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The Effects of a Repeating Simulation Experience on Senior Nursing Students

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THE EFFECTS OF A REPEATING SIMULATION EXPERIENCE ON SENIOR NURSING STUDENTS

by

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ABSTRACT

THE EFFECTS OF A REPEATING SIMULATION EXPERIENCE ON SENIOR NURSING STUDENTS
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Under the Supervision of Professor Kim Litwack, Ph.D.

Nurse educators are challenged with meeting the needs of students and patients. One method of educating students that is used widely across the United States is simulation. The purpose of this dissertation is to determine if participation in a repeating simulation experience has an impact on nursing students' knowledge and clinical judgment. A conceptual analysis of simulation was undertaken to clarify the definition of simulation and confirm the appropriateness of Kolb's theory and Tanner's model as the theoretical framework for the study. A quasi-experimental pre-test/post-test with comparison with norms observational study design guided by Kolb's Theory of Experiential Learning and Tanner's Model of Clinical Judgment was utilized. A knowledge exam was used to evaluation knowledge, the Lasater Clinical Judgment Rubric was used to evaluate clinical judgment, and the National League of Nursing Simulation Design Scale and the Student Satisfaction and Self-Confidence in Learning tool were used to evaluate student reactions. The repeating simulation experience has shown an increase in knowledge and clinical judgment as well as having high levels of satisfaction after participation in this twist of an accepted teaching modality. This dissertation can have implications on nursing education, educational policy, and provides conceptual clarity.

To my parents, Leo and Joann,

to my siblings, Leann, Leo, and Lynzie,

to my family and friends,

and especially to my boyfriend, Rico,

thanks for putting up with me and standing by my side.

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CHAPTER 1

INTRODUCTION

Simulation has become an integral aspect of nursing education (McGovern, Lapum, Clune & Martin, 2012). Plato is credited with coining the phrase "necessity is the mother of invention". While simulation was not a necessity in nursing education, meeting the educational needs of students and finding appropriate clinical experiences has become a challenge. The current health care system is extremely complex and continually changing (Yuan, Williams, Fang, & Ye, 2012). The high acuity of patients in a fast-paced environment presents many challenges for nursing education. Clinical sites and hours available to practice are limited, increased security provides charting access challenges, and there is a shortage of nursing faculty (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010).

Nurse educators have a duty to prepare students to care for patients in this complex system. These constrained clinical opportunities coupled with shortened patient stays limit student practice with real patient care situations which can affect the students' ability to cultivate clinical judgment and capacity to care for patients (Yuan, Williams, & Fang, 2012). Simulation has been found to be extremely beneficial in the education and preparation of nurses (Jeffries, 2012) and is used frequently in programs throughout the United States (Hayden, et al., 2013). Both students and instructors have demonstrated positive reactions to including simulation as a large aspect of the learning process (Mariani & Doolen, 2016).

Problem Statement

Nursing is a practice profession, which necessitates clinical education to be a major focus of knowledge development and application (Yuan, Williams, & Fang, 2012). Transferring knowledge and skills gained in the classroom to practice is a key factor in

establishing clinical competence (Bevan, Joy Keeley, & Brown, 2015). Healthcare is a complex and ever-changing field and many educators struggle to find adequate clinical placement for nursing students (Yuan, et al, 2012). Higher patient acuity, restricted availability, shorter patient stays, and safety concerns add to the challenges of providing an appropriate and educational clinical experience for students (Richardson & Claman, 2014). Many schools of nursing experience a shortage of clinical sites and low patient census, which leads to student dissatisfaction and challenge for students to link what they learn in the classroom to practice (Tubaishat & Tawalbeh, 2015). Clinical experience limitations also present a challenge for educators to effectively evaluate students' clinical competencies (Rizzolo, Kardong-Edgren, Oermann, & Jeffries, 2015). In response to these challenges that arose in nursing education, most schools now utilize simulation to meet the learning needs of students (Jeffries, 2005).

Learning through simulation is utilized in many professions and has revolutionized education from pilot training to medicine (Wunder et al., 2014). Although it has proved beneficial in the realm of aviation training, in the medical field, outcomes research is scattered and inconsistent. While it cannot completely replace the clinical environment, simulation offers a valuable opportunity to augment clinical learning (Leach, 2014). Students gain the opportunity to develop the necessary clinical skills in a realistic, but safe environment (Bland, Topping, & Wood, 2010). Professional bodies endorse simulation as a method of active learning (Schlairet, 2011) and it is found in over 900 nursing programs in the United States (Hayden, Smiley, Alexander, Kardong-Edgen, & Jeffries, 2014). Simulation in nursing education encompasses many forms, including low to high fidelity mannequins,

task-trainers, computerized simulation experiences, and standardized patients (Rourke, Schmidt, & Garga, 2010).

Simulation is a learning modality through which nursing students can enhance knowledge and develop deeper learning (Bevan, et al, 2015). Students experience higher confidence and self-efficacy after a simulation learning opportunity (Richardson & Claman, 2014). Bland, Topping, & Wood (2010) determined that nursing students value simulation and would prefer more simulation opportunities throughout the curriculum. However, the evidence of simulation effectiveness among nursing student skills is lacking in depth (Lin, 2015). Most of the current literature does not focus on learning outcomes such as knowledge and clinical judgment; rather many studies focus on self-efficacy, confidence, and the perceptions of participants (Leach, 2014). More research related to knowledge acquisition and clinical judgment development can aid nurse educators in the utilization of simulation to effectively achieve learning outcomes.

Theoretical Framework

One learning theory and one clinical model were selected to provide the conceptual framework to support the study of simulation as a teaching and evaluation strategy in nursing education. The theory is Kolb's theory of Experiential Learning (1984) and the model is Tanner's Model of Clinical Judgment in Nursing (2006). Kolb's theory is appropriate as it clearly explains the role of simulation in the learning process. Tanner's model is appropriate as it provides a base for understanding clinical judgment. The following section will explain the major tenants of each premise as well as the larger concept of Experiential Learning, in which both concepts are based.

Experiential Learning

The primary argument of experiential learning is that learning occurs through a concrete experience. Merriam and Bierema (2014) discuss the intimate nature of experience and learning in adult education. They go hand-in-hand and one is often not found without the other. They state, "the heart of adult learning is engaging in, reflecting upon, and making meaning of our experiences" (Merriam & Bierema, 2014, p. 104). Experiential learning theory provided a much-needed theoretical base for learning through experience.

Experiential learning transpires when learning and new experiences occur in conjunction with one another (Merriam & Bierema, 2014). It is a "holistic integrative perspective on learning that combines experience, cognition, and behavior" (Kolb, 1984, p. 41). Kolb was the first to propose an experiential learning theory (Merriam & Bierema). He states that learning is a cyclical experience. It usually begins with a concrete experience, followed by active experimentation, abstract conceptualization, and reflective observation (Kolb). The cycle repeats each time the student engages in learning.

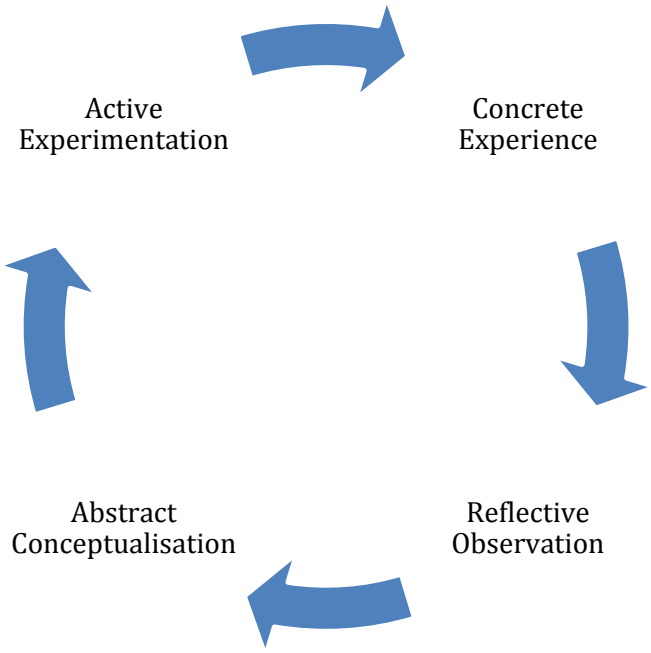
Kolb's Theory of Experiential Learning

Kolb (1984) first discussed the theory of experiential learning as the foundation of learning and development. He presents an experiential learning cycle consisting of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb). Kolb's theory conceptualizes a learning process that goes through these four stages.

First the student learns through an experience, in the case of this study, students will participate in a cardiac code simulation at the beginning of the day. The students then

gain insight through reflection. This can be completed through reflective journaling, debriefing, post-conferences, or various other methods. In this study, it will occur during the debriefing of the morning simulation and then again when students repeat the simulation experience. Students can then expand on that knowledge in a similar situation. Students will participate in a second cardiac code simulation in the afternoon and will be able to expand on the knowledge they gained in the first simulation. Finally, students add to the knowledge base through active experimentation in the second simulation experience and expand their horizons (Waldner & Olson, 2007). Experiential learning provides a medium for students to directly participate in a learning experience, reflect upon the experience, and construct new abstractions and applications for knowledge (Chiang & Chan, 2013).

Figure 1. Kolb's Theory of Experiential Learning



Strengths

There are several strengths to Kolb's theory of experiential learning. This theory explains student learning as a process driven by critical reflection (Merriam & Bierema, 2014). Critical reflection has been shown to be an excellent way for students to gain and retain knowledge. This theory purports that not all learners are the same, and some may spend more time in one stage than another (Merriam & Bierema). Spending unequal time in the various stages provides strength to the cyclic nature of the theory.

This model is also especially helpful in providing understanding to educators and students alike of the different learning processes (Akella, 2010). It is very generalizable and has been utilized in architectural, nursing and business education, and as a management strategy (Akella).

Weaknesses

While there are several strengths attributed to Kolb's theory of experiential learning, there are several weaknesses as well. One of the biggest weaknesses is the almost vacuum-like nature of the theory (Merriam & Bierema, 2014). As described by Kolb, it appears that experience and reflection occur in a silo. Rather, experience and reflection can occur in many different shapes and at many different times (Arella, 2010). Another limitation of this theory is that students may not go through the phases as Kolb maps out (Merriam & Bierema). Although there is a cyclical nature to the process, students may not always follow the steps in the prescribed order.

Another argument against Kolb's theory of experiential learning is that it does not discuss or bring into consideration the effects of gender, social status, cultural dominance and power differentials on learning (Arella, 2010). Many of our learning theories are based

upon white male students (Museus, Lee, & Lambe, 2011). This can lead to bias and inappropriate use of the theory. It also does not address processes that inhibit learning or any of the unconscious thought processes students utilize (Arella).

Kolb and Simulation

In nursing education, a simulation experience follows Kolb's (1984) four stages and is an obvious choice for a theoretical framework (Chiang & Chan, 2013). Experiences create the opportunity for learning, but most of the learning occurs during the reflection period (Zigmont, Kappus, and Sudikoff, 2011). This is congruent with studies of simulation, in that students learn most during the debriefing (Jeffries, 2012). When utilizing Kolb's theory in simulation experiences students have the opportunity to participate in an experience, reflect on that experience, identify gaps in knowledge through refection, and conceptualize new knowledge. (Waldner and Olson, 2007). One of the key aspects of preparing nursing students for professional practice is through experiential learning (Poore, Cullen, & Schaar, 2014). Both clinical and simulation experiences provide the foundation for nursing education (Chiang & Chan, 2014).

Simulation is a form of concrete experience for students, which is a central concept in Kolb's (1984) experiential learning theory (Lisko & O'Dell, 2010). Two of the crucial steps of Kolb's theory – actively participating in a learning experience and reflecting on that experience – are essential principles of simulation as well (Zigmont, et al., 2011). Waldner and Olson (2007) claim using Kolb's experiential learning theory "could provide theoretical scaffolds for building the progression of simulation experiences most helpful in the development of student's nursing knowledge" (p. 11). These claims form the reasoning for the author to choose Kolb's experiential learning theory.

Why Choose Kolb?

Kolb's theory explains meaningful learning gains as derived from students engaging in an experience to enhance or direct learning, reflecting on that experience, generating new ideas based on that experience, and putting those new ideas and knowledge to work in future situations (Kolb, 1984). The educator's role is to provide students' opportunities to learn and guide them down the path of generating new knowledge. The learner truly directs their learning. How much a student learns is dependent on how much they engage in the experiential learning and the activities that follow (Kolb).

Kolb's theory offers strong practical value to nursing education. In the profession of nursing, experiential learning has been one of the foundations to educate and prepare students for practice (Poore et al., 2014). Simulation experiences are used in over 900 nursing schools in the United States alone (Hayden, Smiley, Alexander, Kardong-Edgren, and Jeffries, 2014). As nursing practice needs to be based in theory, nursing education needs a theoretical base as well (Fawcett, 2013). Kolb's theory offers that theoretical base; experiential learning is utilized in simulation throughout the United States and will be strengthened with theory.

Meleis (2012) describes progress of a discipline as including funding for research, as well as dissemination of knowledge. This occurs through publications of research in peer-reviewed journals and theoretical progress. Rourke et al. (2010) state that only ten percent of nursing simulation research is based in theory. Utilizing Kolb's theory in simulation research will advance the science of nursing and provide credible evidence for the continued use of simulation throughout nursing curricula (Waldner & Olson, 2007).

Nursing is a discipline that is intrinsically intertwined with other professions. Many nursing studies utilize theories and knowledge from other disciplines. It is appropriate to use an educational theory for nursing education research. Although there are many nursing theories available to utilize as a conceptual framework, Kolb's theory focuses on *how* students generate new practice-based clinical knowledge, not just if knowledge was acquired.

Tanner's Model of Clinical Judgment

Clinical judgment is a vital aspect of providing appropriate nursing care (Tanner, 2006) and is recognized as a skill that separates the professional nurse from someone in a purely technical role (Coles, 2002, Lasater, 2007). Clinical judgment is a skill that cannot be learned in the classroom alone, rather it is developed and honed through experiences (Tanner). The Model of Clinical Judgment as described by Tanner (2006) defines clinical judgment as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the judgment to take action (or not) use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response (p. 204).

Tanner (2006) developed this definition of clinical judgment through an in-depth review of the literature. Nearly 200 articles were included in the review from published nursing literature that examined:

- "What are the processes (or reasoning patterns) used by nurses as they assess patients, selectively attend to clinical data, interpret these data, and respond or intervene?
- What is the role of knowledge and experience in these processes?
- What factors affect clinical reasoning patterns?" (Tanner, p. 205)

Tanner's review identified four major aspects of clinical judgment: noticing, interpreting, responding, and reflecting (2006). The nurse must incorporate all four of these aspects to engage in clinical judgment and identify and prioritize patient need, assess the best course of action, and respond to the patient (Lasater, 2007). Tanner described each aspect of clinical judgment:

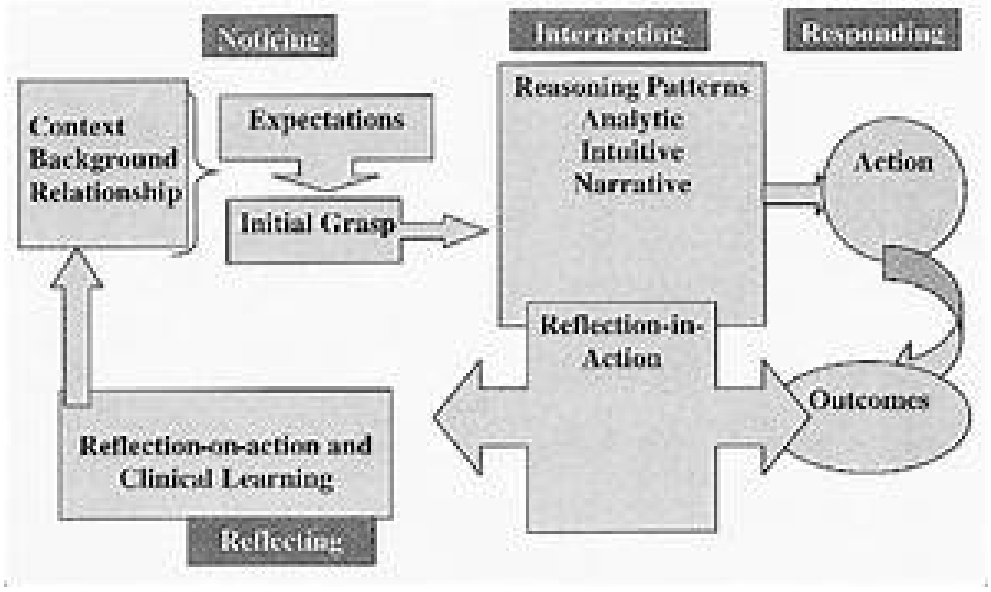


Figure 2. Tanner's Clinical Judgment Model (Tanner, 2006, p. 208)

- Noticing – the nurse's initial grasp and expectations of the situation which develops from the nurse's knowledge of the patient, clinical knowledge, textbook knowledge, and prior experiences
- Interpreting – reasoning pattern triggered by noticing to decipher the data presented in the clinical situation

- Responding – reasoning pattern triggered by the interpretation of the data presented in the clinical situation which is then used to determine the most appropriate course of action for the nurse
- Reflecting – understanding how the patient is responding to the action taken, if an adjustment of the action is needed, and what this situation has added to the nurse's body of knowledge for the future

Strengths

Tanner's Model of Clinical Judgment is an excellent choice to provide the framework for this dissertation as it has several strengths. It is based in evidence and appropriately describes nursing care and process (Nielsen, 2009). Tanner engaged in an in-depth review to analyze the literature and synthesize it for this model. This is a holistic model that recognizes the influence a nurse's personal experience can have upon a clinical situation (Nielsen). It also recognizes several different types of patterns and processes, which allows for the generalizability of the model to practicing nurses as well as nursing students (Lasater, 2007).

