doi:10.3928/01484834-20121212-02

Decker, S., Fey, M., Sideras, S., Caballero, S., Rockstraw, L., Boese, T. . . . Borum, J. (2013). Standards of best practice: Simulation standard VI: The debriefing process. *Clinical Simulation in Nursing, 9*(6), 26-29. doi:10.1016/j.ecns.2013.04.008

Donnelly, F., & Wiechula, R. (2012). Clinical placement and case study methodology: A complex affair. *Nurse Education Today, 32*(8), 873-877. doi:10.1016/j.nedt.2012.02.010

D'Souza, M.S., Venkatesaperumal, R., Radhakrishnan, J., & Balachandran, S. (2013). Engagement in clinical learning environment among nursing students: Role of nurse educators. *Open Journal of Nursing, 3*(1), 25-32.

doi:10.4236/ojn.2013.31004

Elfrink-Cordi, V. L., Kirkpatrick, B., Nininger, J., & Schubert, C. (2010). Using learning outcomes to inform teaching practices in human patient simulation. *Nursing Education Perspectives*, *31*(2), 97-100. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Everly, M. C., (2013). Are students' impressions of improved learning through active learning methods reflected by improved test scores? *Nursing Education Today, 33*(2), 148-151. doi:10.1016/j.nedt.2011.10.023

Felver, L., Gaines, B., Heims, M.., Lasater, K., Laustsen, G., Lynch, M. . . . Tanner, C. (2010). *Best practices in teaching and learning in nursing education.* New York, NY: National League for Nursing.

Field, Andy. (2009). *Discovering statistics using SPSS.* Thousand Oaks, CA: Sage Publication.

Franklin, A. E., Boese, T., Gloe, D., Lioce, L. Decker, S., Sando, C. R. . . . Borum, J. (2013). Standards of best practice: Simulation standard IV: Facilitation. *Clinical Simulation in Nursing, 9*(6), 19-21. doi:10.1016/j.ecns.2013.04.001

Fraser, K., Peets, A., Walker, I., Tworek, J., Paget, M., Wright, B., & McLaughlin, K. (2009). The effect of simulator training on clinical skills acquisition, retention, and transfer. *Medical Education*, *43*(8), 784-789. doi:10.1111/j.1365-2923.2009.03412.x

Ganley, B. J., & Linnard-Palmer, L. (2012). Academic safety during simulation:

Perceptions of nursing students and faculty. *Clinical Simulation in Nursing, 8*(2), 49-57. doi:10.1016/j.ecns.2010.06.004

Gareis, C., & Grant, L. (2013). *Teacher-made assessments: How to connect curriculum, instruction, and student learning.* New York, NY: Routledge.

Garrett, B., MacPhee, M., & Jackson, C. (2010). High-fidelity patient simulation: Considerations for effective learning. *Nursing Education Perspectives, 31*(5), 309-313. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Gates, M., Parr, M. B., & Hughen, J. (2012). Enhancing nursing knowledge using high-fidelity simulation. *Journal of Nursing Education, 51*(1), 9-15. doi:10.3929/0148434-20111116-01

Glidewell, L., & Conley, C. (2014). The use of human patient simulation to improve academic test scores in nursing students. *Teaching and Learning in Nursing, 9*(1), 23-26. doi:10.1016/j.teln.2013.08.001

Gloe, D., Sando, C. R., Franklin, A. E., Boese, T., Decker, S., Lioce, Lo. . . . Borum, J. C. (2013). Standards of best practice: Simulation standard II: Professional integrity of participant(s). *Clinical Simulation in Nursing, 9*(6), 12-14. doi:10.1016/j.ecns.2013.04.004

Goodstone, L., Goodstone, M. S., Cino, K., Glaser, C. A., Kupferman, K., & Dember-Neal, T. (2013). Effect of simulation on the development of critical thinking in associate degree nursing students. *Nursing Education Perspectives, 34*(4), 159-162. Retrieved from http://www.nln.org/newsroom/newsletters-and-

journal/nursing-education-perspectives-journal

Graham, G. (2013). *White papers for dummies.* Hoboken, NJ: John Wiley & Sons.

Hauber, R. P., Cormier, E., & Whyte, J. (2010). An exploration of the relationship between knowledge and performance-related variables in high-fidelity simulation: Designing instruction that promotes expertise in practice. *Nursing Education Perspectives, 31*(4), 242-246. Retrieved from www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Hayden, J. K., Kardong-Edgren, S., & Jefferies, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), 1-64. Retrieved from https://www.ncsbn.org/3669.htm

Henneman, E. A., Roche, J. P., Fisher, D. L., Cunningham, H., Reilly, C. A., Nathanson, B. H., & Henneman, P.L. (2010). Error identification and recovery by students using human patient simulation: Opportunity to improve patient safety. *Applied Nursing Research, 23*(1), 11-21. doi:10.1016/j.apnr.2008.02.004

Hodge, M., Martin, C. T., Tavernier, D., Perea-Ryan, M., Alcala-Van Houten, L. (2008). Integrating simulation across the curriculum. *Nurse Educator, 33*(5), 210-214. doi:10.1097/01.NNE0000312221.59837.38

Hoffman, S. (2015). White paper length: The myth of the two-page white paper. Retrieved from http://hoffmanmarcom.com/white-paper-length

Hope, A., Garside, J., & Prescott, S. (2011). Rethinking theory and practice: Pre-

registration student nurse's experiences of simulation teaching and learning in the acquisition of clinical skills in preparation for practice. *Nurse Education Today, 31*(7), 711-715. doi:10.1016/j.nedt.2010.12.011

Hughes R. G. (2008). *Patient safety and quality: An evidence-based handbook for nurses*. Rockville, MD: AHRQ Publication

Husebo, S. E., Friberg, F., Soreide, E., & Rystedt, H. (2012). Instructional problems in briefings: How to prepare nursing students for simulation-based cardiopulmonary resuscitation training. *Clinical Simulation in Nursing, 8*(7), 307-318. doi:10.1016/j.ecns.2010.12.002

Institute of Medicine. (2003). *Health professions education: A bridge to quality.* Retrieved from http://www.nap.edu/catalog/10681/health-professions-education-a-bridge-to-quality

Ironside, P. M., & McNelis, A. M. (2010). Clinical education in prelicensure nursing programs: Findings from a national survey. *Nursing Education Perspectives, 31*(4), 264-265. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Isaias, P., & Nunes, M. B. (2013). *Information systems research and exploring artifacts: Approaches and methodologies.* Hershey, PA: Information Science Reference.