Weaknesses

Despite its many strengths, Tanner's Model of Clinical Judgment does have weaknesses as well. One weakness of this model is that it has a narrow focus and only discusses clinical judgment. Specific models can be helpful to give guidance for a narrow aspect, but more encompassing models allow for the generation of theory and greater generalizability (Melesis, 2012). Another weakness of this model is it that it assumes student nurses already possess a wealth of prior knowledge and experiences and develop

clinical judgment by telling their stories in reflection (Lasater, 2007). It does not address how the student gains knowledge prior to the clinical experience at hand.

Tanner and Simulation

Tanner's Model of Clinical Judgment has been used to guide simulation research and the simulation experience on its own. The aspects of clinical judgment as identified by Tanner are similar to the stages the student participates in while engaging in simulation (Lasater, 2007). The student nurse has the opportunity to engage in the four major aspects of clinical judgment (noticing, interpreting, responding, and reflecting) as described by Tanner (2006) in the simulation experience. While participating in the simulation itself, the student has the opportunity to notice, interpret, and respond to the patient in the scenario. During simulation debriefing period, the student has the opportunity to engage in reflection, arguably one of the more important aspects of simulation experiences (Jeffries, 2005).

Several simulation assessment tools have been developed based on this model as well. Lavoie, Cossette, and Pepin (2016) used this model to develop a situation awareness instrument to examine nursing students' clinical judgment. While Lasater (2006) based her clinical judgment rubric on the aspects of this model as well. The study for this dissertation uses the Lasater Clinical Judgment Rubric to assess and quantify senior nursing student clinical judgment. This makes the use of this model to guide this dissertation even more appropriate.

Why Choose Tanner?

Through the use of theories and models, concepts or phenomena can be organized and utilized by the researchers and practicing members of a discipline (Smith & Liehr,

2014). Theories and models are often judged through the magnitude to which they guide future research endeavors (Meleis, 2012). Tanner's Model of Clinical Judgment is a potential building block for the nursing profession to build up its simulation education research. This model appropriately describes the process of the development of clinical judgment and is in agreement with Kolb's Theory of Clinical Judgment in that experience is an essential aspect of learning and reflection is required to develop knowledge and judgment.

Kolb and Tanner

It is important in nursing education to base the conceptual framework for the curriculum on theories from education and theories regarding learning in conjunction with nursing theories (Fawcett, 2013). Many nursing programs utilize simulation as a learning modality extensively in the education of students (Shinnick & Woo, 2013). Ensuring research is based in theory provides the opportunity for literature to be unified, generalizable, and progressive (Rourke, Schmidt, & Garga, 2010).

Both Tanner's Model of Clinical Judgment in Nursing and Kolb's theory of Experiential Learning are used to guide this dissertation. Tanner's model was chosen to fill in the gaps left by Kolb's theory of experiential learning in the area of clinical judgment. While Kolb's theory can provide the framework for the design of the study and the research question regarding knowledge realization in practice, an additional model was needed to build upon the knowledge developed by Kolb's theory to transform it into clinical judgment through experience with Tanner's model. Kolb's Theory of Experiential Learning (2015) guides the stages of the simulation experience of the study. Kolb's first stage, concrete experience is the first simulation in which students will participate. Kolb's second stage,

reflective observation, is the debriefing phase students engage in after the simulation. Students have the opportunity to engage in Kolb's third stage, abstract conceptualization, while pre-briefing and planning for their second simulation experience. Finally, students can engage in Kolb's fourth stage, active experimentation while participating in the second simulation experience. During both of the simulation events, including the debriefing phases, students will utilize Tanner's model of clinical judgment to acquire clinical knowledge and further their clinical judgment from the knowledge they developed.

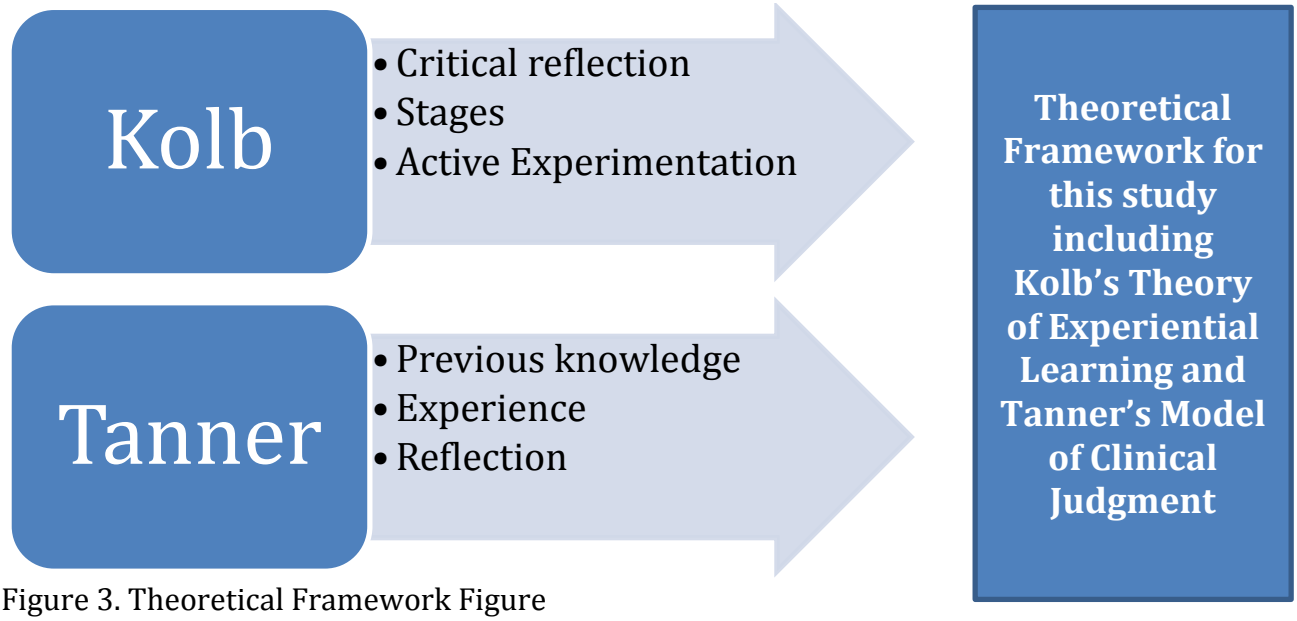


Figure 3. Theoretical Framework Figure

Chapter Summary

In this chapter, the background and theoretical framework are proposed for a dissertation study to examine the effect participation in a repeating cardiac code simulation has on senior nursing student knowledge and clinical judgment as well as student perceptions of that simulation experience. The problem this dissertation addresses

is the lack of evidence relative to simulation and student learning outcomes despite the increased use of simulation throughout nursing education.

Structure to Dissertation

This dissertation will be composed of five chapters and three articles prepared for publication incorporated into those chapters. Chapter One serves as an introduction to the problem and the dissertation. Chapter Two is a review of the literature along with a manuscript of a concept analysis of simulation as a teaching and evaluation modality. Chapter Three outlines the methodology utilized for the study. The results of the pilot study examining the effects simulation has on student knowledge and student perceptions of the simulation as well as the main study examining the effects stimulation has on student knowledge and clinical judgment and student perceptions of the simulation are included in Chapter Four is presented as two prepared for publication manuscripts. Finally, this dissertation will conclude with Chapter Five presenting a synthesis of the dissertation and the anticipated implications.

CHAPTER 2

REVIEW OF THE LITERATURE

INTRODUCTION

This chapter provides a review of the current state of the science of simulation in nursing education. The purpose of this study is to determine if participation in a repeating simulation experience has an impact on senior nursing students' knowledge and clinical judgment required during a simulated cardiac arrest. Included in this chapter is a literature review of simulation in regard to knowledge and clinical judgment in nursing education. The results of the literature review led to a concept analysis manuscript, which is also included at the end of this chapter.

Background

In nursing education today, simulation is used extensively throughout the United States (Hayden, Smiley, Alexander, Kardong-Edgren, Jeffries. 2014). Simulation is a process involving a realistic patient scenario and safe environment, in which students participate in active learning through demonstration of patient care and reflection (Bland, Topping, & Wood, 2011). Medicine has been using simulation techniques in education since the 1960s (Issenberg & Scalese, 2008). Despite the success in other disciplines, the profession of nursing did not really begin to use simulation as a teaching and learning modality until the turn of the century (Nehring & Lashley, 2010).

Simulation has become an integral aspect of nursing education (McGovern, Lapum, Clune & Martin, 2012). The International Nursing Association for Clinical Simulation and Learning (INACSL) developed a Standards of Best Practice for Simulation. It was designed to provide evidence-based guidelines for the implementation of and training for simulation

(INACSL, 2016). These guidelines cover simulation design, outcomes and objectives, facilitation, debriefing, participant evaluation, professional integrity, simulation-enhanced interprofessional education, and a simulation glossary.

It is important for schools that use simulation to follow these best practices. Simulation can only be reliable as a teaching and learning modality and as an evaluation strategy if it follows the evidence of prior research. Developing standardized terminology and guidelines enhances understanding between facilitators and learners and provides a base for simulation education (INACSL, 2016). If simulation experiences do not follow these best practices, students may not be gaining the proper experience or education (Hayden et al., 2014).

Despite the increased use of simulation in nursing education (Hayden et al., 2014), there is still much to be learned about its effectiveness (Leach, 2014). Much of the research in the literature is aimed at examining student confidence and attitudes towards simulation as a learning modality (Chiang and Chan, 2014). Frequently, research in a new area or on a new concept begins with qualitative analysis to understand and describe the nature of the phenomena. After building the base of knowledge, quantitative analysis is undertaken to concretely quantify data through tests and statistical analysis (Melnyk & Fineout-Overholt, 2011). More research is needed on the effect simulation has on learning outcomes in nursing education.

Aim

Although there have been studies examining the effect simulation has on student learning outcomes, a gap in the literature still exists which warrants a review to explore the available literature regarding this aspect of simulation. The goals of this review are to

recognize emerging themes and identify knowledge gaps. The aim of this literature review is to describe the available evidence of the effect of simulation on nursing students' learning outcomes, specifically, clinical knowledge gain and application and clinical judgment.

Methods

A review of the literature was conducted to determine if simulation has an effect on nursing students' learning outcomes. In order to fully explore the literature, a broad approach was utilized. A computer-assisted search was conducted using multiple databases including CINAHL, OVID, ERIC, ProQuest, and Cochrane. The search terms *nurse* or *nursing* combined with *assess* or *evaluate* and *simulation* and *knowledge* or *clinical judgment* were used to identify studies relevant to the aim of the review. Studies that were not in English, published before 2010, or dissertations were excluded. The author reviewed all scholarly articles and ten relevant studies were found and included in the literature review.

Type of participants

In this review, studies that included a population of nursing students who participated in a simulation experience with medium- or high-fidelity human patient simulators were included.

Types of studies

Primary studies addressing the evaluation of simulation on student learning outcomes were included. Those studies were comprised several different designs, including: experimental, quasi-experimental, descriptive, qualitative, and mixed-methods studies. Meta-analyses and systematic reviews were also included. Studies were excluded if

they only utilized case study, role-play simulation, simulated interviews, or only examined student confidence or satisfaction.

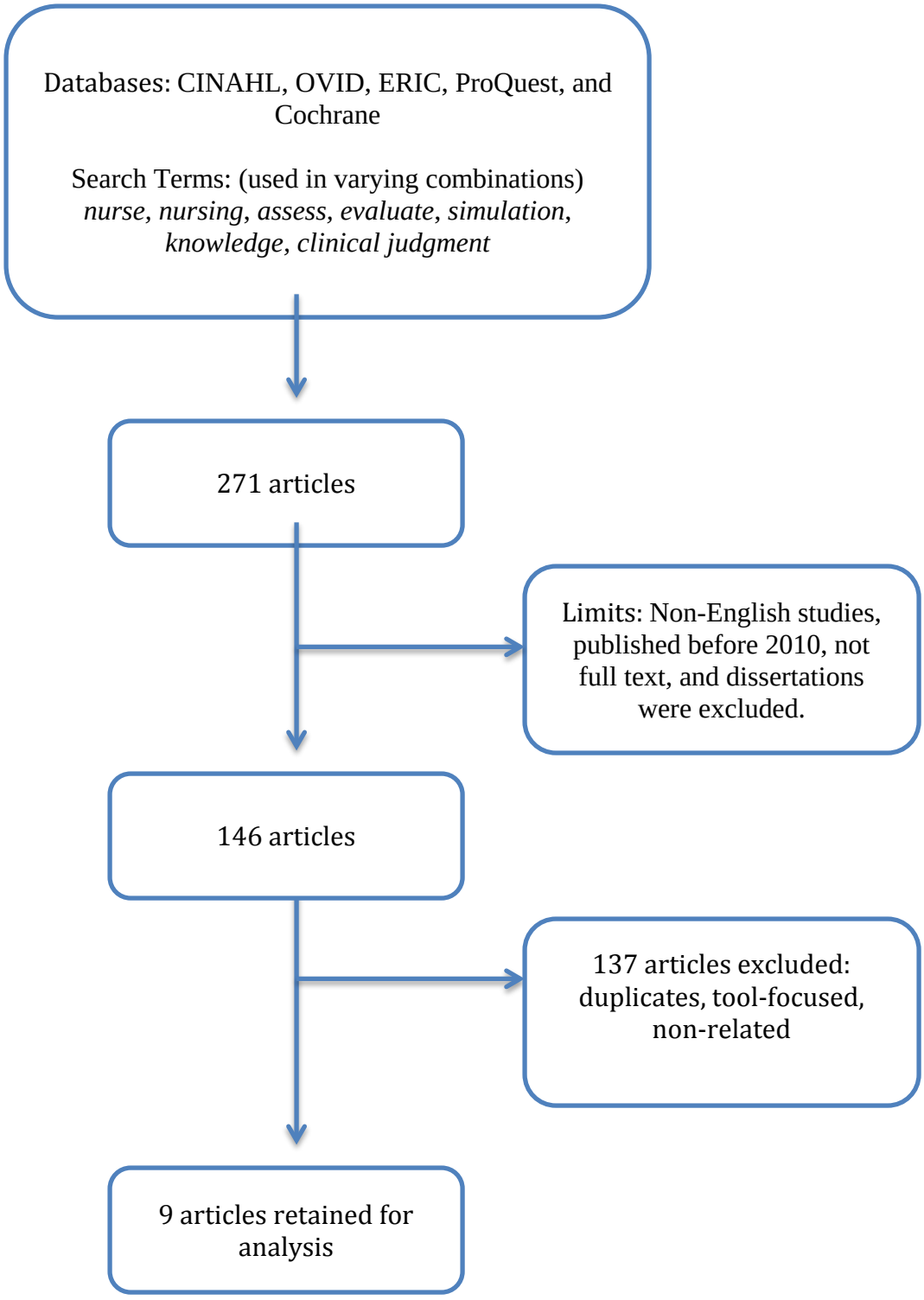


Figure 4 Literature Review Search Figure

Literature Review Analysis

A summary of the literature utilized in the review can be found in the evidence table after the Findings section.

Major Concepts

Two major concepts emerged in the review of the literature: knowledge acquisition and clinical judgment. For each of these concepts, sub-concepts emerged as well. In knowledge acquisition, themes of skills, cognitive processes, and subject matter were identified. The sub-themes of actions and thought processes were identified for the concept of clinical judgment.

Assumptions

There are assumptions in every study and review of the literature. An assumption is a belief that is accepted as true, even if there is no proof provided (Gray, Grove, & Sutherland, 2017). In this review of the literature, there are three major assumptions. The first assumption is that simulation is "a dynamic process involving the creation of a hypothetical opportunity that incorporates an authentic representation of reality, facilitates active student engagement and integrates the complexities of practical and theoretical learning with opportunity for repetition, feedback, evaluation, and reflection" (Bland, Topping, & Wood, 2011, p. 668). The second assumption is that interdisciplinary simulation "occurs when two or more health care professions engage autonomously in highly realistic scenarios to learn with, from and about each other, in a safe and controlled manner" (Gough, Hellaby, Jones, & MacKinnon, 2012, p. 154).