Issenberg, S. B., McGaghie, W. C., Gordon, D. L., Symes, S., Petrusa, E. R., Hart, I. R., & Harden, R. M. (2002). Effectiveness of a cardiology review course for internal medicine residents using simulation technology and deliberate practice. *Teaching and Learning in Medicine, 14*(4), 223-228. doi:10.1207/S15328015TLM1404_4

Issenberg, S. B., McGaghie, W. C., Petrusa, E. R., Gordon, D. L., & Scalese, R. J. (2005). Features and uses of high-fidelity medication simulations that lead to effective learning: A BEME systematic review. *Medical Teacher, 27*(1), 10-28. doi:10.1080/01421590500046924

Jefferies, P. R. (2012). *Simulation in nursing education: From conceptualization to evaluation.* New York, NY: National League for Nursing.

Kaddoura, M. A. (2010). New graduate nurses' perceptions of the effects of clinical simulation on their critical thinking, learning, and confidence. *The Journal of Continuing Education in Nursing, 41*(11), 506-516. doi:10.3928/00220124-20100701-02

Kameg, K. M., Cozzo, N., Howard, V. M., & Perozzi, K. J. (2013). Fusion of psychiatric and medical high fidelity patient simulation scenarios: Effect on nursing student knowledge, retention of knowledge, and perception. *Issues in Mental Health Nursing, 34*(12), 892-900. doi:10.3109/01612840.2013.854543

Kaplan, B. G., Abraham, C., & Gary, R. (2012). Effects of participation vs. observation of a simulation experience on testing outcomes: Implications for logistical planning for a school nursing. *International Journal of Nursing Education Scholarship, 9*(1), 1-15. doi:10.1515/1548-923x.2398

Kaplan, B. G., Connor, A., Ferranti, E. P., Holmes, L., & Spencer, L. (2012). Use of an emergency preparedness disaster simulation with undergraduate nursing students. *Public Health Nursing, 29*(1), 44-54. doi:10.1111/j.1525-1446.2011.00960.x

Kardong-Edgren, S., Lungstrom, N., & Bendel, R. (2009). VitalSim® versus SimMan®:

A comparison of BSN student test scores, knowledge retention, and satisfaction. *Clinical Simulation in Nursing 5*(3), 105-111. doi:10.1016/j.ecns.2009.01.001

Kirkman, T. R. (2013). High fidelity simulation effectiveness in nursing students' transfer of learning. *International Journal of Nursing Education Scholarship, 10*(1), 1-6. doi:10.1515/ijnes-2012-0009

Kirwan, M., Mathews, A., & Scott, P. A., (2013). The impact of the work environment of nurses on patient safety outcomes: A multi-level modeling approach. *International Journal of Nursing Studies, 50*(2), 253-263. doi:10.1016/j.ijnurstu.2012.08.020

Kolb, D. A. (1984). *Experiential learning: Experiences as the source of learning and development.* Englewood Cliffs, NJ: Prentice-Hall.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 192-212. doi:10.5465/AMLE.2005.17268566

Laerd Statistics (2013). One-way MANOVA in SPSS. Retrieved from https://statistics.laerd.com/

Leech, N. L., Barrett K. C., & Morgan, G. A. (2011). *IBM SPSS for intermediate statistics: Use and interpretation.* New York, NY: Routledge.

Levett-Jones, T., Lapkin, S., Hoffman, K., Arthur, C., & Roche, J. (2011). Examining the impact of high and medium fidelity simulation experiences on nursing students' knowledge acquisition. *Nurse Education in Practice, 11*(6), 380-383. doi:10.1016/j.nepr.2011.03.014

Lewis, D., & Ciak, A. D. (2011). The IMPACT of a simulation lab experience for nursing students. *Nursing Education Perspectives, 32*(4), 256-258. doi:10.5480/1536-32.4.256

Lindsey, P., & Jenkins, S. (2013). Nursing students' clinical judgment regarding rapid response: The influence of a clinical simulation education intervention. *Nursing Forum, 48*(1), 61-70. doi:10.1111/nuf.12002

Lioce, L., Reed, C. C., Lemon, D., King, M. A., Martinez, P. A., Franklin, A. E . . . . Borum, J. (2013). Standards of best practice: Simulation standard III: Participant objectives. *Clinical Simulation in Nursing, 9*(6), 15-18. doi:10.1016/j.ecns.2013.04.005

Lioce, L., Meakim, C. H., Fey, M. K., Chmil, J. V., Mariani, B., & Alinier, G. (2015). Standards of best practice: Simulation standard IX: Simulation design. *Clinical Simulation in Nursing, 9*(6), 309-315. doi:10.1016/j.ecns.2015.03.005

Lisko, S. A., & O'Dell, V. (2010). Integration of theory and practice: Experiential learning theory and nursing education. *Nursing Education Perspectives, 31*(2), 106-108.

Lo, B. M., Devine, A. S., Evans, D. P., Byars, D. V., Lamm, O. Y, Lee, J. L. . . . Walker, L. L. (2011). Comparison of traditional versus high fidelity simulation retention of ACLS knowledge. *Resuscitation 82,* 1440-1443. doi:10.1016/j.resuscitation.2011.06.017

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2010). *Methods in educational research: From theory to practice.* San Francisco, CA: Jossey-Bass.

Maestre, J. M., & Rudolph, J. W. (2015). Theories and styles of debriefing: The good judgment method as a tool for formative assessment in healthcare. *Revista Española de Cardiologia, 68*(4), 282-285. doi:10.1016/j.rec32014.05.018

Mattern, J. (2013). How to write a white paper. Retrieved from http://www.dirjournal.com/business-journal/how-to-write-a-white-paper/

Mayers, A. (2013). *Introduction to statistics and SPSS in psychology.* Cranbury, NJ: Pearson.

Mayville, M. L. (2011). Debriefing: The essential step in simulation. *Newborn and Infant Nursing Reviews, 11*(1), 35-39. doi:10.1016/j.amjsurg.2014.05.034

McNelis, A. M., Fonacier, T., McDonald, J., & Ironside, P. M. (2011). Optimizing prelicensure students' learning in clinical settings: Addressing the lack of clinical sites. *Nursing Education Perspectives, 32*(1), 64-65. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Meakim, C., Boese, T., Decker, S., Franklin, A. E., Gloe, D., Lioce, L. Sando, C. R. . . . Borum, J. C. (2013). Standards of best practice: Simulation standard I: Terminology. *Clinical Simulation in Nursing, 9*(6), 3-11. doi:10.1016/j.ecns.2013.04.001

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in Adulthood: A comprehensive guide.* San Francisco, CA: Jossey-Bass.

Meyer, M. N., Connors, H., Qingjang, H., & Gajewski, B. (2011). The effect of simulation on clinical performance: A junior nursing student clinical comparison

study. *Simulation in Healthcare, 6*(5), 296-277. doi:10.1097/SIH.ob013e318223a048

Mills, M., van de Bunt, G. G., de Bruijn, J. (2006). Comparative research: Persistent problems and promising solutions. *International Sociology, 21*(5), 619-631. doi:10.1177?0268580906067833

National Advisory Council on Nurse Education and Practice. (2010). Addressing new challenges facing nursing education: Solutions for a transforming healthcare environment. Retrieved from http://www.hrsa.gov/advisorycommittees/bhpradvisory/nacnep/

National Council State Boards of Nursing. (2005). *Clinical instruction in prelicensure nursing programs.* Retrieved from https://www.ncsbn.org/index.htm

National Council State Boards of Nursing. (2006). *A national survey on elements of nursing education.* Retrieved from https://www.ncsbn.org/index.htm

National Council State Boards of Nursing. (2009). The effect of high-fidelity simulation on nursing students' knowledge and performance: A pilot study. *NCSBN Research Brief, 40,* 1-28. Retrieved from https://www.ncsbn.org/nclex.htm

National Council State Boards of Nursing. (2013). NCLEX-*RN detailed test plan.* Retrieved from https://www.ncsbn.org/index.htm

Nevin, M., Neill, F., & Mulkerrins, J. (2013). Preparing the nursing student for internship in a pre-registration nursing program: Developing a problem-based approach with the use of high fidelity simulation equipment. *Nurse Education in Practice*, 1-6 doi:10.1016/j.nepr.2013.07.008

Nickerson, M., & Pollard, M. (2010). Mrs. Chase and her descendants: A historical view of simulation. *Creative Nursing, 16*(3), 101-105. doi:10.1891/1078-4535.16.3.101

Nugent, P. M., & Vitale, B. A. (2012). *Test success: Test-taking techniques for beginning nursing students.* Philadelphia, PA: F. A. Davis Company

Nurse Executive Center (2010). *Elevating frontline critical thinking: Best nursing practices for overcoming task-focused tunnel vision.* Retrieved from http://www.advisory.com/research/post-acute-care-collaborative/complimentary-resources/elevating-frontline-critical-thinking

Paige, J. T., Arora, S., Fernandez, G., & Seymour, N. (2015). Debriefing 101: Training faculty to promote learning in simulation-based training. *American Journal of Surgery, 209*(1), 126-131. doi:10.1016/j.amjsurg.2014.05.034

Parker, R. C. (2013). 4 keys to compelling content marketing with white papers. Retrieved from http://contentmarketinginstitute.com/2013/08/keys-compelling-content-marketing-white-papers/

Pauly-O'Neill, S., & Cooper, E. (2013). Addressing gaps in quality and safety education during pre-licensure clinical rotations. *Journal of Nursing Education and Practice, 3*(11), 65-70. doi:10.5430/jnep.v311p65

Pope, W. S., Gore, T., & Renfroe, K. C. (2013). Innovative teaching strategy for promoting academic integrity in simulation. *Journal of Nursing Education and Practice, 3*(7), 30-35. doi:10.5430/jnep.v3n7p30

Powell-Laney, S., Keen, C., & Hall, K. (2012). The use of human patient simulators to enhance clinical decision-making of nursing students. *Education for Health,*

25(1), 11-15. Retrieved from http://www.educationforhealth.net/

Rauen, C. A. (2004). Simulation as a teaching strategy for nursing education and orientation in cardiac surgery. *Critical Care Nurse, 24*(3), 46-51. Retrieved from http://ccn.aacnjournals.org/

Riley, W., Davis, S., Miller, K., Hansen, H., Sainfort, F., & Sweet, R. (2011). Didactic and simulation nontechnical skills team training to improve perinatal patient outcomes in a community hospital. *The Joint Commission Journal on Quality and Patient Safety, 37*(8), 357-364. Retrieved from http://www.jcrinc.com/the-joint-commission-journal-on-quality-and-patient-safety/

Rutherford-Hemming, T. (2012). Simulation methodology in nursing education and adult learning theory. *Adult Learning, 23*(3), 129-137. doi:10.1177/1045159512452848

Rutherford-Hemming, T., Lioce, L., & Durham, C. F. (2015). Implementing standards of best practice for simulation. *Nurse Educator, 40*(2), 96-100. doi:10.1097/NNF.0000000000000115

Sakamuro, S., Stolley, K., & Hyde, C. (2015). White paper: Purpose and audience. *Purdue University Online Writing Lab*. Retrieved from http://owl.english.purdue.edu/owl/resource/546/1/

Sando, C. R., Coggins, R. M., Meakim, C., Franklin, A. E., Gloe, D., Boese, T. . . . Borum, J. (2013). Standards of best practice: Simulation standard VII: Participant assessment and evaluation. *Clinical Simulation in Nursing*, *9*(6), 30-32. doi:10.1016/j.ecns.2013.04.007