Webber (2002) defines knowledge as "the cumulative, organized, and dynamic body of scientific and phenomenological information used to identify, relate, understand, explain, predict, influence, and/or control nursing phenomena" (p. 17). This refers to the assumption that the term knowledge in this review refers to cognitive knowledge application. Finally, the last assumption is that clinical judgment is "the conclusion about a patient's needs, concerns, or health problems, and the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response (Billings & Halstead, 2012).

Perspectives

Several perspectives have emerged in this review of the literature. Some of the studies use strictly a pre-test/post-test or questionnaire method to collect information. These data can be described as the student perspective. Other studies are observational, and therefore come from the perspective of the instructor or researcher. Only one study in this review utilizes multiple methods of data collection and examining simulation from both the perspective of the student and instructor or researcher. It is important that this review contains both of these methods, as this study will use both a pre-test/post-test design and observational methods to collect data.

Biases

Unfortunately, bias can occur in the most thorough of literature reviews (Gray et al., 2017). In this review, possible biases may include publication bias, time-lag bias, and language. Publication bias may have occurred, as studies with positive findings are more likely to be published and therefore available in a literature search. Time-lag

bias may have occurred as interdisciplinary simulation research involving nursing students is still in the early stages and negative results are usually published years later (Gray et al.). Finally, a language bias most likely occurred, as only studies published in English are included.

Strengths

It is important to include the strengths of the studies as well as the weaknesses. Discussing strengths aids in the dissemination and use of research findings (Gray et al, 2017). The strengths of the studies included in this review of the literature include strong study designs. Many of the studies use quasi-experimental designs and one used a randomized experimental design. Another strength is the use of pre- and post-tests to establish a baseline of student knowledge /skills prior to intervention. Significance, in a statistical sense, applies to all of these studies that used inferential statistics. Several studies also used a control and an intervention group, which add strength to the findings.

Weaknesses

Although there are many strong aspects to the research studies included in this review, there are several weaknesses as well. Every study used a convenience sample. While this may be a necessity due to the type of research being conducted, it can have an effect on the generalizability of the findings. Many of the studies also had small sample sizes, which limit power. Several of the studies also used self-reporting methods to collect data, and this can be biased.

Limitations

This review also has several limitations. The small number of studies included in the review, excluding any studies not written in English, and those published before 2010 could have impacted the outcomes of the review or addressed some of the gaps in the literature. This review examines three different, although related, topics which split the focus and reduced the amount of articles included for the respective topics.

Findings

In the ten articles reviewed, there were two major themes: knowledge and clinical judgment. There have been more studies examining the outcome of knowledge acquisition and retention related to simulation; therefore there is more data available for this aspect. Included in this review, seven studies examined knowledge acquisition while only three examined clinical judgment.

Knowledge

Many studies examine knowledge acquisition as an outcome of simulation. This dissertation defines knowledge as: the body of scientific and phenomenological information, which is dynamic and ever changing. This information is then used in every aspect of nursing phenomena, from identification to influence and control (Webber, 2002). Knowledge acquisition is an important learning outcome, with seven out of the ten articles included examining this aspect of simulation.

Cooper et al. (2010) utilized simulation to evaluate final semester nursing students' ability to care for a deteriorating patient. They used a mixed methods design to measure student knowledge and skills performance. They discovered students had satisfactory knowledge, but had deficits in managing patients. This study was the only one to have

students participate in two (although different) simulations. Cooper et al. (2010) found that overall students had improved skill performance in the second simulation experience even though skills deteriorated as the patient status declined. This study showed that students may not be adequately prepared upon graduation to adequately care for deteriorating patients.

Students perform significantly better on course content related to the simulation experience and demonstrate superior knowledge than students that do not participate in a simulation experience (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010). Elfrink et al utilized a paired t-test to determine the average of student improvement from the pre-test to the post-test. They also gauged student learning from pre-to post-simulation using a one-sample t-test. This is uncommon for many studies, and adds strength to the data.

Levett-Jones, Lapkin, Hoffman, Arthur, and Roche (2011) reported students who participated in high fidelity simulation versus medium fidelity simulation had higher post-test scores, but the finding was not statistically significant. This study was quasi-experimental and demonstrated moderate evidence strength. In order to measure the effectiveness of the simulation, the authors had students complete a multiple-choice post-test. They discovered this method does not fit the purpose of simulation and may not yield accurate results. (Levett-Jones et al). This study also only examined the difference between medium- and high-fidelity simulations experiences. This does not give a complete picture of the advantage of using simulation, as there was no control group without a simulation experience.

Luctkar-Flude et al. (2015) reported results showing second-year students scored significantly better on the post-test following an experience with an unresponsive patient

simulation scenario. Third and fourth year students also participated in the study. Although their knowledge scores increased, it was not statistically significant. Fourth year students had the highest overall performance scores in the simulation experience. This is most likely due to their experience. The second year students went into the simulation with the least knowledge, and therefore stood the most to gain and learn. Simulation offers students the opportunity to address the knowledge gap of caring for unresponsive patients (Luctar-Flude et al).

Venkatasalu, Keller, and Shao (2015) found a theme of increased knowledge synthesis and retention in their qualitative phenomenographic study. They reported simulation better prepares first-year students for end of life care in the clinical setting than lecture alone. Students were able to learn through putting knowledge into practice.

Yuan et al. (2012) completed a systematic review to determine if student performance can be improved through a simulation experience. This review delivered mixed results. Students who participated in high-fidelity simulation were found to have higher test and skill scores. However, students had mixed results on objective structured clinical examinations (OSCE), some students' scores decreased while others increased.

Clinical Judgment

In a multi-site study, Fawaz et al. (2016) examined the impact of using high-fidelity simulation on the development of clinical judgment and motivation among nursing students. Researchers used a pre-test/post-test design with a control group to increase the reliability of the findings. They found students who participated in the high-fidelity simulation experience had significantly higher scores in both clinical judgment and motivation.

Lindsey and Jenkins (2013) used simulation to educate nursing students on a rapid response situation. The control group received the traditional "code blue" education while the intervention group participated in a simulation experience. Students who participated in the simulation experience had significantly higher post-test scores than students who received the traditional education (Lindsey & Jenkins).

Page-Cutrara and Turk (2017) examined a specific aspect of simulation, the pre-briefing experience. The control group had traditional pre-briefing while the experimental group had structured pre-briefing, which was the same, but included worksheets and facilitated reflection. They found that students who participated in the structured pre-briefing experience demonstrated higher competency performance and clinical judgment. Their findings demonstrate the importance of engaging in best-practices in simulation education.

Discussion

There was evidence in the literature that simulation positively affects learning outcomes of nursing students. Most of the evidence indicated that simulation improved nursing student knowledge development and retention as well as skill development. In all of the studies included in this review, simulation was associated with higher test grades or scores. Two of the studies showed significant improvement in student knowledge of the subject matter (Elfrink et al, 2010) , improvement in test scores and a significant difference between the control and intervention groups in favor of simulation (Fawaz & Hamdan-Mansour, 2016). However, there were not significant findings in all of the studies. Although Levett et al. (2011) and Venkatasalu, et al., (2015) found test higher scores in their study, there was no statistically significant improvement. Another example is in the

study conducted by Luctkar-Flude, et al., (2015). They also did not find any significant difference in knowledge acquisition between groups and even found overall poor performance of older students.

While many studies include knowledge in their assessment of simulation, far fewer examine the relationship between clinical judgment and simulation. This review included two of those studies and both showed a significant difference in clinical judgment after a simulation experience. Fawaz and Hamdan-Mansour (2016) found a significant difference between the control and intervention groups regarding clinical judgment. While Lindsey and Jenkins (2013) found significantly higher scores in clinical judgment in both the pre- and post-tests as well as between the control and intervention groups.

The findings presented in this review are congruent with previous assessments of the state of simulation science. Many studies produce positive results, but additional and higher-quality research with larger sample sizes are needed to enhance the science (Yuan, Williams, & Fang, 2012). Further research on the effect simulation has on knowledge and clinical judgment will richen the literature related to the learning outcomes of nursing students in simulation.

Table 1
Quantitative Studies

Author Year Country	Research Question or Hypothesis	Design Sample	Measures	Analyses Used	Findings	Strengths/Limitation
Cooper et al. 2010 United Kingdom	To determine the ability of nursing students (in their final semester) to care for a deteriorating patient and determine relationships between knowledge, situation awareness, and skill performance.	Mixed-methods study N = 51	All participants attended a nursing laboratory experience. The completed a knowledge questionnaire and participated in two deteriorating patient simulations. The simulations were randomly stopped and students were questioned to determine student situation awareness.	An assessment of normalcy was completed on the variables of knowledge, skill performance (SP), and situation awareness (SA). Parametric analysis was then completed. Frequencies and percentages were used for demographic data. Inferential statistics were used for relationships	Knowledge (M=74%) and skill performance (M=60%) were adequate across the two simulation scenarios. Skills performance by students significantly improved ($p<0.01$) by the second simulation. However, skill performance significantly declined as the patient condition deteriorated. Mean SA was 59% with higher scores	Mixed-methods, high Cohen scores Participants only 46%, small sample size, one site

				. Pearson product-moment correlation was used for scale variables. Spearman's rank-order correlation was used for normally distributed variables. Independent group t-tests were used for demographic variables and mean assessment scores. Repeated-measurement t-tests were used for participant differences between related scores. Finally, Cohen's kappa was used for	relating to physiology (77%) than comprehension (44%). Authors concluded that students may not be prepared well enough to deal the deteriorating patients.	

				inter-rater ratings.		
Elfrink, et al, (2010) United States	To inform teaching practices through the measurement of cognitive learning outcomes associated with human patient simulation	Quasi-experimental study N = 84 n = 41 second-year students n = 43 third-year students	Students prepared for simulation and answered a two question assignment, participate in simulation and debrief, and complete the same two question assignment.	Descriptive before and after frequencies were conducted, average improvement pre- to post-simulation were calculated using a paired t-test, a once-sample t-test was used to gauge learning as well as retention.	There was improvement in students' subject matter knowledge during the simulation (p=0.000) and retained that knowledge until the final exam (p=0.005).	Quasi-experimental design No control group, only limited to cognitive knowledge, sample came from the same school of nursing
Fawaz & Hamdan-Mansour 2016 Lebanon	To examine the impact of using high-fidelity simulation on the development of clinical judgment and motivation among nursing students	Quasi-experimental post-test N = 56	The control group received tradition method demonstration while the intervention group received the simulation method on heart failure. All participants	Descriptive statistics were used for demographic analysis and a t-test for two independent samples was used to examine a	There was a significant difference post HFS between the intervention and control groups in clinical judgment ($t = 5.23$, $p < 0.001$) and	Quasi-experiential design Control group and intervention group Convenience sample, small sample size, no pre-test scores to see if there was a change over time.

			attended a hospital setting where students demonstrated nursing skills and knowledge on a patient with heart failure. At the end of clinical practice, all students were evaluated by the researcher.	difference between the groups.	motivation ($t = -6.71$, $p < 0.001$).	
Levett-Jones, et al. (2011) Australia	To measure and compare knowledge acquisition in nursing students in medium or high fidelity simulation experiences.	Quasi-experimental N = 84	Participants were placed into two groups control (medium fidelity) and intervention (high fidelity). They took pre- and post-tests to determine knowledge acquisition.	Independent *t*-test was used to determine if there was statistical significance between the scores. ANOCVA was used to determine if changes in knowledge occurred over time.	Although changes in test scores was observed, it was not statistically significant between the control and intervention groups ($p>0.05$), including the mean scores and changes in knowledge over time ($p>0.05$).	Quasi-experimental design The pre- and post-tests used may not have been the best choice to show knowledge attainment.

Lindsey & Jenkins 2013 United States	To examine the impact of a simulation experience on student nurses' clinical judgment regarding managing patients in rapid deterioration.	Randomized pre-test/post-test design N = 79	All students were pre-tested, control group received traditional code blue and rapid response education and received post-test after. Intervention group received a novel education intervention and were post-tested after.	Descriptive statistics were used for demographic analysis and a independent sample t-test was completed to compare the two groups test scores.	The intervention group scored significantly higher ($t(77) = 7.65$, $p < 0.001$) than the control group.	Randomized experimental design, larger sample size The intervention group received training on RRT and the control group did not. Convenience sample
Page-Cutrara & Turk 2017 Canadat	To determine the effect a structured pre-briefing has on nursing student competency performance, clinical judgment, and experience	Experimental randomized-group design N = 76	This took place with two different cohorts over two semesters (Spring and Fall). The control and experimental groups were randomized by course section. The control group had traditional pre-briefing while the experimental group had structured pre-	SPSS was used to analyze the variables. Independent sample t-tests were used to compare total CCEI scores between groups. ANCOVA was used to compare the groups controlling for the semester. A	Competency performance ($p<0.001$), clinical judgment ($p<0.001$), and student experience ($p<0.001$) were all significantly higher in the experimental group. No relationship was found between pre-briefing and simulation	Experimental design, valid and reliable tools, Small sample size, one study site, may have selection bias with volunteer students

			briefing which was the same, but included worksheets and facilitated reflection. Both lasted less than 30 minutes. The experimental group then filled out the Prebriefing Experience Scale and everyone participated in a 15-minute chest pain simulation. During the simulation, data collectors used the Creighton Competency Evaluation Instrument and it's sub-scale, Clinical Judgment. All participants participated in a 15-minute debriefing experience.	Mann-Whitney U test was used to compare distribution scores on the CCEI-CJ and once again, ANCOVA was used to control for the semester. A Mann-Whitney U test was used to compare the distribution of the PES scores. A Spearman's rho correlation coefficient relation was used to examine relationships between groups and PES scores and CJ scores and PES scores.	performance.	

Shin, et al. (2015) Korea	To identify the best available evidence about the effects of patient simulation in nursing education	Meta-analysis N = 20 studies included	A search was undertaken using EBSCO, Medline, ScienceDirect, and ERIC. Inclusion criteria consisted of partial-task trainers, human patient actors, full body task trainers, or high fidelity mannequins. Studies needed to have quantitative outcomes that focused on nursing student learning. Studies must have an experimental or quasi-experimental design, subjects must be nursing students or nurses. Exclusion criteria consisted of computer-based virtual patients	Effect sizes were calculated using comprehensive Meta-Analysis version 2, fixed effects models were uses to find common effect size, random effects models attempted to estimate distributions of mean effect size, a homogeneity test looked for statistical significance.	There were significant post-intervention improvements in various domains for participants who received simulation education compared to control groups with a mean difference of 0.71. In subgroup analysis, simulation education in nursing has benefits on performance and psychomotor skills.	Utilized Kirkpatrick's four levels of evaluation. Limited number of studies, small participant numbers in the studies used, did not provide level of evidence of studies used.

			and computer software. Studies that did not report a control group, results comparing a group that received simulation with a control group, non-empirical studies, or literature reviews, and qualitative studies.			
Yuan, et al. (2012) China	To complete a systematic review exploring the evidence to determine if performance can be enhanced by high-fidelity simulation	Systematic review N = 26 studies including RCT, non-	A search was undertaken using CINHAL, ProQuest, MEDLINE, Science Direct, OVID, and	Two independent reviewers assessed the eligibility and methodologi	Only nine English and seventeen Chinese studies measured the differences in	Only included higher-quality studies and used JBI levels of evidence Does not provide robust evidence

		RCT, and quasi-experimental studies	Chinese Academic Journal. The search terms were used individually and in combinations were: high-fidelity simulation, knowledge, skill, effect, nursing, medical, and education. Inclusion criteria comprised of empirical studies determining the effects of high-fidelity simulation on knowledge and skills in nursing or medical education. Studies were excluded if they employed a review or case methodology, described interventions without evidence of	cal quality of the studies. Level of evidence was assessed with the Joanna Briggs Institute (JBI) levels of evidence while quality of controlled trials was evaluated with the Jadad scale. Data from RCTs were analyzed by meta-analysis using RevMan software. Heterogeneity between combines studies was tested using the standard chi-square test.	knowledge (by 0.53 points) and skills (by 1.15 points) after high-fidelity simulation. High-fidelity simulation enhanced scores on knowledge and skills exams, but OSCE (decreased by 0.82 points or increased by 1.17 points) performance was mixed.	about the effect of high-fidelity simulation on OSCE performance.

			evaluation or used role-playing, standardized patients or low/mid-fidelity simulation as the comparison group.			

Table 2
Qualitative Studies

Author Year Country (if appropriate)	Research Question / Purpose	Design Sample	Data Collection Strategies s	Findings	Strengths/ Limitations
Luctkar-Flude, et al., (2015) Canada	Describe learner experience, knowledge, confidence, and performance of assessments and interventions for the unresponsive patient across 3 years of an undergraduate nursing program.	Descriptive cross-sectional study N = 239 Second, third, and fourth year Bachelor of Nursing Science students	Participants completed an open-ended knowledge quiz, self-confidence scale, satisfaction scale, and experience survey. Raters completed a critical behavior performance checklist on the participants.	Overall knowledge, confidence, and performance scores were similar between second-, third-, and fourth-year students; however performance times for many critical assessments and interventions were poor. Second-year nursing students' knowledge increased following the new model (p=0.002).	Large sample size Single-site study Performance checklist completed based on group work, not individuals

Venkatasalu, et al., (2015) UK	To design, use, and assess the effectiveness of high-fidelity simulation teaching versus classroom-based end-of-life care teaching for first-year students	Phenomenology approach N = 12 N = 7 simulation-based N = 5 classroom-based	12 individual semi-structured interviews were conducted	Both strategies improved student knowledge, simulation-based learning was perceived as better in terms of enhanced practical skills and improved emotional experience	Phenomenographic approach allows for examination on how people experience a given phenomena. This shows both the similarities and differences. "Insider effect", students discussed learning methods outside of the study,

What Remains Unclear

This review of the literature uncovers the gap of available information on the effect simulation has on nursing students' clinical judgment. More definitive research examining the benefits and effects of simulation is needed. Many of the current studies examine student feelings and beliefs rather than learning outcomes. Although self-efficacy is important to examine, nurse educators need more evidence to ensure they provide students with the best education possible. More research is also warranted on the effects of simulation on clinical judgment. There are not many studies available on this topic, which can lead to a bias in the literature. It becomes essential to conduct studies to generate knowledge when there is a distinct lack of evidence to guide practice (Melnyk & Fineout-Overholt, 2011). In order to have strong, evidence-based practice, replication studies are needed to enhance the credibility of research (Polit & Beck, 2012). These studies reduce the possibility of error and add to the generalizability of the findings (Gray et al., 2017). Further research in this area coupled with examining the effects simulation has on knowledge can lead to changes in the way nurses are educated and better patient outcomes.

In all ten of the studies included in this review of the literature, simulation is being used as both a teaching and evaluation modality. When it is being used as a means to evaluate student learning outcomes, it is formative. Formative evaluation can occur any time throughout the learning process. The teacher uses the evaluation to identify student weaknesses and areas that need improvement (Caputi, 2010). The current conceptual definition of simulation only discusses the evaluative aspects of simulation in the form of

summative evaluation. Summative evaluation occurs at an end point of the learning process, this can be at the end of a semester or at the end of a program (Caputi).

Manuscript One: "Simulation as a Learning and Evaluation Modality: A Concept Analysis"

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Abstract

A concept analysis was conducted to clarify the definition of simulation as a learning modality and method of evaluation. Due to the lack of clarity and the upsurge of multiple uses for simulation, a new definition is warranted. A broad approach was utilized in order to fully explore the literature. A computer-assisted search was conducted using multiple databases including CINAHL, OVID, ERIC, ProQuest, and Cochrane. Nursing and education books, dictionaries, and thesauruses were also reviewed to determine the meaning of simulation. Exclusion criteria included studies that were not in English, published before 2010, or dissertations. After conducting the analysis, a new conceptual definition is proposed. This new definition allows nursing educators to utilize simulation as a teaching methodology and an evaluation method while highlighting the need for adequate simulation training.

Key words: simulation, evaluation, teaching methodology, nursing student, definition

Simulation as a Learning and Evaluation Methodology: A Concept Analysis

Simulation as a teaching-learning modality in nursing education has been increasing over the past several years (Caputi, 2010). Most programs use simulation as a learning modality; however, some are beginning to use it as an evaluation method as well (Leach, 2014). There are currently two conceptual definitions in the literature regarding simulation, one focuses on simulation as a learning methodology while the other focuses on simulation as a summative evaluation methodology. Minimalizing formative evaluation in the conceptual definition of simulation in nursing education can give rise to confusion and inconsistencies in research (Meleis, 2012). It is vital to address this issue to close the gap in knowledge and practice. This report will offer a new definition of the concept of simulation based on literature exploring simulation as a learning methodology and as a formative and summative evaluation method. The Walker and Avant (2011) modified version of Wilson's (1963/1969) concept analysis plan was used to guide this analysis.

Background

Nursing educators are tasked with providing students a clinical experience that will enhance the application of theoretical knowledge learned in the classroom (Shin, Park, & Kim, 2015). The current health care system is extremely complex and continually evolving to meet patient needs (Yuan, Williams, Fang, & Ye, 2012). This presents many challenges for nursing education. Clinical sites and hours available to practice are limited, increased security provides charting access challenges, and there is a shortage in nursing faculty (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010). These constrained clinical opportunities coupled with shortened patient stays limit student practice with real patient care situations which can affect the students' ability to cultivate clinical competence and capacity to care

for patients as well as apply theoretical knowledge learned in the classroom (Yuan, Williams, & Fang, 2012).

In nursing education, simulation is an active learning process in which students usually participate in groups to provide care for a patient. This may occur in the form of a manikin, actor, or standardized patient (Jeffries, 2012). A variety of manikins exist for nursing education simulation purposes, they range from simple task trainers to medium- and high-fidelity manikins (Jeffries, 2005). The level of fidelity must be matched with the learning goals of the students (Caputi, 2010). Students take on a designated role in an evolving case study to address issues and learn first-hand the effects of their decisions (Rourke, Schmidt, & Garga, 2010). Immediately following the simulation activity, a period of debriefing takes place. The debriefing period consists of a structured discussion led by the facilitator to guide students in self-reflection and analysis of the experience; this is an integral part of the learning process (Caputi, 2010).

Simulation provides an opportunity for students to bridge the gap between classroom knowledge and clinical practice in a safe and realistic learning environment (Jeffries, 2012). Providing a realistic environment in which there is no impact or threat to actual patients reduces student anxiety about causing patient harm (Luctkar-Flude et al, 2015) and creates a safe environment where students can concentrate efforts on personal learning (Raurell-Torreda, et al, 2015). The military has found that simulation is an excellent way to "teach students complex skills and build team and individual knowledge" (Coleman, 2001, p. 73). Levett-Jones, Lapkin, Hoffman, Arthur, and Roche (2011) list the claimed benefits of simulation as students are actively involved in unpredictable, time-sensitive, and challenging clinical situations that they may only be able to observe in a real-

life situation, learn from mistakes without patient harm, practice skills, participate in interprofessional communication and teamwork, and provide the opportunity for formative and summative assessments.

Significance to Nursing Education

Simulation as a part of the nursing curriculum is becoming more and more common (Shin et al., 2015). In a recent study, the National Council of State Boards of Nursing (NCSBN) found that over 900 nursing programs in the United States were using medium- to high-fidelity patient manikins in the curriculum (Hayden et al., 2014). Simulation is considered a recommended teaching-learning strategy in nursing education to aid in the development of clinical skill (Venkatasalu, Kelleher, and Shao, 2015).

Simulation has shown to have positive effects on nursing student confidence and self-efficacy (Leach, 2014). Chiang and Chan (2014) found that simulation led to a significant increase in student critical thinking and another study found an increase in student knowledge acquisition and retention after a simulation experience (Akhu-Zaheya, Gharaibeh, & Alostaz, 2012). Other studies have found inconclusive evidence regarding simulation and student clinical judgment, warranting further investigation. In addition to serving as a teaching-learning methodology, simulation is also being used as both a formative and summative evaluation method (Billings & Halstead, 2012, Leach, 2014).

It is important for simulation facilitators to be well versed in simulation as a learning modality. The rigor of simulation must be upheld in order for students to benefit from this form of instruction (Hayden et al., 2014). Unfortunately, this is not seen across the United States in every program that utilizes simulation as a learning methodology

(Rutherford-Hemming, Lioce, Kardong-Edgren, Jeffries, & Sittner, 2015). It is often not reported in studies if these standards are being met.

Consequences

The effects of an incomplete conceptual definition of simulation can be seen throughout the literature. In the absence of a complete definition, a lack of rigor and objective evaluation in the research regarding simulation has been observed (Liaw, Scherpbier, Rethans, & Klainin-Yobas. 2012). Yuan, Williams, and Fang (2012) claim learning outcomes of simulation research are inconsistent and vary in rigor and focus. Moreover, this concern also applies to the small but growing set of studies using simulation as a means of evaluation. There is also a lack of simulation training for faculty and staff (Rutherford-Hemming et al., 2016), which is required to meet the International Nursing Association for Clinical Simulation and Learning (INASCL) standards of best practice. It is vital that nursing research regarding simulation education practices be reliable and valid. There is a current call for schools of nursing to design curricula from evidence-based educational modalities (Jalali-Nia, Salsali, Dehghan-Nayeri, & Ebadi, 2011). The education of nurses needs to be informed by evidence just as clinical medicine is informed by evidence (Cook, 2014).

Due to the confusion and toll this incomplete definition has taken on simulation research, action needs to be taken. Meleis (2012) argues that a concept analysis is an excellent strategy for developing concepts. Walker and Avant, (2011) agree with this thought, claiming concept analyses can be used to refine the concepts in a theory. Once a concept analysis is completed, it cannot be considered the end of the road (Bland, Topping, & Wood, 2011), as knowledge is fluid and ever expanding. Both concepts and attitudes may

change over time, thus requiring a new concept analysis (Walker & Avant). Based upon these arguments, a new concept analysis was needed for simulation as a learning and evaluation methodology.

Study

Aim

The need for a broader definition of simulation warrants a review of the concept. The gap created by this definition can lead to confusion (Meleis, 2012) and insufficient use of simulation in nursing curricula. The aim of this analysis is to explore, clarify, and define the concept of simulation as an evaluation method. The goals of this concept analysis are to better enhance simulation in nursing education as learning strategy, evaluation method, and thereby improve nursing education and research in this area.

Method

As stated above, the phenomenon of simulation as an evaluative method needs to be clarified and redefined to encompass its many elements. While implementing this undertaking, it is important to include the philosophical basis throughout the project in order to assess the current knowledge of simulation as an evaluative method and construct new and improved concepts to clarify the definition (Rodgers, 2005).

This concept analysis was accomplished utilizing the Walker and Avant (2011) modified version of Wilson's (1963/1969) classic concept analysis procedure. The goals of this concept analysis are to better enable simulation in nursing education as learning strategy, evaluation method, and thereby improve nursing education and research. As stated above, Walker and Avant's (2011) modified version of Wilson's (1963/1969) method of concept analysis was utilized. In Wilson's classic method, eleven steps of the

process are outlined. This modified version is found to be more user-friendly and appropriate for nursing (Meleis, 2012). Walker and Avant have modified that down to only eight steps, which they claim is "sufficient to capture the essence of the process" (p. 159). These steps include the selection of a concept, determining the reason for analysis, identifying all uses of the concept, determining the defining attributes, finding a model case as well as borderline, related, contrary, invented and illegitimate cases, identifying antecedents and consequences, and defining the empirical referents (Walker & Avant, p. 160).

This author performed the concept analysis under the historicist view of science, specifically utilizing Toulmin's idea of science. In order to gain understanding of scientific activity, historicism classically places greater importance on the processes and contexts utilized (Rodgers, 2005). Historicism proclaims that in order to fully understand a concept or phenomenon, one must first consider its place in historical development (Rodgers). Tolumin takes this a step further and places great emphasis on concepts and the continuing expansion of knowledge and science (Tolumin, 1972).

Data sources

A broad approach was utilized to complete a thorough search in order to explore the literature fully and identify all uses of the concept and not limit the outcome (Walker & Avant, 2011). A computer-assisted search was conducted using multiple databases including CINAHL, OVID, ERIC, ProQuest, and Cochrane. Nursing and education books, dictionaries, and thesauruses were also reviewed to determine the nature of simulation. The search terms *nurse* or *nursing* combined with *assess* or *evaluate* and *simulation* and *outcomes* were used to distinguish studies relevant to the aim of the review. Exclusion

criteria included studies that were not in English, published before 2010, or dissertations. Studies were also excluded if they used case study, role-play simulation, simulated interviews, or only examined student confidence or satisfaction. The terms *nurse* or *nursing* were also removed to include definitions from other disciplines.

Primary studies addressing simulation as an evaluation method were included. This comprised of experimental, quasi-experimental, descriptive, qualitative, and mixed-methods studies. Meta-analyses and systematic reviews were also included. The participants of the studies included in the analysis comprised of nursing students who participated in a simulation experience with human patient simulators.

Results

The first two phases of concept analysis, selecting a concept and determining the reason for analysis were completed simultaneously. Simulation in nursing education was chosen after the tasks of soul-searching and a review of the literature were completed by the author to find a topic that was interesting, important, and manageable, as Walker and Avant (2011) suggest. Based on the review of the current literature, the aim of the analysis was determined to be performing a concept analysis that describes simulation as a teaching-learning strategy and a summative and formative evaluation method. This is vital to keep the analysis on track and focused (Walker & Avant).

Uses of the concept

This analysis is attempting to define evaluation through simulation; therefore, both the concepts of simulation and evaluation will be discussed. It is important to identify all uses of the concept available (Walker & Avant, 2011). Examining the concepts from the nursing, medical, educational, military, and general perspectives provided a diverse base.

The search for uses of simulation began with dictionary definitions. Some general definitions of simulation include "to imitate or reproduce the appearance, character, or condition" (The Concise Oxford English Dictionary, 2015) or "the act or process of pretending" (dictionary.reference.com, 2015). Medically, simulation has been referred to as "imitation of symptoms of one disease by another" (Taber's, 2001) and "a reproduction or representation" (medical-dictionary.com, 2015). To gain perspective from the military, Page and Smith state "*modeling* and *simulation* refers to the use of models, including emulators, prototypes, simulators, stimulators, either statically or over time, to develop data as a basis for making managerial or technical decisions. The terms "modeling" and "simulation" are often used interchangeably" (2001, p. 54).

Turning to textbooks and the available literature provides a more concise definition of simulation in the realm of nursing education. Jeffries (2005) describes simulation as "a student or group of students providing care for a patient who is represented by a manikin, an actor, or an SP (standardized patient), depending on the clinical situation" and an activity "observed by faculty" (p. 3). Caputi (2010) claims simulation is a "technique or device that attempts to create a realistic representation of the real world" (p. 30). While descriptive, these definitions do not fully explain the concept of simulation. Hansen and Bratt (2015) define "competence acquisition in (simulated learning experiences)… as a summative student demonstration of essential behaviors, safety, clinical judgment, knowledge application, and psychomotor skill occurring in a structured, controlled, and authentic environment, as evaluated by a trained instructor based on predetermined competency objectives" (p. 106). This definition only looks at evaluating simulation in a summative manner.

Identifying the use of the concept of evaluation occurred in the same fashion as simulation. Evaluation is defined as the process of judging "the value or condition of (someone or something) in a careful and thoughtful way" (Merriam-Webster, n.d.). Taber's (2001) describes evaluation as a judgment and the final step in the nursing process, which can be formative or summative (Caputi, 2010)

Examining the literature provided further clarification of the use of evaluation. Hansen and Bratt (2015) define evaluation as the "outcome of the assessment process" (p. 104), while Billings and Halstead (2012) describe it as "next level of judging the value and quality of performance at a defined end point" (p. 441). Another definition offered by McDonald (2014) provides guidance to nurse educators stating that evaluation is "a value judgment that attaches meaning to the data obtained by measurement and gathered through assessment. It is guided by professional judgment and involves interpreting what the accumulated information means and how it can be used" (p. 13). Formative evaluation is an on-going process throughout the learning experience and allows the instructor to identify where the student is strong and weak (Caputi, 2010). Summative evaluation occurs at the end of a formal learning experience, such as at the end of a semester or just prior to graduation (Caputi).

Defining attributes

Walker and Avant (2011) describe determining the defining attributes as the core of an analysis. Several characteristics were identified with both simulation and evaluation that formed themes across the available resources. These are the fewest possible attributes that clearly depict the concept (Walker & Avant). The defining attributes identified regarding simulation include: a realistic situation, active participation, reflection, and

trained facilitators. The defining attributes identified regarding evaluation include: demonstration, assessment, and objectives.

Providing a realistic learning environment for students emerged as a defining attribute. Tubaishat and Tawalbeh (2015) describe a realistic environment as a valuable aspect of the simulation experience. This is partly due to the fact that a realistic learning environment can supplement an inadequate clinical experience (Yaun, Williams, Fang, & Ye, 2012). A realistic environment in a simulation experiences provides the opportunity for students to actively participate in a situation they may not legally be allowed to in clinical with real patients (Caputi, 2010). A realistic environment also allows students to assess, intervene, and evaluate patient outcomes (Shin et al., 2015).

Active participation is also necessary in a simulation experience. Elfrink, et al. (2010) state students must be interactive in the experience to enhance knowledge and skills. Simulations provide active experiential learning experiences, which enhance knowledge gained through didactic lecture or written materials (Caputi, 2010). In order for simulation experiences to be successful, students must interact and engage with the learning activity first hand (Bland et al. 2011), which can better prepare students for clinical practice (Raurell-Torreda et al., 2015).