Schlairet, M. C., & Pollock, J. W. (2010). Equivalence testing of traditional and

simulated clinical experiences: Undergraduate nursing students' knowledge acquisition. *Journal of Nursing Education, 49*(1), 43-47. doi:10.3928/01484834-20090918-08

Schroeder, J. (2013). Improving NCLEX-RN pass rates by implementing a testing policy. *Journal of Professional Nursing, 29*(2), 43-47. doi:10.1016/j.profnurs.2012.07.002

Sears, K., Goldsworthy, S., & Goodman, W. M. (2010). The relationship between simulation in nursing education and medication safety. *Journal of Nursing Education, 49*(1), 52-55. doi:10.3928/01484834-2009018-12

Shinnick, M. A., Woo., M., & Evangelista, L. S. (2012). Predictors of knowledge gains using simulation in the education of prelicensure nursing students. *Journal of Professional Nursing, 28*(1), 41-47. doi:10.1016/j.profnurs.2011.06.006

Sinclair, B., & Ferguson, K. (2009). Integrating simulated teaching/learning strategies in undergraduate nursing education. *International Journal of Nursing Education Scholarship, 6*(1), 1-11. doi:10.2202/1548-923X.1676

Smith, A., Siassakos, D., Crofts, J., & Draycott, T. (2013). Simulation: Improving patient outcomes. *Seminars in Perinatology, 37*(3), 151-156. doi:10.1053/j.semperi.2013.02.005

Stefaniak, J. E., & Turkelson, C. L. (2013). Does the sequence of instruction matter during simulation? *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare,* 1-6. doi:10.1097/sih.0b013e3182a8336f

Stelzner, M. A. (2010). How to write a white paper: A white paper on white papers.

Retrieved from http://homepages.abdn.ac.uk/n.beacham/pages/teaching/CS5037/assessment/abdn.only/HowToWriteAWhitePaper

Sullivan-Mann, J., Perron, C. A., & Fellner, A. (2009). The effects of simulation on nursing students' critical thinking scores: A quantitative study. *Newborn and Infant Nursing Reviews, 9*(2), 111-116. doi:10.1053/j.nainr.2009.03.006

Tawalbeh, L. I., & Tubaishat, A. (2014). Effect of simulation on knowledge of advanced cardiac life support, knowledge retention, and confidence of nursing students in Jordan. *Journal of Nursing Education, 53*(1), 38-44. doi:10.3928/0148434-20131218-01

Thomas, C., & Mackey, E. (2012). Influence of a clinical simulation elective on baccalaureate nursing student clinical confidence. *The Journal Of Nursing Education, 51*(4), 236-239. doi: 10.3928/01484834-20120224-03

Wiseman, A., Haynes, C., and S. H. (2013). Implementing professional integrity and simulation-based learning in health and social care: An ethical and legal maze or a professional requirement for high-quality simulated practice learning? *Clinical Simulation in Nursing, 9*(10), 437-443. doi:10.1016/j.ecns.2012.12.004

Wood, R. Y., & Toronto, C. E. (2012). Measuring critical thinking dispositions of novice nursing students using human patient simulators. *Journal of Nursing Education, 51*(6), 349-352. doi:10.3928/01484834-20120427-05

Zendejas, B., Cook, D. A., & Farley, D. R. (2010). Teaching first or teaching last: Does the timing matter in simulation-based surgical scenarios? *Journal of Surgical*

Education, *67*(6), 432-438. doi:10.1016/j.jsurg.2010.05.001

Zori, S., & Morrison, B. (2009). Critical thinking in nurse managers. *Nursing Economics, 27*(2), 75-79. Retrieved from http://www.nursingeconomics.net/cgi-bin/WebObjects/NECJournal.woa

Zulkosky, K. D. (2012). Simulation use in the classroom: Impact on knowledge acquisition, satisfaction, and self-confidence. *Clinical Simulation in Nursing, 8*(1), 25-33. doi:10.1016/j.ecns.2010.06.003

Appendix A: The Project

Simulation in Nursing Education

A White Paper for Best-Practices in Simulation Recommendations

Lori Podlinski, MSN/MBA, RN

Due to the medical complexity of patients, nursing students often take on an observational role rather than hands-on in the clinical area (Meyer, Connors, Qingjang, & Gajewski, 2011). When nursing students become passive learners, they are denied the opportunity to practice and apply the knowledge they received through didactic learning. This lack of application of knowledge can have a negative effect on nursing students' content mastery (Thomas & Mackey, 2012).

Many nursing schools have incorporated simulation training into their curricula, in addition, to hands-on clinical instruction to provide deliberate practice to promote patient safety and consistent content mastery opportunities.

This white paper will provide a brief history of the use of simulation in nursing education. It also will discuss the problem that prompted the investigation of the effect of simulation training on content exams. This paper includes a review of literature that supports the use of simulation in nursing education, as well as the promotion of the use of best-practices for simulation training.

THE GOAL OF THIS PAPER IS TO OPEN A DIALOGUE ABOUT THE CURRENT SIMULATION PRACTICES AND PROVIDE RECOMMENDATIONS TO PROMOTE THE IMPLEMENTATION OF BEST-PRACTICES DURING SIMULATION LEARNING

The Problem

The goal of implementation of simulation training at the nursing program was to promote nursing students' content mastery by providing additional opportunities to facilitate linking classroom theory to practice. A further investigation into exam scores revealed that the failing percentages have remained the same even though simulation training has been implemented into the nursing program.