Reflection, usually in the form of debriefing, is another defining attribute of simulation. Reflection and support can facilitate learning (Schlariet, 2011). Engaging in self-reflection in a non-threatening environment allows students to maximize the effects of learning (Ahn & Kim, 2015). It aids in constructing confidence and should be included in every simulation experience (Jeffries, 2012).

Appropriately trained staff was the final defining attribute of simulation that emerged. Trained faculty and standardization of simulation is essential to producing high-quality simulation experiences (Rutherford-Hemming et al., 2015).

Demonstration is the act of showing how to do something (Billings & Halstead, 2012, p. 268) and necessary in evaluation through simulation (Hansen & Bratt, 2015). It is a tool of the evaluation process (McDonald, 2014). Visibly demonstrating a skill or process aids in retention (Billings & Halstead). Wunder et al. (2014) state that demonstration of skills leads to competency-based nursing curriculum.

Assessment and evaluation are two separate entitles (McDonald, 2014). Assessment is understood to be the process of evaluation (Hansen & Bratt, 2015) or the act of gathering information with a specific purpose in mind (Billings & Halstead, 2012). Billings and Halstead state the main purpose of assessment is to understand and improve student learning. Assessments are the building blocks of evaluation (McDonald).

The final defining attribute identified with evaluation is the presence of objectives. Clear objectives are a vital aspect of evaluation (Jeffries, 2012). Objectives allow the student to understand what is expected of them so they can strive for success (Billings & Halstead, 2012). The instructional process from learning to assessment and evaluation are guided by the clearly defined learning objectives (McDonald, 2014). The objectives of an evaluation will determine if it is formative or summative.

Model case

Meleis (2012) states that a model case is an example of what is, most certainly, the concept. These cases may be found in research or in reality. However, the author may also construct a model case for the purpose of clarifying the concept (Walker & Avant, 2011).

For this concept analysis, the author constructed two fictional model cases. The example of a case is one in which students participate in a simulation experience for evaluation purposes follows these guidelines mid-semester as a formative evaluation experience. The second case in one in which students participate in a simulation experience for evaluation purposes follows these guidelines at the end of the semester as a summative evaluation experience.

After learning about the concept of stroke evaluation and care in a lecture class, the students engage in a simulation regarding that topic. They enter the simulation center and receive pre-briefing and report on a patient. Once the students enter the patient room, they perform a patient assessment and recognize the signs and symptoms of a stroke. The students then contact the doctor and recommend the appropriate tests. After receiving the test results, students once again contact the doctor to obtain medication orders. They then administer the medication and provide instruction to the patient and family.

While this is occurring, the instructor trained in simulation education is observing the student behavior and as they concurrently assess a list of pre-determined objectives the students should follow. They are concurrently assessing the student performance as well using a valid and reliable tool. Upon completion of the scenario, the students and instructor engage in reflection of the scenario to reinforce learning and discuss mistakes.

Other cases

Walker and Avant (2011) state it is important to identify other cases as well, such as borderline or contrary cases. A borderline case is one that contains most of the defining attributes (Walker & Avant). An example of this would be a scenario as described in the model case, except the students do not engage in reflection at the end of the experience.

Reflection is an integral step in simulation, and a scenario that does not include this aspect cannot be considered a simulation experience (Jeffries, 2005).

According to Walker and Avant (2011) a contrary case is a scenario that is a clear depiction of what the concept is not. A contrary case for evaluation through simulation would be considered a simulation experience in which the students receive continuous feedback and guidance throughout the simulation. Student performance or knowledge is not evaluated throughout or at the completion of the simulation.

Antecedents and consequences

The next step identified by Walker and Avant (2011) is recognizing antecedents and consequences of the concept. Antecedents are defined as "those events or incidents that must occur or be in place prior to the occurrence of the concept" (Walker & Avant, p. 167). While performing the concept analysis of simulation as an evaluation method, several antecedents were identified. They include the suspension of disbelief, an open and safe environment, student and faculty investment in simulation, faculty training, and a grading rubric.

Consequences are defined as "those events or incidents that occur as a result of the occurrence of the concept" (Walker & Avant, p. 167). Several consequences were identified while performing the concept analysis. They include confidence, identification of student competence or the need for remediation, and the transfer of knowledge.

Empirical referents

The final step in Walker and Avant's (2011) concept analysis strategy is defining the empirical referents. Empirical referents encompass phenomena that demonstrate the occurrence of the concept (Walker & Avant). The presence of simulation evaluation tools

and student gains in knowledge, confidence, and satisfaction provide recognition to the analyst that evaluation through simulation did occur.

Definition

Based upon the concept analysis performed, the author of this paper presents the following definition of evaluation of nursing students through simulation:

> Simulation as an evaluation method is a process involving a realistic patient scenario and safe environment provided by an instructor trained in simulation education, in which students participate in active learning through demonstration of patient care and reflection. While the student is participating in the simulation, the trained instructor is observing and assessing student performance of cognition, psychomotor skills, clinical judgment, or critical thinking or any combination of these elements based on pre-determined objectives and using a valid and reliable tool for formative or summative evaluation.

This new definition allows nursing educators to utilize simulation as a teaching methodology and an evaluation method while highlighting the need for adequate simulation training. Including evaluation allows the educator to appropriately assess the students' learning outcomes in the simulation experience and in the overall course.

Arguments

Although there is a wealth of information regarding simulation, most of it does not examine student learning outcomes (Leach, 2014). Although some researchers are now beginning to explore the realm of student outcomes. For example, Shin, et al. (2015) state simulation improves learning outcomes in nursing students. Some nursing educators are now using simulation to evaluate learning outcomes as well (Billings & Halstead, 2012).

Despite overall student satisfaction with simulation as a learning modality, Schlairet (2011) discovered students expressed lower enthusiasm of simulation when it was used as an evaluation method. McDonald (2014) states that testing is not an appropriate time to teach. Evaluation through simulation combines learning and evaluation, which may be unfair to students. This increased anxiety demonstrates that educators need to express exact expectations to students and state if the simulation is to be a formative or summative assessment or a learning activity.

Limitations

While this analysis presented a thorough search and proposed a new conceptual definition of simulation, some limitations of the analysis remain. The literature search was limited to articles and other sources written in English, published after 2010, and did not include dissertations. A new definition may have been excluded. The definition was primarily examined from a nursing perspective. This may have limited the richness of the meaning by not fully exploring the definition through other disciplines.

Conclusion

Simulation is a valuable teaching-learning modality in the clinical learning of nursing students (Chiang & Chan, 2014) and a recommended component of curriculum (Venkatasalu et al, 2015). While simulation is usually employed as a learning strategy, its use as an evaluation method is increasing (Leach, 2014). This new use does not fit the current conceptual definition of simulation as set forth by Hansen and Bratt (2014). Incomplete conceptual definitions can give rise to confusion and inconsistency in research (Walker & Avant, 2011). This can be seen by the call for further research (Eggenberger, Keller, Chase, & Payne, 2012) that is found to be valid and reliable (Liaw et al. 2012). To

address this issue, this author proposes a new definition after conducting a thorough concept analysis.

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Kolb and Tanner Influences within the Concept Analysis

Although the concept analysis in this chapter uses Tolumin (1972) and historicism to guide the analysis, there are strong links to both Kolb's Theory of Experiential Learning (1984) and Tanner's Model of Clinical Judgment (2006) for this dissertation. Clarifying the concept of simulation allows for greater understanding of where this learning modality fits into Kolb's learning cycle. This has an impact on the appropriateness for using a borrowed theory in this nursing study and can translate to other studies in the discipline as well. Clinical judgment takes the knowledge the nurse has developed and uses it to reach a conclusion regarding the needs, concerns, or health problems of the patient and what action should or should not be taken (Tanner, 2006). This is developed after multiple experiences caring for patients. This concept analysis provides a broader definition which meets the needs of an experience as described by Tanner and provides support for the use of the model for this dissertation.

Chapter Summary

This chapter presented the current state of the science of simulation as a teaching and evaluation modality in nursing education. It began with a review of the literature, focusing on the learning outcomes of knowledge and clinical judgment. After performing the review of the literature, it became obvious there are some gaps including studies regarding clinical judgment and how simulation is used to evaluate students. A concept analysis manuscript was presented at the end of the chapter to provide a more appropriate and applicable broader definition of simulation teaching and evaluation methodology.

CHAPTER 3

METHODS

INTRODUCTION

The purpose of this study is to determine if participation in a repeating cardiac arrest simulation experience has an impact on senior nursing students' knowledge and clinical judgment. This chapter provides an in-depth discussion of the methodology utilized in this study. The chapter concludes with a detailed discussion of the tools that were used in this study.

Purpose of the Study

The purpose of this study is to determine if participation in a repeating cardiac arrest simulation experience has an impact on senior nursing students' knowledge and clinical judgment. An additional aim was to examine students' attitudes about the simulation. This chapter provides a detailed description of the methodology utilized in the study. Although they are presented in the manuscripts in Chapter Four, a more in-depth description of the research methods including design, setting and sample, intervention, instrumentation, data collection procedure, and data analyses are presented in this chapter. The manuscript from this study will be published in a nursing education peer-reviewed journal.

Significance of the Study

In this study, the researcher will examine the effect a repeating cardiac code simulation experience has on senior nursing student knowledge and clinical judgment as well as student perceptions of the simulation. The findings from this study can provide conceptual clarity to simulation regarding its use as a learning method and an evaluation

tool with nursing students; impact nursing education and policy related to nursing education. It can also provide a pathway for future nursing education research.

Conceptual Clarity

The author anticipates that this study will provide an increase in conceptual clarity relative to simulation. It is important to have a clear understanding of a concept, especially a learning modality, to ensure there is no confusion and the concept is utilized uniformly both in practice and research. An incomplete or unclear conceptual definition of simulation in nursing education can give rise to confusion and inconsistencies in research (Meleis, 2012). Many educators are using simulation as a learning modality to achieve learning outcomes (Caputi, 2010). However, there is a new trend in nursing education to use simulation as an evaluation method in both formative and summative evaluation (Leach, 2014, Billings & Halstead, 2012). For this reason, it was important to complete a conceptual analysis to provide a new, more encompassing definition of simulation for accuracy and clarity.

Nursing Education and Policy

Learning through simulation is utilized in many professions and has revolutionized education (Wunder et al., 2014). While it cannot completely replace the clinical environment, simulation offers a valuable opportunity to augment clinical learning (Leach, 2014). Students gain the opportunity to develop the necessary clinical skills in a realistic, but safe environment (Bland, Topping, & Wood, 2010). Professional bodies endorse simulation as a method of active learning (Schlairet, 2011). Several states have also deemed simulation as an acceptable method to replace up to 50 percent of clinical time (Rutherford-Hemming, Lioce, Kardong-Edgren, Jeffries, Sittner, 2016)

The National Council of State Boards of Nursing (NCSBN) performed a longitudinal multi-site study on simulation as pedagogy in nursing education and presented the results in 2014. This study showed that up to 50 percent of clinical time can be safely substituted with simulation (Hayden et al., 2014). While answering important questions about simulation and education, this study uncovered even more questions regarding the regulation of simulation in nursing education. One major question this study did not address is time ratios. It was not discussed if one hour of clinical is equal to one hour of simulation time or if the ratio is different (Breymier et al., 2015). Rather, nursing programs have been left to determine the appropriate ratio if the state board of nursing does not set one (Breymier et al.).

Another issue that arose is the qualification of simulation facilitators. In the NCSBN study, every site was strictly following the International Nursing Association for Clinical Simulation and Learning (INACSL) standards of best practice (Hayden et al.). Unfortunately, this is not seen across the United States in every program that utilizes simulation as a learning methodology (Rutherford-Hemming et al., 2015). This raises the question as to whether states need to control simulation practices and require facilitators to be certified. A team of specially trained simulation facilitators may be required to educate students through the medium of simulation. This may further lead to independent simulation centers in the future that would require regulations (Rutherford-Hemming et al.). This study can have an impact on nursing education by demonstrating that simulation impacts knowledge and clinical judgment, which can be used to meet NCSBN standards and provide evidence for changes in future policy.

Future Research

It is anticipated that the findings from this study will be utilized to create new and more in-depth research questions regarding simulation in nursing education. Despite the NCSBN study results and others showing students experience higher confidence and self-efficacy after a simulation learning opportunity (Richardson & Claman, 2014), there is a distinctive lack of evidence on the effectiveness simulation demonstrates on student skills (Seacomb, McKenna, & Smith, 2012). More large-scale studies demonstrating the effectiveness of simulation are needed to effectively create educational policies (Hayden et al., 2014). It is also vital to perform studies to determine the appropriate hourly ratio of clinical to simulation time and faculty development (Rutherford-Hemming et al., 2016). Education of nurses needs to be informed by evidence just as clinical medicine is informed by evidence (Cook, 2014).

Research Design

A quasi-experimental pre-test/post-test with comparison with norms observational study design was utilized for this project. The pre-test/post-test design is an excellent option when the researcher is focused on examining a change within a group (Polit & Beck, 2012). It is often the simplest and most common research methodology to examine such a change (Gray, Grove, & Sutherland, 2017). Quasi-experimental designs are interventional studies and used by researchers to examine subjects that are not randomly assigned to specific treatment conditions (Polit & Beck). Researchers will often choose this design if it is determined that a true experimental design cannot be ethically or practically utilized (Gray et al., 2017). This type of design is found to be more practical, feasible, and related closer to the real world (Polit & Beck). Researchers also often use observational studies in

order to suggest that a given predictor may be the cause of an outcome (Hulley, Cummings, Browner, Grady, & Newman, 2013).

Self-report measures were used in this study as a means of data collection for student attitudes. Surveys are often used in research because of their flexibility and broad scope (Polit & Back, 2012). Researchers will use surveys to obtain information on a population about the prevalence, distribution, or interrelations of the group. A psychometrically tested rubric was also used in this study to assess student clinical judgment. Rubrics provide researchers and instructors a means of quantifying subjective experiences (Caputi, 2010). They provide clearly detailed directions and expectations, which increases the reliability (Billings & Halstead, 2012).

Research Hypotheses

1. Participation in a repeating cardiac code simulation experience will increase senior nursing student clinical practice knowledge.
2. Participation in a repeating cardiac code simulation experience will increase senior nursing student clinical judgment.
3. Senior nursing students will report high levels of satisfaction with the repeating cardiac code simulation experience.
4. Senior nursing students will report high levels of confidence in learning after participating in a repeating cardiac code simulation experience.

Research Questions

1. What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical practice knowledge?

2. What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical judgment?
3. What is the level of satisfaction senior nursing students experience after participation in a repeating cardiac code simulation experience?
4. What is the level of confidence in learning senior nursing students experience after participation in a repeating cardiac code simulation experience?

Theoretical and Operational Definitions

The following definitions are provided to the reader as a means of consistency for this study.

Nursing Student

In this study, a nursing student will be defined as a student with senior standing in a undergraduate baccalaureate nursing program. A student is an active member in the teaching-learning process who is the recipient of information on nursing subject matter (Billings & Halstead, 2012).

Simulation

This dissertation proposes a broader definition of simulation as both a formative and summative teaching methodology and evaluation method. Simulation as a learning and evaluation method is a process involving a realistic patient scenario and safe environment provided by an instructor trained in simulation education, in which students participate in active learning through demonstration of patient care and reflection. While the student is participating in the simulation, the trained instructor is observing and assessing student performance of cognition, psychomotor skills, clinical judgment, or critical thinking or any combination of these elements based off pre-determined objectives for formative or

summative evaluation. The studies associated with this dissertation use simulation as a formative learning methodology and evaluation method.

Student Learning Outcomes

Student learning outcomes are defined for this study as pre-determined behaviors established by a nursing instructor prior to the cardiac code simulation event that will act as evidence the student has achieved the goal or objective (McDonald, 2014).

Knowledge

Knowledge in nursing education is accepted as body of scientific and phenomenological information, which is dynamic and ever changing. This information is then used in every aspect of nursing phenomena, from identification to influence and control (Webber, 2002). This study will use the term knowledge to describe cognitive knowledge acquisition, synthesis, or enrichment.

Clinical Judgment

Clinical judgment is the process of determining a conclusion made by the nurse in regards to a patient's needs, concerns, health problems and choosing the best course of action (Tanner, 2006). In the profession of nursing, clinical judgment is often regarded as the outcome of critical thinking (Billings & Halstead, 2012).

Previous Healthcare Experience

Experience can have a profound effect on clinical judgment (Tanner, 2006). In this study, previous healthcare experience is defined as currently or previous employment in a healthcare setting.

Previous Code Experience

As experience can have a profound effect on clinical judgment (Tanner, 2006) and it is also the basis of experiential learning (Kolb, 1984), participants will be asked if they have experience with a code situation before.

Assumptions of Study

- Students answer all questions truthfully, honestly, and to the best of their ability.
- Responses will accurately reflect student opinions of the simulation.
- Senior baccalaureate nursing students will recognize changes and make appropriate decisions for their patients prior to graduation.
- Participants will complete all of the pre-work assigned for the simulation event.
- Students will actively participate in the simulation experience.