Percentages of Exam Failures at the Nursing Program

	2011	2012	2013
Neonatal Assessment	51	50	52
Postpartum Assessment	43	44	42
Cardiovascular Nursing	52	53	50
Pediatric Assessment	60	60	61
Respiratory Deviations	35	34	35
Gastrointestinal Nursing	50	51	52

Note: Adapted from Blackboard Learn® at the nursing program

Simulation in Nursing Education

Simulation mannequins can be either static or computerized. The static mannequins, low-fidelity, are typically used for nursing students to practice certain skills, such as injections and urinary catheter insertion. Medium-fidelity mannequin simulation provides a more realistic approach to student learning, as this type of mannequin can simulate heart, lung, and bowel sounds, in addition to the low-fidelity features (Jefferies, 2012). High-fidelity mannequins are the latest technology in simulation. The high-fidelity mannequins have more realistic features than the low and medium-fidelity mannequins. The high-fidelity mannequins can blink their eyes, and perform biological features, such as sweating and crying, adding to the realism of the experience (Broussard, 2008).

Significance of the Study

This study is significant because it addressed if there was an effect of simulation training on content mastery as evidenced by exam scores in the nursing program. Determining whether simulation training has an effect on exam scores will help the nursing program's faculty determine if the nursing students who receive the simulation training before content examination have an advantage over the nursing students who do not receive simulation training before the content examination. The results of this study can be used to help determine the optimal use of simulation training throughout the curriculum so that the school provides a consistent academic and simulation training program experience for all nursing students enrolled in the program.

Review of Literature

Experiential Learning Theory and Simulation

Studies have revealed that learners lose interest in an educational experience that does not permit active involvement (Jefferies, 2012). Simulation training involves active participation by nursing students by having the students perform the clinical techniques they learn in the classroom setting during the simulation experience. Kolb's experiential learning theory (ELT) provided the theoretical foundation for this study. Figure 1

illustrates how ELT applies to a simulation experience in the nursing program.

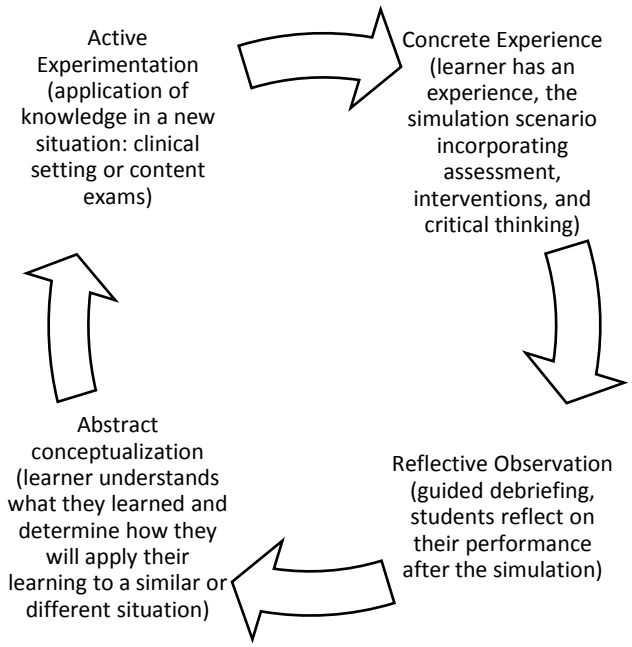

Figure 1. Kolb's stages of experiential learning theory and how it applies to simulation learning. Adapted from "Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education" by A. Y. Kolb and D. A. Kolb, 2005, *Academy of Management Learning and Education, 4*, p. 198.

Simulation and Exam Scores

Glidewell and Conley (2014) found that nursing students who received simulation training scored significantly higher on the renal and cardiac content exams when compared to nursing students who did not receive simulation training. Additionally, Stefaniak and Turkelson (2013) and Zendejas, Cook, and Farley (2010) found that students who received simulation training before attending lecture scores significantly higher on multiple choice examinations that students who attended the lecture before the simulation training.

Simulation as a Teaching Strategy

Crookes, Crookes, and Walsh (2013) found that nursing students who learn through simulation may have an advantage in learning to students who learn strictly at the patient's bedside. Additionally, Garrett, MacPhee, and Jackson (2010) concluded that nursing students valued the real time changes in the patient's status during simulation training as a positive learning experience. However, Nevin, Neil, and Mulkerrins (2013) found that nursing students felt simulation was not an effect method of content delivery. Furthermore, Ganley and Linnard-Palmer (2013) found that some nursing students did not feel safe during simulation training. One of the benefits of simulation training is that it promotes learning in a safe environment. However, the students in this study expressed that they felt incompetent if they did not perform assessments correctly during the simulation. The feeling of incompetence can lead to increased anxiety and stress that can interfere with the students' ability to learn.

Simulation and Content Mastery

Simulation studies have provided support that simulation aid in nursing students' content mastery. Gates, Parr, and Hughen (2012) found that posttest scores increased significantly after the student received simulation training when compared to students who did not receive simulation training. Kaplan, Connor, Ferranti, Holmes, and Spencer (2012) found that 95% of nursing students who completed a postsimulation survey on emergency preparedness stated that simulation helped increase their knowledge in handling and emergency. Furthermore, Tawalbeh and Tubaishat (2014) found that nursing students who received a simulation in advanced cardiac life support in addition to

the presentation and demonstration on a static mannequin that the control group received, scored significantly higher on posttest scores, three months after the training. This study indicated that nurse students who received simulation training were able to retain knowledge when compared to the control group.

In contrast, some studies on simulation found that simulation does not promote knowledge acquisition. Akhu-Zaheya, Gharaibeh, & Alostaz (2013) and Schlairet and Pollock (2010) found that there was no statistical difference in knowledge gained among students who received simulation training and students who did not. However, most of the research studies to date support that nursing students who receive simulation training gain more knowledge when compared to nursing students who do not receive simulation training.

Simulation and Transfer of Learning

One of the goals of simulation training in nursing education is a transfer of learning to content examination and the patients' bedside. The Nurse Executive Center (2010) found that 90% of faculty believed that the nursing students who completed their programs are competent to provide safe and effective care. Contrarily, only 10% of hospital administration share that sentiment. Overall, research is lacking that documents students transfer of learning following a simulation experience.

Simulation and Critical Thinking Skills

Critical thinking is crucial for a nursing student to become a successful thinker and practice as a safe, competent nurse. Goodstone et al. (2013) found that there was no statistical difference in the California Critical Thinking scores between nursing students

who received weekly case studies and student who received weekly simulation training in their health assessment course. Wood and Toronto (2012) also found that there was no statistical difference in critical thinking scores in nursing students who received traditional health assessment skills practice and student who received simulation training to practice skills.

Currently, there is a debate on when the introduction of simulation training should occur in the nursing curriculum. Blum, Borglund, and Parcells (2010) concluded that advanced students can integrate more concepts into the simulation, therefore, receive the most benefit. However, Sullivan-Mann, Perron, and Fellner (2009) found that freshmen nursing students critical thinking scores on the Health Sciences Reasoning Test improved after students were exposed to diverse clinical simulation scenarios when compared to students who did not have exposure to simulation scenarios.

Simulation and Patient Safety

The National Council State Boards of Nursing (NCSBN) has responded to the Quality and Safety Education for Nurses (QSEN) initiation by increasing the amount of questions on the nurse licensure exam from 19% to 23%. The QSEN initiative looks to prepare adequately nurse to provide the safest bedside nursing care possible. Pauly-O'Neill and Cooper (2013) found that nursing students only spent 36 minutes out of 210, focused on patient safety when observed in the clinical area. The use of simulation can allow faculty to focus on patient safety in a controlled environment. Riley et al. (2011) concluded that patient outcomes improved when the labor and delivery health care staff participated in didactic and simulation training when compared to health care teams who received only

didactic training. Additionally, Sears, Goldworthy, and Goodman (2010) found that nursing students who received simulation training had fewer medication errors when compared to students who did not receive simulation training. Current research provides evidence that simulation can improve patient safety in the clinical area.

Results of the Study

Archival data of eight content exams were examined from the 2014 calendar year to determine if simulation training had an effect on content exam scores. Content exam scores were compared among nursing students who received simulation training before exam testing and students who did not receive simulation training before exam testing. Table 1 shows the mean scores for each of the content exams.

Table 1

Mean Content Exam Scores for Calendar Year 2014

Content Exam	*n*	*M*	Content Exam	*n*	*M*
Neonatal Assessment			Pediatric Assessment		
No Simulation	24	74.22	No Simulation	29	74.54
Simulation	29	82.97	Simulation	24	74.68
Postpartum Assessment			Meningitis		
No Simulation	24	77.08	No Simulation	29	91.88
Simulation	29	83.33	Simulation	24	92.55
Preeclampsia			Respiratory Deviations		
No Simulation	24	84.52	No Simulation	29	84.43
Simulation	29	84.71	Simulation	24	84.16
Cardiovascular Nursing			Gastrointestinal Nursing		
No Simulation	24	77.46	No Simulation	29	77.87
Simulation	29	82.29	Simulation	24	81.60

The content exam scores that were statistically significant were *neonatal assessment*, *postpartum assessment*, and *cardiovascular nursing*. However, the results failed to show a significant difference in scores for meningitis, pediatric assessment, respiratory deviations, gastrointestinal nursing, and preeclampsia content exams. The lack of evidence to support that simulation training made a difference in these five content areas has provided the opportunity to review the current simulation policy and to construct recommendations based on the use of best practices during simulation training.

INACSL Standards of Best Practice[SM]

The International Nursing Association for Clinical Simulation and Learning (INACSL) has developed standards of best practice to guide the implementation and training of participants for use of simulation. Following best practices, help promotes the quality and consistency of outcomes from simulation learning. Furthermore, the use of best-practices will standardize simulation learning to maximize simulation-based learning (Rutherford-Hemming, Lioce, & Durham, 2015).

Terminology: standardizing the terminology used in simulation training allows participants to have a better understanding of the simulation experience. The use of consistent terminology will signify mutual beliefs among the participants and simulation curriculum planners. Additionally, the use of standard definitions of terminology will promote clear communication among all stakeholders (Meakim et al., 2013).

Professional Integrity: academic dishonesty in nursing education has been a growing problem. Maintaining the integrity of a simulation scenario provides a challenge for nursing faculty as students can be "prepped" by students who have already received the

simulation training (Pope, Gore, & Renfroe, 2013, p. 30). Students who share any information from the simulation can alter the simulation environment and a future students' learning experience (Gloe et al., 2013).

Participant Objectives: are what drives the simulation experience. The objectives also help to determine if the students have met the learning outcome. Objectives should be clear and made available to the students before the simulation experience. Lioce et al. (2013) stated that objectives should include:

- All the learning domains.
- Correlate to the student's level of knowledge.
- Be consistent with the program learning outcomes.
- Involve evidence-based practice.
- Holistically view the patient in the scenario.
- Be achievable within a designated timeframe.

Facilitation: guides the achievement of participant objectives through engagement of the students during the simulation experience. Facilitation has three phases: before, during, and after the simulation experience. An example of facilitation before is called prebriefing. Prebriefing includes providing an orientation to the scenario and a review of the objectives. During the scenario, the facilitator will implement the developed cues if there was a need to redirect the student during the scenario. An example of facilitation after the scenario is in the form of debriefing which will be discussed later in this paper (Franklin et al., 2013).

Facilitator: is the key component in the learning process. The responsibilities of the facilitator are orienting the learner to the simulation learning experience and promoting and maintaining the fidelity of the simulation experience. Fidelity refers to the realism of the simulated experience. Another role of the facilitator is providing a safe environment for the students to learn without fear of negative consequences (Boese et al., 2013). Additionally, Husebo, Friberg, Soreide, and Rystedt (2012) stated that the facilitator has the responsibility of bridging the gap between the simulation and real life scenario that it mimics.

Debriefing: is considered the most crucial element of the simulation experience. The effectiveness of debriefing lies solely on the skill of the facilitator who leads the debriefing session (Paige, Arora, Fernandez, & Seymour, 2015). INACSL stated that all simulation experiences must include a debriefing session. There are multiple methods of debriefing available. The NCSBN suggests that nursing programs use a standardized debriefing method using a Socratic methodology (Alexander et al., 2015). A Socratic method of debriefing is when the facilitator who is leading the debriefing sessions uses a soothing voice to ask open-ended questions to guide the student to the clinical judgment of the facilitator (Maestre & Rudolph, 2015).