Sample/Subjects

A convenience sample of senior nursing students at the University of Scranton was used for this study. A convenience sample is a group of participants that is easily accessible to the researcher (Polit & Beck, 2012) who meet the inclusion criteria and are opportune to access (Hully et al., 2013). The biggest advantages to utilizing a convenience sample in a study are cost effectiveness and logistics. In the case of this study, it made logistical sense to use a convenience sample. Inclusion criteria included students currently enrolled in NURS 472 in the spring semester of 2017 who also agreed to participate in the study. The exclusion criteria for this study were students who were not enrolled in NURS 472 in the spring semester of 2017 and who did not agree to participate in the study.

In a quantitative study, power is referred to as the probability the researcher has to correctly reject the null hypothesis if the sample size is large enough (Hulley et al, 2013).

This is often the final determination for sample size in correlational, quasi-experimental, and experimental studies (Gray et al., 2017). For this study, the needed sample size was determined through power analysis. Performing a power analysis has two benefits. It reduces the risk of a Type II error and it also strengthens the validity of the statistical conclusion through determining what sample size is needed before the study begins (Polit & Beck, 2012). A G-Power power analysis was performed which dictated a need for 45 participants to achieve significance (Faul, Erdfelder, Buchner, & Lang, 2009). Participants agreed to take part in the study through completion a consent form, demographic survey, knowledge pre-test/post-test, engaged in two simulation experiences, responded to a simulation survey about their level of confidence and satisfaction.

All students who gave informed consent were included in the study. In the pilot study 56 students participated and in the follow up study 65 students participated.

Setting

This study was conducted at in the Nursing Laboratory and Simulation Center at the University of Scranton. The University of Scranton is a private Catholic and Jesuit institution in Northeast Pennsylvania with spirituality at the heart of its mission statement. The university has around 4,000 undergraduate students and almost 2,000 graduate students. The nursing department focuses its priorities on clinical excellence and professionalism through the Jesuit ideals of the university. In order to provide students with a realistic learning environment, the nursing laboratory and simulation center has two simulation rooms with high-fidelity mannequins. The Nursing Laboratory and Simulation Center provides a highly controlled environment in which to conduct this study. Highly controlled environments is an artificially created setting in which specific strategies have

been undertaken to control for outside influences (Gray et al., 2017). Although students are familiar with this setting in that they have participated in simulations, practiced, and learned in this environment for three years prior to this study, it is not being considered a naturalistic environment due to the controlled nature of the setting.

There are two debriefing rooms available next to the simulation rooms as well to continue the learning process through reflective observation and abstract conceptualization. These debriefing rooms reduce the outside noise and create a safe environment for students to express thoughts and feelings which will increase the opportunity for learning and growth (Billings & Halstead, 2012). This setting was chosen for ease of access to the population. This is where students regularly participate in simulation learning activities, regardless of the study. Conducting the study in the same place as past simulation instructional activities reduces negative effects of a new and unfamiliar environment.

Tools

A demographic questionnaire, tools to assess knowledge, clinical judgment, and a simulation design scale were used in this study.

1. The variable of content knowledge will be measured with a ten-item quiz students will take before and after the simulation (Baker, Sturdivant, Masters, McCarthy, & Carlson, 2015). This tool was chosen as a self-reporting measure. It is conceptually appropriate and is designed for use with this population. This will provide ordinal level data for the study.
2. The variable of clinical judgment (including noticing, interpreting, responding, and reflecting) will be measured using the Lasater Clinical Judgment Rubric (Lasater, 2007). This observational tool is conceptually appropriate, designed for use with this population, and has validity and reliability testing supporting its use. This will provide ordinal level

data for the study. In the article presenting the LCJR the author did not include information related to the reliability or validity of the instrument. However, a study by Victor Chmil, Turk, Adamson, and Larew (2015) found an internal consistency using Cronbach's alpha of 0.92. In one qualitative study discussing the validity of the tool, it was discovered that this rubric provides "a medium for shared language and a framework for student evaluation in the debriefing process and afterwards" (Cato, Lasater, & Peoples, 2009).

3. The variable of student attitudes will be measured using the National League of Nursing (NLN) Simulation Design Scale and the NLN Student Satisfaction and Self-Confidence in Learning tool. These tools have been psychometrically tested extensively, are conceptually appropriate, and are designed for use in this population. The NLN Simulation Design Scale established content validity by ten content experts, reliability was test using Cronbach's alpha (0.92 for presence of features, 0.96 for importance of features). The NLN Simulation Student Satisfaction and Self-Confidence in Learning tool established reliability using Cronbach's alpha (satisfaction = 0.94, self-confidence = 0.87) (NLN, 2006).

Knowledge Tool

This study utilized a knowledge tool that was developed for a previous study assessing for changes in student knowledge regarding a cardiac arrest after simulation and additional training (Baker et al., 2015). This questionnaire consists of ten items that were developed through the general conferment and agreement of the authors of the original study (Baker, et al.). The first five items are true or false questions and the last five items are fill-in-the-blank. The scores of this test range from zero to one hundred with each item being worth ten points and no partial credit was given.

Lasater Clinical Judgment Rubric

Lasater (2007) explains clinical judgment using Benner et al.'s (1996) definition, "clinical judgment refers to the ways in which nurses come to understand the problems, issues, or concerns of clients/patients, to attend to salient information and to respond in concerned and involved ways" (p. 2). In conjunction with this definition, Lasater created the rubric following the Tanner Clinical Judgment Model (2006) as the theoretical basis.

The Lasater Clinical Judgment Rubric (LCJR) was created to evaluate and discuss clinical judgment with students while in a simulation setting (Victor-Chmil, Turk, Adamson, & Larew, 2015). The tool is formatted as a rubric for clinical instructors to complete. There are four main sections of the LCJR based off Tanner's four phases – noticing, interpreting, responding, and reflecting. These sections are further divided into specific tasks and scored by "exemplary, accomplished, developing, and beginning" with detailed descriptions for each. Each "exemplary" score is worth four points, "accomplished" is worth three points, "developing" is worth two points, and "beginning" is worth one point. Scores can range from 12 to 44 on this tool.

The noticing section of the tool includes three sections: focused observation, recognizing deviations from expected patterns, and information seeking. The interpreting section of the tool includes two sections: prioritizing data and making sense of data. The responding section of the tool includes four sections: calm and confident manner, clear communication, well-planned intervention/flexibility, and being skillful. The reflecting section of the tool includes two sections: evaluation/self-analysis and commitment to improvement. This tool was originally designed for baccalaureate nursing students, however, the tool has also been used for Associate degree nursing students as well.

During the creation of the LCJR the underlying concept driving the framework was Tanner's Clinical Judgment Model (2006). This model was used to develop the rubric and define levels of clinical judgment (Lasater, 2007). Lasater used the definition of clinical judgment established by Benner et al (1996). This definition agrees with the model established by Tanner. This allows the LCJR guided by Tanner's Clinical Judgment Model to remain appropriate and adequate.

The LCJR is an effective instrument to assess the clinical judgment of nursing students in a simulation exercise (Lasater, 2007). It was developed in 2007, but the original article discussing the LCJR does not offer any reliability or validity reports. However, subsequent studies utilizing this instrument have tested for reliability and validity. The LCJR is easy to administer and shows great inter-rater reliability (Victor Chmil et al., 2015). The content validity of the tool has been tested as well (Cato et al., 2009). It is associated with a low cost to administer the rubric and can be utilized to begin to quantify student clinical judgment.

NLN Simulation Design Scale

The NLN Simulation Design Scale (SDC) was designed to evaluate the five major elements (objectives/information, support, problem solving, feedback, and fidelity) of the design of the simulation scenario utilized (NLN, 2006). The tool has two components; one queries the user on the different features of the simulation while the other component queries the user on the importance of those features. A grand total of 20 items are assessed on this tool using a five-item Likert scale (Franklin, Burns, & Lee, 2014).

The NLN SDC was established for content validity for simulation developing and testing in 2006 (NLN, 2006). The instrument also demonstrates great reliability through

Cronbach's alpha and great validity as well (Franklin et al, 2014). This instrument was used to determine student satisfaction with the simulation experience by examining the elements of the simulation and their corresponding importance to the students.

NLN Student Self-Confidence in Learning Tool

The NLN Student Self-Confidence in Learning Tool (SCLS) was designed to quantify the level of satisfaction the student has with the simulation activity and the student's self-confidence in learning (Franklin et al, 2014). The tool consists of 13 items including two sub-sections; one regarding satisfaction with instruction and one regarding self-confidence in learning. Responders use a time-item Likert scale ranging from "strongly agree" to "strongly disagree" to indicate opinions about a statement on the tool (NLN, 2006).

The NLN SCLS was established for content validity for simulation developing and testing in 2006 (NLN, 2006). The instrument also demonstrates great reliability through Cronbach's alpha and great validity as well (Franklin et al., 2014). This instrument was used to determine student satisfaction with the simulation experience and confidence in learning after the simulation experience with five items of the instrument focusing on student satisfaction and eight items focusing on self-confidence in learning.

Procedures

The procedure for this study took place in several phases: the planning phase, the pre-test phase, the simulation phase, and the post-test phase.

Planning Phase

In the planning phase, training of data collectors for recruitment, consent, and data collection occurred. The data collectors received the same training and discussion of the tool prior to use to minimize variation and the chance of errors.

Pre-test Phase

In the pre-test phase, students who agreed to participate in the study completed the demographic sheets, knowledge pre-test, and consent forms. By having all the students who will participate in the study complete the pre-test at the same time before the simulation experience, it enhanced the control of the study by eliminating variance due to timing of the test administration and provide a more consistent measurement.

First Simulation Phase

During the simulation phase, all students in the senior class participated in the simulation experience. To manage the participation of this simulation, students were organized by their clinical group, which consisted of four to five students. Two students were randomly selected to act as the "primary nurses" and enter the patient room to provide care and assess the patient. The other students were observers who then turned into members of the code team once a code or rapid response was called. Students were pre-briefed with a script from their instructors and have a total of 20 minutes of this sub-phase to plan their patient care. Upon entering the simulation environment, students had up to 20 minutes to complete the scenario. During this time, the two data collectors and authors of this study (who have already been trained on the Lasater Clinical Judgment Rubric) observed the students during the simulation and completed the rubric. After completing the simulation (after reaching completion of the scenario or reaching the maximum time limit) students were debriefed by their instructors. Debriefing lasted 40 minutes and instructors had a debriefing guide to follow. Providing instructors with a pre-briefing and debriefing guide enhanced the consistency of the student experience and therefore measurements and reduces the risk of a Type I error.

Learning Activities

In addition to participating in the simulation experience, students had the opportunity to engage in various learning activities throughout the day. Although schedules varied slightly depending on time and space, all students had a two hour and forty-five minute break from simulation. During this time students had a 30-minute lunch or dinner break as well as various learning activities such as inserting an IV, assessing a critical patient, and enforcing learning about ventilators and chest tubes. These activities were related to class content, but not the simulation.

Second Simulation Phase

During the second simulation phase, all students in the senior class once again were required to participate in the simulation experience. Students were pre-briefed with a script from their instructors and have a total of 20 minutes of this sub-phase to plan their patient care. They received a report on the same patient they cared for earlier in the day, but this time it was one month later and the patient was admitted with Congestive Heart Failure. After receiving report and examining the patient chart, students once again had up to 20 minutes to complete the scenario. During the simulation, the data collectors observed the students and completed the Lasater Clinical Judgment Rubric for a second time. After completing the simulation (by either reaching completion of the scenario or reaching the maximum time limit) students were debriefed by their instructors. Debriefing lasted 40 minutes and instructors had a debriefing guide to follow.

Post-test Phase

Finally, during the post-test phase, students that participated in the study remain in the debriefing room to complete the post-test. Completing the post-test the day of the

simulation helps to maintain participant retention in the study and focuses on immediate learning gains.

Ethical Considerations

In order to ensure the participant rights are protected, the Institutional Review Board was consulted. Students were required to participate in the simulation as part of their clinical course, but they could choose to participate in the study by completing the demographic sheet and questionnaires. They were invited to participate by the principle investigator who is not connected to their course and assured participating or not participating had no effect on their grade.

Limitations

As with any study, there are several limitations to this one. This study plans used a convenience sample. Convenience samples can limit the generalizability of the findings, however, because of the advantages in logistics (Hulley et al., 2013), it is the best method for this project. This study is also only drew students from one school. Unfortunately, creating a study with multiple school involvement is not feasible at this time. Another limitation of this study is the lack of psychometric testing on the tool to assess knowledge developed by Baker et al (2015). The lack of psychometric testing on this tool could jeopardize the reliability and validity of the findings.

Summary

In this chapter, a study to examine the effect participation in a repeating cardiac code simulation has on senior nursing student knowledge and clinical judgment and student perceptions of that simulation. This chapter in conjunction with the two manuscripts in the next chapter present the methodology utilized in this study. A quasi-

experimental pre-test/post-test with comparison with norms observational study design was used for this study. The determination of sample size and reasons for the setting were discussed in this chapter. Finally, the purpose, conceptual definitions, ethical considerations, and limitations of the study were discussed.

CHAPTER 4

RESULTS

INTRODUCTION

The purpose of this dissertation is to determine if participation in a repeating simulation experience has an impact on senior nursing students' knowledge and clinical judgment required during a simulated cardiac arrest. In this chapter, the two studies that were developed to address these questions are presented. The first was a pilot study that examined the impact a repeating simulation experience had on senior nursing student knowledge and their attitudes towards the simulation. The second study examined the impact a repeating simulation experience had on senior nursing student knowledge and clinical judgment as well as their attitudes towards the simulation. This chapter presents those two manuscripts.

Manuscript Two: Knowledge and Attitudes of Senior Nursing Students in a Repeating Cardiac Code Simulation

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Abstract

Background: The purpose of this observational study was to examine the use of a repeating simulation experience as a means of educating senior nursing students on cardiac arrest and student satisfaction with the simulation event.

Methods: Students took a pre-test to quantify knowledge and then participated in one cardiac code simulation in the morning followed by various other learning activities and then participated in a second cardiac code simulation and the post-test along with surveys at the end of the day.

Results: Students showed a significant increase in knowledge after participating in the cardiac code simulation ($p<0.001$) and demonstrated high levels of satisfaction with the simulation ($M = 56.6$, max score = 65, and $M = 176$, max score = 200).

Conclusion: Students educated in cardiac codes with a high-fidelity repeating simulation event demonstrate an increase in knowledge and report high satisfaction with the event. This may lead to improved patient safety.

Key words: simulation, content knowledge, cardiac code, satisfaction, confidence

Knowledge and Attitudes of Senior Nursing Students in a Repeating Cardiac Code Simulation

Simulation provides an opportunity for students to bridge the gap between classroom knowledge and clinical practice in safe and realistic learning environment (Jeffries, 2012). Providing a realistic environment in which there is no impact on or threat to actual patients reduces student anxiety about causing patient harm (Luctkar-Flude et al, 2015) and creates a safe environment where students can concentrate on learning (Raurell-Torreda, et al, 2015). Levett-Jones, Lapkin, Hoffman, Arthur, and Roche (2011) summarize the commonly held beliefs about the benefits of simulation as students are actively involved in unpredictable, time-sensitive, and challenging clinical situations that they may only be able to observe in a real-life situation, learn from mistakes without patient harm, practice skills, participate in interprofessional communication and teamwork, and provide the opportunity for formative and summative assessments.

Background

Simulation is a process involving a realistic patient scenario and safe environment, in which students participate in active learning through demonstration of patient care and reflection. While the student is participating in the simulation, the instructor is observing and assessing student performance based upon pre-determined objectives and provides the student with opportunities for repetition and feedback. This process blends theoretical nursing knowledge with practical application to provide a learning environment for students (Bland, Topping, & Wood, 2001).

Simulation is an active learning process in which nursing students usually participate in groups to provide care for a patient. A simulation experience can be broken up into three

important aspects: the pre-briefing period, the simulation scenario, and the debriefing period (Chamberlain, 2015).

In the pre-briefing period, the atmosphere of the simulation experience is established. Students recieve instruction on the simulation objectives, scenario, roles, tasks, and time frame (Page-Cutara, 2014). Typically, students are oriented to the physical environment at this time as well, which will enhance the satisfaction of the participants as well as increase participation and effectiveness (Chamberlain, 2015).

The simulation scenario is the most physically active portion of the experience. This may occur through the use of a manikin, actor, or standardized patient (Jeffries, 2012). A variety of manikins exist for nursing education simulation purposes, they range from simple task trainers to medium-level fidelity to high-fidelity manikins (Jeffries, 2005). The level of fidelity must be matched with the learning goals of the students (Caputi, 2010). Students take on a designated role in an evolving case study to address issues and learn first-hand the effects of their decisions (Rourke, Schmidt, & Garga, 2010).

Immediately following the simulation activity, a period of debriefing takes place. While many people think the scenario is the most important aspect of the simulation experience, research has shown that most of the learning occurs during the debriefing period (Chiang & Chan, 2014). The debriefing period consists of a structured discussion led by the facilitator to guide students through self-reflection and analysis and is an integral part of the learning process (Caputi, 2010).