Assessment and Evaluation: a formative assessment will provide students with feedback with the goal of developing ways the student can improve their performance in the three learning domains: knowledge, skills, and attitudes. A summative evaluation of a simulation experience is looking to determine if the student was able to meet their learning objectives. Furthermore, a summative evaluation can be used as a high-stakes

evaluation. However, high-stakes evaluation should be conducted by trained objective raters. INACSL recommends that high-stakes evaluation should only be conducted if the simulation was pilot-tested and there is a standardized format for scoring with a reliable and valid tool (Sando et al., 2013).

Simulation Design: the standardization of simulation experiences will provide consistent student learning outcomes. INACSL suggests a simulation experience should be pilot tested to ensure that students can meet the learning outcomes of the scenario. Pilot testing will provide an opportunity for identification of any confusing or missing components of the scenario. Pilot testing will provide an opportunity for the facilitator to address any problems before the students' live simulation experience (Lioce et al., 2013).

Policy Recommendations Guided by INACSL

- Terminology
    - Include simulation terminology and definitions in the student handbook
    - Include simulation terminology in tools that evaluate effectiveness of simulation experience to maintain consistency
- Professional Integrity
    - Include simulation learning in the academic dishonesty policy to promote confidentiality of the simulation experience
    - Consider that when a student violates the confidentiality of the scenario that it will breach of ethical conduct

    - Consider having the students sign a simulation confidentiality agreement at least once an academic year

- Participant Objectives
    - Review the simulation learning objectives to ensure they address the cognitive, psychomotor, and affective learning domains
    - Review simulation learning objectives to ensure they promote knowledge, application transference, skill performance, and self-confidence
- Facilitation
    - Allow time for orientation of the students to the simulated environment
    - Provide ground rules that will promote a safe learning environment
    - Allow the simulation scenario to progress without interruption
- Facilitator
    - Provide cues that redirect the scenario, such as diagnostic results, telephone calls from health care provider or other interdisciplinary departments, live cues from the patient to alert students to symptoms
    - Develop a rubric that evaluates the student's acquisition of understanding, technical skills, and attitudes
    - Develop a method of sharing students' performance in simulation with clinical faculty
- Debriefing
    - Use a standard method of debriefing throughout the program

    - Develop an opportunity for more faculty to become trained in debriefing techniques for use throughout the curriculum

- Assessment and Evaluation
    - Collect and preserve evaluation data regarding the facilitator's effectiveness
    - Collect and retain evaluation data regarding the simulation experience's effectiveness
    - Obtain reliability and validity data on the rubric for high-stakes testing
- Simulation Design
    - Pilot test new simulation scenarios

References

Akhu-Zaheya, L. M., Gharaibeh, M. K., & Alostaz, Z. M. (2013). Effectiveness of simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students in Jordan. *Clinical Simulation in Nursing, 9*(9), 335-342. doi:10.1016/j.ecns.2012.05.001

Alexander, M., Durham, C. F., Hooper, J. I., Jefferies, P. R., Goldman, N., Kardong-Edgren, S. . . . Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation, 6*(3), 39-42. doi:10.1016/s2155-8256(15)30783-3

Blum, C. A., Borglund, S., & Parcells, D. A. (2010). High-fidelity nursing simulation: Impact on student self-confidence and clinical competence. *International Journal of Nursing Education Scholarship, 7*(1), 1-14. doi:10.2202/1548-923X.2035

Boese, T., Cato, M., Gonzalez, L., Jones, A., Kennedy, K., Reese, C. . . . Borum, J. (2013). Standards of best practice: Simulation standard V: Facilitator. *Clinical Simulation in Nursing, 9*(6), 22-25. doi:10.1016/j.ecns.2013.04.010

Broussard, L. (2008). Simulation-based learning: How simulators help nurses improve clinical skills and preserve patient safety. *Nursing for Women's Health, 12*(6), 521-524. doi:10.1111/j.1751-486x.2008.00386.x

Crookes, K., Crookes, P. A., & Walsh, K. (2013). Meaningful and engaging teaching techniques for student nurses: A literature review. *Nurse Education in Practice, 13*(4), 239-243. doi:10.1016/j.nepr.2013.04.008

Franklin, A. E., Boese, T., Gloe, D., Lioce, L. Decker, S., Sando, C. R. . . . Borum, J.

(2013). Standards of best practice: Simulation standard IV: Facilitation. *Clinical Simulation in Nursing, 9*(6), 19-21. doi:10.1016/j.ecns.2013.04.001

Ganley, B. J., & Linnard-Palmer, L. (2012). Academic safety during simulation: Perceptions of nursing students and faculty. *Clinical Simulation in Nursing, 8*(2), 49-57. doi:10.1016/j.ecns.2010.06.004

Garrett, B., MacPhee, M., & Jackson, C. (2010). High-fidelity patient simulation: Considerations for effective learning. *Nursing Education Perspectives, 31*(5), 309-313. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Gates, M., Parr, M. B., & Hughen, J. (2012). Enhancing nursing knowledge using high-fidelity simulation. *Journal of Nursing Education, 51*(1), 9-15. doi:10.3929/0148434-20111116-01

Glidewell, L., & Conley, C. (2014). The use of human patient simulation to improve academic test scores in nursing students. *Teaching and Learning in Nursing, 9*(1), 23-26. doi:10.1016/j.teln.2013.08.001

Gloe, D., Sando, C. R., Franklin, A. E., Boese, T., Decker, S., Lioce, L. . . . Borum, J. C. (2013). Standards of best practice: Simulation Standard II: Professional integrity of participant(s). *Clinical Simulation in Nursing, 9*(6), 12-14. doi:10.1016/j.ecns.2013.04.004

Goodstone, L., Goodstone, M. S., Cino, K., Glaser, C. A., Kupferman, K., & Dember-Neal, T. (2013). Effect of simulation on the development of critical thinking in associate degree nursing students. *Nursing Education Perspectives, 34*(4), 159-

162. Retrieved from http://www.nln.org/newsroom/newsletters-and-journal/nursing-education-perspectives-journal

Husebo, S. E., Friberg, F., Soreide, E., & Rystedt, H. (2012). Instructional problems in briefings: How to prepare nursing students for simulation-based cardiopulmonary resuscitation training. *Clinical Simulation in Nursing, 8*(7), 307-318. doi:10.1016/j.ecns.2010.12.002

Jefferies, P. R. (2012). *Simulation in nursing education: From conceptualization to evaluation.* New York, NY: National League for Nursing.