Simulation provides an opportunity for students to bridge the gap between classroom knowledge and clinical practice in a safe and realistic learning environment (Jeffries, 2012). Providing a realistic environment in which there is no impact on or threat

to actual patients reduces student anxiety about causing patient harm (Luctkar-Flude et al, 2015) and creates a safe environment where students can concentrate on learning (Raurell-Torreda, et al, 2015). Levett-Jones, Lapkin, Hoffman, Arthur, and Roche (2011) list the benefits of simulation as students are actively involved in unpredictable, time-sensitive, and challenging clinical situations that they may only be able to observe in a real-life situation, learn from mistakes without patient harm, practice skills, participate in interprofessional communication and teamwork, and provide the opportunity for formative and summative assessments.

Simulation has shown to have positive effects on nursing student confidence and self-efficacy (Leach, 2014). Chiang and Chan (2014) found that simulation led to a significant increase in student critical thinking and another study found an increase in student knowledge acquisition and retention after a simulation experience (Akhu-Zaheya, Gharaibeh, & Alostaz, 2012). Other studies have found inconclusive evidence regarding simulation and student clinical judgment, warranting further investigation.

Purpose

The purpose of this study was to examine the use simulation as a means of educating senior nursing students on cardiac arrest. The goals for students were to: gain greater understanding of a cardiac arrest event, learn the roles of the healthcare team, utilize critical thinking skills through the nursing process and care for a patient in a cardiac arrest; the goal for the educators was to assess student learning through simulation rather than lecture alone. Three research questions are associated with this study 1) What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical practice knowledge? 2) What is the level

of satisfaction senior nursing students experience after participation in a repeating cardiac code simulation experience? 3) What is the level of confidence in learning senior nursing students experience after participation in a repeating cardiac code simulation experience?

Methods

Research Design

A quasi-experimental pre-test/post-test observational study design was used for this project. Students participated in one cardiac code simulation in the morning followed by other learning activities and then participated in a second cardiac code simulation at the end of the day. This study was presented to and approved by the University of Scranton Institutional Review Board.

Sample/Subjects

A convenience sample of 67 senior nursing students at the University of Scranton were invited, and 56 students participated in all phases. Based on the power analysis completed using the G-Power program, a sample size of 45 was determined (Faul, Erdfelder, Buchner, & Lang, 2009). All senior-level students enrolled in a baccalaureate-nursing program at the University of Scranton in the Advanced Nursing Concepts course participated in the simulation, but were not required to participate in the study. Participation in the study required completion of a knowledge pre-test/post-test.

Setting

This study was conducted at in the Nursing Laboratory and Simulation Center at the University of Scranton. In order to provide students with a realistic learning environment, the nursing laboratory and simulation center has two simulation rooms with high-fidelity mannequins. There are two debriefing rooms available next to the simulation rooms as

well to continue the learning process through reflective observation and abstract conceptualization. This setting was chosen for ease of access to the population. The simulation experiences took place at three different times of the spring semester, following student clinical placement in an Intensive Care Unit.

Measurement

A demographic information questionnaire, tools to assess knowledge, clinical judgment, and the NLN Simulation Design Scale were used in this study.

1. The variable of content knowledge was measured with a ten-item quiz students took before the first and after the second simulation experiences. The first five questions were true/false and the second five were fill-in-the-blank. The content of cardiac arrest was conceptually appropriate and designed for use with the student population in the senior level course.
2. Student perceptions of the simulation experience were measured using the NLN Simulation Design Scale and the NLN **Student Satisfaction and Self-Confidence in Learning tool. These tools were chose as self-reporting measures. They are conceptually appropriate and designed for use with this population.**

Procedures

The procedure for this study occured in several phases: the planning phase, the pre-test phase, the simulation phase, and the post-test phase.

Pre-test Phase

In the pre-test phase, students who agreed to participate in the study completed the demographic sheets, knowledge pre-test, and consent forms. Allowing all the students who participated in the study to complete the pre-test at the same time before the simulation

experience, which enhanced the control of the study and provided a more consistent measurement.

Simulation Phase

During the simulation phase, all students in the senior class participated in groups of four or five in the simulation experience. Students were pre-briefed with a script from their instructors and had a total of 20 minutes of this sub-phase to plan their patient care. Upon entering the simulation environment, students had 20 minutes to complete the scenario. After completing the simulation either by reaching completion of the scenario or reaching the maximum time limit, instructors debriefed the students in their small groups. Debriefing lasted approximately 40 minutes and instructors followed a debriefing guideline. Providing instructors with a pre-briefing and debriefing guide enhanced the consistency of the student experience and therefore measurements. It also added another layer of control to the study. In this phase, students engaged in two aspects of Kolb's learning cycle (2015). During the simulation they engaged in the concrete experience phase. During the debriefing phase they engaged in the reflective observation phase.

Post-test Phase

Finally, during the post-test phase, the students that participated in the study remained in the debriefing to complete the post-test, which was the same ten-item quiz they took at the beginning of the study. Completing the post-test the day of the simulation helped to maintain participant retention in the study.

Results

Data Analysis

The SPSS Statistics 23 software was used to analyze the data. Descriptive statistics were analyzed to describe the demographic information of the participants and student satisfaction and self-confidence. A paired sample t-test was used to determine a significant change in knowledge in participants.

Participant Characteristics

Of the 67 nursing students that participated in the simulation, 56 participated in the study. Prior to participation in this study 21% of students had participated in a code situation before and 76% were employed in the healthcare field. The mean age of participants was 21 years (SD = 2.067; range – 21 – 33).

Findings

The results demonstrated an increase in student content knowledge after participation in the cardiac code simulation and high levels of student satisfaction. The results of the paired samples t-test comparing the content knowledge pre-test score (M = 52.86) and the post-test score (M = 67.14) showed there was a significant difference (t = -7.5, df = 55, p <0.001). Students also demonstrated high levels of satisfaction on the NLN Student Satisfaction and Self-Confidence in learning (M = 56.66, max score = 65, SD = 5.71) and the NLN Simulation Design Scale (Satisfaction with simulation elements M = 90.04, max sore = 100, SD = 6.87, Important of elements M = 90.91, max score = 100, SD = 8.41).

Discussion

The hypothesis that students will have greater knowledge after participating in a cardiac code simulation was supported. These findings are congruent with much of the

research available on simulation in nursing students. Nursing students who participated in a high-fidelity CPR simulation demonstrated higher knowledge acquisition and retention than their counterparts (Aqel & Ahmad, 2014). Students scored significantly higher on the knowledge exam, measured in a pre-to post-test format, after participating in the cardiac code simulation. However, these findings are not consistent with other research findings, one study found that although students had an increase in basic life support knowledge after a simulation experience, there was not a significant difference between the control and experimental group (Akhu-Zaheya, Gaharaibeh, Alostaz, 2012).

Students also demonstrated high satisfaction scores regarding the simulation as well. This is congruent with the current literature available on simulation. Students often experience higher confidence and self-efficacy after a simulation learning opportunity (Richardson & Claman, 2014). Many students seek out opportunities to participate in simulation experiences (Jeffries, 2012) and report high satisfaction rates (Chiang & Chan, 2014).

There were several limitations to this study, the convenience sample came from a single site and the tool to assess content knowledge was not psychometrically tested prior to its use. Also, the lack of a control group qualifies the results. These findings regarding simulation will add to the growing body of knowledge already to provide additional data that simulation has an impact on nursing education. This study:

- Provides insight into the relationship between simulation and nursing student knowledge acquisition
- Highlights the need for students to participate in high-risk, low-probability situations they would not have the opportunity to in the clinical setting

- Adds to the body of knowledge that supports simulation as a learning modality and the need to incorporate it into undergraduate nursing programs.

Conclusion

This study examined the effect a cardiac code simulation had on senior nursing student knowledge. Although there was statistical significance in this study, more research is needed. This study adds to the literature regarding the legitimacy of simulation as a teaching methodology through examining learning outcomes. Further research with a control group, larger sample size, or multiple sites would be beneficial. It would also be helpful to examine other learning outcomes, such as clinical judgment.

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Manuscript Three: Senior Nursing Students in a Repeating Simulation Experience

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Abstract

Background: The purpose of this study is to determine if participation in a repeating cardiac arrest simulation experience has an impact on nursing students' knowledge, clinical judgment, satisfaction, and confidence in learning.

Methods: To measure content knowledge, students completed a pre-test before the simulation experience began. They participated in a cardiac arrest simulation twice with a break between the two experiences that included alternate learning activities. After the second simulation and debriefing period, students completed the content knowledge post-test. Two trained data collector completed the Lasater Clinical Judgment Rubric on students' performance during both simulations.

Results: Students showed a significant increase in both knowledge and clinical judgment after participating in the repeating cardiac code simulation event ($p<0.001$) and demonstrated high levels of satisfaction with the simulation event.

Conclusion: The repeating simulation experience has shown an increase in content knowledge and clinical judgment after participation in this twist of an accepted teaching modality.

Key words: simulation, knowledge, clinical judgment, cardiac code, satisfaction, confidence

Senior Nursing Students in a Repeating Simulation Experience

A combination of clinical issues, coupled with shortened length of stays for patients, effects nursing students' ability to cultivate competency (Yuan, Williams, & Fang, 2012). In order to address this issue, many nurse educators and schools of nursing have turned to simulation as a teaching and learning modality. Through the inclusion and increased use of simulation, it has truly become a vital aspect of many nursing curricula (McGovern, Lapum, Clune & Martin, 2012). Simulation also offers educators a quantifiable modality to assess student achievement of learning outcomes (Caputi, 2010). Most of the current research in simulation has focused on student confidence and satisfaction (Leach, 2014). There have been fewer studies that examine the learning outcomes of simulation in nursing students (Leach, 2014), although this number has been growing. However, far fewer studies examine the outcomes of a repeating simulation experience. This use of a repeating simulation experience may offer greater insight and increase the achievement of student learning outcomes.

Background

Significance of the Problem

Simulation has become a significant teaching and learning modality in nursing education in the United States. In a recent study, the National Council of State Boards of Nursing (NCSBN) found that over 900 nursing programs in the United States were using medium-to high-fidelity simulated patient manikins in their curriculums (Hayden et al., 2014). One reason simulation has become so popular is that it is the now a highly recommended teaching-learning modality to aid nursing students in the development of clinical skills (Venkatasalu, Kelleher, & Chun, 2015). Despite popularity of simulation

across the United States in nursing programs, there is a lack of evidence on the effectiveness of the simulated experiences on the development of nursing students' skills (Seacomb, et al., a). Most of the literature on simulation with nursing students does not address learning outcomes; rather many studies focus on self-efficacy, confidence, and the perceptions of participants (Leach, 2014). There is also little to no research on the effect repeating simulations have on student learning outcomes.

Conceptual Framework

This study was guided by Kolb's theory of experiential learning (Kolb, 1984) and Tanner's model of clinical judgment in nursing (Tanner, 2006). Kolb's theory was selected as it compliments the learning process of simulation and Tanner's model was chosen as it provides a basis for understanding clinical judgment.

Experiential learning is a key component of preparing nursing students for professional practice (Poore, et al., 2014) through clinical and simulation experiences. Experiential learning provides some of the foundational elements of nursing education (Chiang & Chan, 2014). Kolb's theory explains learning via concrete experience in a cycle, which is comprised of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Simulation is closely related to Kolb's (1984) experiential learning theory (Lisko & O'Dell, 2010) as two of the crucial steps of Kolb's theory – actively participating in a learning experience and reflecting on that experience – are essential principles of simulation (Zigmont, et al., 2011). Utilizing Kolb's theory in simulation, underscores the need for students to participate in an experience, reflect on that experience, identify gaps in knowledge through refection, conceptualize new knowledge, and develop good judgment (Waldner & Olson, 2007).

In this study, students engaged in all four aspects of Kolb's learning cycle. During the simulation phase they engaged in the concrete experience of caring for a patient in cardiac arrest. After the simulation ended, students engaged in reflective observation during the debriefing phase. While students had a lunch break and participated in other learning activities, not related to cardiac arrest, they had the opportunity to discuss the day and explain the events that took with their colleagues and engage in abstract conceptualization. Finally, students repeated the simulation, the case began differently, but ended with a cardiac arrest once again so students can use the knowledge they developed and engage in active experimentation to put into action what they learned previously from mistakes.

Tanner's Model of Clinical Judgment in Nursing was also used to guide this study. Tanner (2006) identified four major aspects of clinical judgment: noticing, interpreting, responding, and reflecting. In order to effectively engage in clinical judgment, the student nurse must utilize all four of these aspects to then identify and prioritize patient needs, assess the best course of action, and respond to the patient (Lasater, 2007). In a simulation experience, the student nurse has the opportunity to engage in the steps of clinical judgment identified by Tanner. While participating in the simulation, the student notices, interprets, and responds to the patient in the scenario. During the debriefing period of the simulation, the student engages in reflection, arguably one of the more important aspects of simulation experiences (Jeffries, 2005). To quantify student clinical judgment, this study used the Lasater Clinical Judgment Rubric. The theoretical framework for this tool was Tanner's model, which makes the use of this model even more appropriate.

Review of Literature

The studies included in this review are all single simulation studies. The literature on simulation in nursing education is substantial, however, there have been many inconsistencies in findings (Doolen et al., 2016). There have been more studies examining the outcome of knowledge acquisition and retention in regards to simulation, therefore there is more data available for this aspect. Simulation is often associated with higher grades or scores in simulation studies (Chiang & Chan, 2014). Two studies showed significant improvement in student knowledge of subject matter (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010) and improvement of test scores and a significant difference between the control and intervention groups in favor of simulation (Fawaz & Hamdan-Mansour, 2016). However, not all of the studies demonstrated statistically significant findings. Levett, Lapkin, Hoffman, Arthur, & Roche (2011) and Venkatasalu, et al., (2015) found higher scores, but no statistically significant improvement while Luctkar-Flude, et al., (2015) found no significant difference in learning between groups and overall poor performance of older students.

While many studies include knowledge in their assessment of simulation, far fewer examine the relationship between clinical judgment as an outcome of simulation. This review included two of those studies and both showed a significant difference in clinical judgment after a simulation experience. Fawaz and Hamdan-Mansour (2016) found a significant difference between the control and intervention groups regarding clinical judgment. While Lindsey and Jenkins (2013) found significantly higher scores in clinical judgment in both the pre- and post-tests as well as between the control and intervention groups.

This review of the literature threw into focus the gap of available information on the effect simulation has on nursing students' clinical judgment. More research examining the benefits and effects of simulation is needed. Many of the current studies examine student feelings and beliefs rather than learning outcomes. More research is also warranted for the effects of simulation on clinical judgment. Further research on knowledge gain along with capturing other dimensions of clinical practice, such as clinical judgment, are needed.

Purpose

The purpose of the study is to determine if a repeating simulation experience has an impact on senior nursing students' knowledge and clinical judgment required during a simulated cardiac arrest. The first aim of this study is senior nursing students will demonstrate an increase in knowledge regarding cardiac arrest after this simulation. The second aim of this study is senior nursing students will demonstrate an increase in clinical judgment after participation in a cardiac code simulation. There are four research questions for this study: 1) What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical practice knowledge? 2) What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical judgment? 3) What is the level of satisfaction senior nursing students experience after participation in a repeating cardiac code simulation experience? 4) What is the level of confidence in learning senior nursing students experience after participation in a repeating cardiac code simulation experience?

Methods

Research Design

The purpose of this study is to determine if participation in a repeating cardiac arrest simulation experience has an impact on senior nursing students' knowledge and clinical judgment. A quasi-experimental pre-test/post-test with comparison with norms observational study design was used for this study. This study was approved by the University of Scranton Institutional Review Board.

Sample/Subjects

A convenience sample of senior nursing students enrolled in an Advanced Nursing Concepts course at the University of Scranton was used for this study. All students enrolled in the course were required to participate in the simulation, but could opt out of participation in the study. Participation in the study required completion of the pre-test/post-test and surveys in their entirety. In order to determine the sample size for this project, a power analysis was completed.

Setting

This study was conducted at in the Nursing Laboratory and Simulation Center at the University of Scranton. This setting was chosen for logistical purposes and ease of access to the population.

Procedure

The procedure for this study took place in several phases: the planning phase, the pre-test phase, the simulation phase, and the post-test phase.

In the planning phase, training of data collectors for recruitment, consent, and data collection occurred. The data collectors received the same training and partook in discussion of the tool prior to use to minimize variation and the chance of errors.

In the pre-test phase, students who agreed to participate in the study completed the demographic sheets, knowledge pre-test, and consent forms. By having all the students who will participate in the study complete the pre-test at the same time before the simulation experience, it will enhance the control of the study and provide a more consistent measurement.