Kaplan, B. G., Connor, A., Ferranti, E. P., Holmes, L., & Spencer, L. (2012). Use of an emergency preparedness disaster simulation with undergraduate nursing students. *Public Health Nursing, 29*(1), 44-54. doi:10.1111/j.1525-1446.2011.00960.x

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 192-212. doi:10.5465/AMLE.2005.17268566.

Lioce, L., Reed, C. C., Lemon, D., King, M. A., Martinez, P. A., Franklin, A. E. . . . Borum, J. (2013). Standards of best practice: Simulation standard III: Participant objectives. *Clinical Simulation in Nursing, 9*(6), 15-18. doi:10.1016/j.ecns.2013.04.005

Maestre, J. M., & Rudolph, J. W. (2015). Theories and styles of debriefing: The good judgment method as a tool for formative assessment in healthcare. *Revista Española de Cardiologia, 68*(4), 282-285. doi:10.1016/j.rec32014.05.018.

Meakim, C., Boese, T., Decker, S., Franklin, A. E., Gloe, D., Lioce, L. . . . Borum, J. C.

(2013). Standards of best practice: Simulation standard I: Terminology. *Clinical Simulation in Nursing, 9*(6), 3-11. doi:10.1016/j.ecns.2013.04.001

Meyer, M. N., Connors, H., Qingjang, H., & Gajewski, B. (2011). The effect of simulation on clinical performance: A junior nursing student clinical comparison study. *Simulation in Healthcare, 6*(5), 296-277. doi:10.1097/SIH.ob013e318223a048

Nevin, M., Neill, F., & Mulkerrins, J. (2013). Preparing the nursing student for internship in a pre-registration nursing program: Developing a problem based approach with the use of high fidelity simulation equipment. *Nurse Education in Practice*, 1-6. doi:10.1016/j.nepr.2013.07.008

Nurse Executive Center (2010). *Elevating frontline critical thinking: Best nursing practices for overcoming task-focused tunnel vision.* Retrieved from http://www.advisory.com/research/post-acute-care-collaborative/complimentary-resources/elevating-frontline-critical-thinking

Paige, J. T., Arora, S., Fernandez, G., & Seymour, N. (2015). Debriefing 101: Training faculty to promote learning in simulation-based training. *American Journal of Surgery, 209*(1), 126-131. doi:10.1016/j.amjsurg.2014.05.034

Pauly-O'Neill, S., & Cooper, E. (2013). Addressing gaps in quality and safety education during pre-licensure clinical rotations. *Journal of Nursing Education and Practice, 3*(11), 65-70. doi:10.5430/jnep.v311p65

Pope, W. S., Gore, T., & Renfroe, K. C. (2013). Innovative teaching strategy for promoting academic integrity in simulation. *Journal of Nursing Education and*

Practice, 3(7), 30-35. doi:10.5430/jnep.v3n7p30

Rutherford-Hemming, T., Lioce, L., & Durham, C. F. (2015). Implementing standards of best practice for simulation. *Nurse Educator, 40*(2), 96-100. doi:10.1097/NNF.0000000000000115

Sando, C. R., Coggins, R. M., Meakim, C., Franklin, A. E., Gloe, D., Boese, T . . . . Borum, J. (2013). Standards of best practice: Simulation standard VII: Participant assessment and evaluation. *Clinical Simulation in Nursing, 9*(6), 30-32. doi:10.1016/j.ecns.2013.04.007

Schlairet, M. C., & Pollock, J. W. (2010). Equivalence testing of traditional and simulated clinical experiences: Undergraduate nursing students' knowledge acquisition. *Journal of Nursing Education, 49*(1), 43-47. doi:10.3928/01484834-20090918-08

Sears, K., Goldsworthy, S., & Goodman, W. M. (2010). The relationship between simulation in nursing education and medication safety. *Journal of Nursing Education, 49*(1), 52-55. doi:10.3928/01484834-2009018-12

Stefaniak, J. E., & Turkelson, C. L. (2013). Does the sequence of instruction matter during simulation? *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare,* 1-6. doi:10.1097/sih.0b013e3182a8336f

Sullivan-Mann, J., Perron, C. A., & Fellner, A. (2009). The effects of simulation on nursing students' critical thinking scores: A quantitative study. *Newborn and Infant Nursing Reviews, 9*(2), 111-116. doi:10.1053/j.nainr.2009.03.006

Tawalbeh, L. I., & Tubaishat, A. (2014). Effect of simulation on knowledge of advanced

cardiac life support, knowledge retention, and confidence of nursing students in Jordan. *Journal of Nursing Education, 53*(1), 38-44. doi:10.3928/0148434-20131218-01

Thomas, C., & Mackey, E. (2012). Influence of a clinical simulation elective on baccalaureate nursing student clinical confidence. *The Journal of Nursing Education, 51*(4), 236-239. doi:10.3928/01484834-20120224-03

Wood, R. Y., & Toronto, C. E. (2012). Measuring critical thinking dispositions of novice nursing students using human patient simulators. *Journal of Nursing Education, 51*(6), 349-352. doi:10.3928/01484834-20120427-05

Zendejas, B., Cook, D. A., & Farley, D. R. (2010). Teaching first or teaching last: Does the timing matter in simulation-based surgical scenarios? *Journal of Surgical Education, 67*(6), 432-438. doi:10.1016/j.jsurg.2010.05.001