During the simulation phase, all students in the senior class participated in the simulation experience. Students were pre-briefed with a script from their instructors and have a total of 20 minutes of this sub-phase to plan their patient care. Upon entering the simulation environment, students had up to 20 minutes to complete the scenario. During this time, the data collectors (who have already been trained on the Lasater Clinical Judgment Rubric) observed the students during the simulation and completed the rubric. After completing the simulation (after reaching completion of the scenario or reaching the maximum time limit) students were debriefed by their instructors. Debriefing lasted 40 minutes and instructors had a debriefing guide to follow. Providing instructors with a pre-briefing and debriefing guide enhanced the consistency of the student experience and therefore measurements. It also adds another layer of control to the study.

In addition to participating in the simulation experience, students had the opportunity to engage in other course activities not related to cardiac arrest throughout the day. Although schedules varied slightly depending on time and space, all students had a two hour and forty-five minute break from simulation. During this time students had a 30

minute lunch or dinner break as well as various learning activities such as inserting an IV, assessing the critical patient, and enforcing learning about ventilators and chest tubes.

During the second simulation phase, all students in the senior class once again were required to participate in the simulation experience in groups of four or five. Students were pre-briefed with a script from their instructors and had a total of 20 minutes of this sub-phase to plan their patient care. They received a report on the same patient they cared for earlier in the day, but this time it was one month later and the patient was admitted with Congestive Heart Failure. Students once again had up to 20 minutes to complete the scenario. During the simulation, the data collectors observed the students and completed the Lasater Clinical Judgment Rubric for a second time. After completing the simulation (by either reaching completion of the scenario or reaching the maximum time limit) students were debriefed by their instructors. Debriefing lasted 40 minutes and instructors had a debriefing guide to follow.

Finally, during the post-test phase, students that participated in the study remain in the debriefing room to complete the post-test. Completing the post-test the day of the simulation helps to maintain participant retention in the study.

Tools

A demographic information questionnaire, tools to assess knowledge, clinical judgment, and a simulation design scale was used in this study.

1. The variable of content knowledge was measured with a ten-item quiz students completed before the first and after the second simulation. This tool was chosen as a self-reporting measure providing ordinal level data. It is conceptually appropriate and is designed for use with this population.

2. The variable of clinical judgment (including noticing, interpreting, responding, and reflecting) was measured using the Lasater Clinical Judgment Rubric. This observational tool is conceptually appropriate, designed for use with this population, and has validity and reliability testing supporting its use. This will provide ordinal level data for the study.
3. The variable of student attitudes was measured using the National League of Nursing (NLN) Simulation Design Scale and the NLN Student Satisfaction and Self-Confidence in Learning tool. These tools have been psychometrically tested extensively, are conceptually appropriate, and are designed for use in this population (NLN, 2006).

Results

Data Analysis

In order to analyze the data from this study, the SPSS Statistics 23 software was utilized. The demographic information of the participants and student satisfaction and self-confidence were analyzed using descriptive statistics. A paired sample t-test was used to determine if there was a significant change in knowledge and clinical judgment of the participants.

Participant Characteristics

All students enrolled in NURS 472 participated in the simulation (N = 70). From those participating in the simulation, 66 participated in the study (89% female and 11% male). Prior to participating in this study 27% of students had previously participated in a code situation and 77% were employed in the healthcare field. The mean age of participants was 21 years (SD = 1.171; range: 21-29).

Findings

Our results demonstrated an increase in both student knowledge and clinical judgment after participation in the cardiac code simulation and high levels of student satisfaction. The results of the paired samples t-test of the knowledge pre-test score (M = 55.54) and the post-test score (M = 63.69) showed there was a significant difference ($t = -5.6$, $df = 64$, $p < 0.001$). The results of the paired samples t-test of the LCJR from the first simulation (M = 19.42) and the second simulation (M = 33.08) showed there was a significant difference ($t = -13.9$, $df = 11$, $p < 0.001$). Students demonstrated high levels of satisfaction with the NLN Student Satisfaction and Self-Confidence in learning (M = 56.6, max score = 65) and the NLN Simulation Design Scale (Elements of the Simulation M = 87.5, max score = 100, Importance of the Element M = 92.3, max score = 100).

Discussion

The major aim of this study was to determine if a repeating simulation experience had an effect on nursing student knowledge, clinical judgment, and satisfaction with the simulation, and self-confidence in learning. The findings of this study demonstrate that senior nursing students had a significant increase in knowledge and clinical judgment. Students also had an overall positive attitude of the simulation experience. These findings are consistent with previous studies regarding single simulation experiences.

In the course of completing this study, several limitations were noted. The quasi-experimental design of this study could potentially give rise to threats to internal validity. Maturation could pose a threat to internal validity (Polit & Beck, 2012) as students participated in the simulation at three different points in the semester to match with student clinical rotations. However, scores were fairly consistent among all of the

participants. Testing and instrumentation could also create a threat to internal validity (Polit & Beck). There was not much time between the pre-test and the post-test which could effect answers on the post-test rather than reflect change.

A convenience study was utilized for the sample, which was taken from a single site. Also, the tool used to test knowledge was not psychometrically tested. The quasi-experimental design of this study also proved to be a limitation as there was a lack of a control group. Despite these limitations, the findings from this study regarding a repeating simulation event will add to the growing body of knowledge and provide additional data that simulation has a profound impact on nursing education. This study specifically provides educators with additional data and understanding on the relationship between simulation and knowledge development and clinical judgment. It also demonstrates the importance of a repeating simulation experience to improve student outcomes and later patient safety.

Conclusion

A vital aspect of nursing education is to ensure students are adequately prepared to care for patients upon graduation. Simulation has been shown to be an avenue of which students are receptive. The repeating simulation experience utilized in this study has shown nursing students have a significant increase in knowledge and clinical judgment after participation in this twist of an accepted teaching modality. This can lead to more evidence-based learning opportunities for students and improved patient outcomes in the future. More in-depth research with a comparative group to enhance the internal validity as well as using multiple schools to have a larger sample size is needed to further these findings.

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Summary

In this chapter, two of the three manuscripts that comprise of this dissertation were presented. They provided data on research questions one and two as well as addressing the research hypotheses as well. Manuscript One addressed research hypotheses one, three, and four:

- Participation in a repeating cardiac code simulation experience will increase senior nursing student clinical practice knowledge.
- Senior nursing students will report high levels of satisfaction with the repeating cardiac code simulation experience.
- Senior nursing students will report high levels of confidence in learning after participating in a repeating cardiac code simulation experience.

Manuscript One also answers the research questions one, three, and four:

- What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical practice knowledge?
- What is the level of satisfaction senior nursing students experience after participation in a repeating cardiac code simulation experience?
- What is the level of confidence in learning senior nursing students experience after participation in a repeating cardiac code simulation experience?

In Manuscript One, all three null hypotheses were rejected.

Manuscript Two addresses all four hypotheses and four research questions:

5. Participation in a repeating cardiac code simulation experience will increase senior nursing student clinical practice knowledge.
6. Participation in a repeating cardiac code simulation experience will increase senior

nursing student clinical judgment.

7. Senior nursing students will report high levels of satisfaction with the repeating cardiac code simulation experience.
8. Senior nursing students will report high levels of confidence in learning after participating in a repeating cardiac code simulation experience.

and

5. What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical practice knowledge?
6. What is the effect of a repeating cardiac code simulation experience following Kolb's experiential learning theory on senior nursing student clinical judgment?
7. What is the level of satisfaction senior nursing students experience after participation in a repeating cardiac code simulation experience?
8. What is the level of confidence in learning senior nursing students experience after participation in a repeating cardiac code simulation experience?

In Manuscript Two, all four null hypotheses were rejected.

CHAPTER 5

SYNTHESIS

INTRODUCTION

The purpose of this dissertation was to determine if participation in a repeating simulation experience has an impact on senior nursing students' knowledge and clinical judgment required during a simulated cardiac arrest. Two studies were developed to answer these questions. The first was a pilot study that examined the impact a repeating simulation experience had on senior nursing student knowledge and their attitudes towards the simulation. The second study examined the impact of a repeating simulation experience on senior nursing student knowledge and clinical judgment as well as student attitudes about the experience.

Synthesis of the Studies

Simulation is used frequently in nursing education throughout the United States (Hayden, Smiley, Alexander, Kardong-Edgen, & Jeffries, 2014). The popularity has grown in part due to the constrained opportunities in the clinical environment. This includes high patient acuity and shortened patient stays (Yuan, Williams, & Fang, 2012). Simulation has provided an opportunity for educators to supplement nursing student education. Both students and educators have responded to simulation experiences in a positive manner. Students often look forward to and seek opportunities to participate in simulation events (Jeffries, 2005).

Gaps still exist in the literature regarding the effects a simulation experience has on student skills; (Lin, 2015) specifically knowledge and clinical judgment despite the frequent use of simulation throughout nursing education. The majority of simulation

research focuses on student satisfaction, however, far fewer, if any have investigated student knowledge and clinical judgment changes with a repeating simulation experience. This dissertation adds to the growing body of knowledge in simulation research and offers more evidence for the use of simulation in nursing education.

The introduction of simulation into nursing education has been met favorably by both students and educators (Jeffries, 2005). This learning modality often provides students with higher confidence levels in their performance and knowledge acquisition (Zapko et al., 2018). Often, a concept both in education in healthcare alters over time to meet the current needs. This holds true for simulation. Today it is used not only as a learning methodology, but also as an evaluation method.

This dissertation uses simulation as both a learning methodology and a formative evaluation method. The current available definitions of simulation either describe the concept as a learning methodology or a summative evaluation method, but not both. It is important for definitions to accurately and completely describe a concept, so confusion can be minimized or eliminated (Melesis, 2012). This dissertation offers a new inclusive definition of simulation to meet the current needs of nursing educators. The synthesis of the manuscripts that follows this section will address these gaps further.

Synthesis of the Manuscripts

In Chapter One, two main problems were identified: a need for a more complete definition of simulation and the need for more research on the effects of a repeating simulation experience on senior nursing student knowledge and clinical judgment.

Problem 1: The Call for a More Complete Definition of Simulation

The first problem identified in Chapter One, the need for a more complete definition of simulation, was addressed. An incomplete definition can lead to confusion and inconstancies in the research (Meleis, 2012). Simulation in nursing education is a growing body of research and inconsistencies due to an incomplete definition can lead to poor research and inconclusive evidence of the benefits of simulation. This problem was addressed in Manuscript One, *Simulation as a Learning and Evaluation Modality: A Concept Analysis*. After a review of available literature and resources, a new definition of simulation was proposed.

Problem 2: The Effects of a Repeating Simulation Experience

Knowledge

Knowledge acquisition is an important aspect of the nursing student experience. There have been studies on this subject, but more research is needed to generate evidence-based educational practices. Both Manuscript Two*, Knowledge and Attitudes of Senior Nursing Students in a Repeating Cardiac Code Simulation*, and Manuscript Three, *Senior Nursing Students in a Repeating Simulation Experience*, address the issue of the effects a repeating simulation experience has on student knowledge. The findings from this dissertation add to the growing body of knowledge that simulation has a statistically significant impact on nursing student knowledge through higher test scores. In both of the studies completed for this dissertation, participants showed a significant change in knowledge after participation in the simulation event. These results are congruent with other studies in this area. Elfrink et al. (2010) performed a study with nursing students examining knowledge acquisition after a simulation and found significant improvement in

the subject of the simulation. Another study performed using simulation as a means to educate students found an improvement from pre- and post-test scores after participation in a simulation experience (Fawaz et al., 2016). In the case of CPR training, students who participate in simulation as part of the curriculum demonstrate improved knowledge acquisition and retention (Aqel & Ahmad, 2014).

Clinical Judgment

The development of clinical judgment in nursing students is often referred to as attempting to teach students to "think like a nurse" (Lasater, 2007, Tanner, 2006). Traditional undergraduate nursing education places students in the clinical setting where they are required to process and intervene appropriately while providing patient care (Nielsen, 2009). Teaching and evaluating clinical judgment in the simulation environment offers a safe setting in which students can learn and grow. Manuscript Three, *Senior Nursing Students in a Repeating Simulation Experience* addresses the issue of the effect a repeating simulation experience has on student clinical judgment. The findings from this dissertation demonstrated participation in a repeating cardiac code simulation allowed students to better develop clinical judgment in that clinical situation. Participants in the study demonstrated a statistically significant increase on the Lasater Clinical Judgment Rubric scores with mean scores increasing between the two simulation experiences. These findings replicate Fawaz et al. (2016) and Lindsey and Jenkins (2013) that found significant improvement in student clinical judgment after participation in a simulation event. Simulation provides a safe and consequence-free environment in which students can make mistakes (Jeffries, 2005). This platform could lessen student anxiety and therefore increase understand and clarity.

Implications

This dissertation holds the potential to have impact on nursing education and contribute to the growing data on simulation. The findings of this study can potentially:

- Add conceptual clarity to simulation as a means of education and evaluation
- Provide insight into the relationship between simulation and nursing student knowledge development
- Provide insight into the relationship between simulation and nursing student clinical judgment
- Add to the body of knowledge that supports simulation as a learning modality and the need to incorporate it into undergraduate nursing programs.

Conceptual Clarity

The fundamental goal of scientific inquiry is to create or define a theory (Polit & Beck, 2012). Before a theory can be created, the basic building blocks need to be identified and defined, the concepts (Gray et al., 2017). Conceptual clarity allows for greater understanding and empiric meaning which leads to more accurate research (Chinn & Kramer, 2015).

It is important to have a clear understanding of a concept, especially a learning and evaluation modality, to ensure there is no confusion and the concept is utilized uniformly both in practice and in research (Meleis, 2012). An incomplete or unclear conceptual definition of simulation in nursing education can give rise to confusion and inconsistencies in research (Meleis, 2012). Many educators are using simulation as a learning modality to achieve learning outcomes and as an evaluation method to assess if those outcomes have been achieved (Caputi, 2010). This dissertation offers a more complete definition of

simulation, which can provide the needed conceptual clarity to this construct. Engaging in the concept analysis also provided a stronger base for utilizing Kolb's theory of Experiential Learning (1984) and Tanner's Model of Clinical Judgment (2006) as the theoretical framework guiding this dissertation.

Educational Practices

The education of nurses needs to be informed by evidence just as clinical medicine is informed by evidence (Cook, 2014). The Institute of Medicine (IOM) argues a change in the education of health care professionals is needed to increase patient safety and improve healthcare (IOM, 2010). Over the past several years, the use of simulation has exploded in the sector of nursing education (Caputi, 2010). While this is an exciting step forward in education, it is important that nurse educators keep up with the changing methodologies (Billings & Halstead, 2012). Simulation facilitators need to be well versed in the learning modality that is simulation. The rigor of simulation must be upheld in order for students to benefit from this form of instruction (Hayden et al., 2014).

It is often difficult to change the traditions associated with healthcare professional education, especially when new technology is involved (Rutherford-Hemming, 2016). Research into the modality of simulation helps to guide the current educational practices. This dissertation employed a traditional simulation experience with a slight twist, using Kolb's theory of Experiential Learning (1984) to guide a repeating simulation experience. This can allow other nursing instructors to plan and guide simulation experiences for nursing students using the studies associated with this dissertation. If more research is done in this area, it can generate a change in nursing curricula throughout the United States. This dissertation also demonstrated the significant impact a repeating simulation

experience can have on student knowledge and clinical judgment. This can encourage more educators to engage in this type of simulation experience.

Educational Policy

This section will introduce how this dissertation can inform practice and policy. Research is an essential component of policy as it informs practice and provides a theoretical and data foundational base on which to build (Chinn & Kramer, 2015). Simulation allows students gain the opportunity to develop the necessary clinical skills in a realistic, but safe environment (Bland, Topping, & Wood, 2010). The NCSBN performed a longitudinal multi-site study on simulation as pedagogy in nursing education and presented the results in 2014. This study showed that up to 50 percent of clinical time can be safely substituted with simulation (Hayden et al., 2014). One major question this study did not address is time ratios. It was not discussed if one hour of clinical is equal to one hour of simulation time or if the ratio is different (Breymier et al., 2015). Rather, nursing programs have been left to determine the appropriate ratio if the state board of nursing does not set one (Breymier et at.).

Professional bodies endorse simulation as a method of active learning (Schlairet, 2011). Several states have also deemed simulation as an acceptable method to replace up to 50 percent of clinical time (Rutherford-Hemming, Lioce, Kardong-Edgren, Jeffries, Sittner, 2016). This dissertation can be used as a stepping-stone to create a study that can help determine appropriate time ratios for clinical to simulation. It can also be used to add to the growing body of knowledge that demonstrates students have better retention of knowledge after a simulation experience (Aqel & Ahmad, 2014). This can then be used to

implement policies that support all nursing students have some experience with simulation before completion of a program.

Future Research

More definitive research examining the benefits and effects of simulation is needed. There is a distinctive lack of evidence on the effectiveness simulation demonstrates on student skills (Seacomb, McKenna, & Smith, 2012). More large-scale studies demonstrating the effectiveness of simulation are needed to effectively create educational policies (Hayden et al., 2014). More research is also warranted for the effects of simulation on clinical judgment. There are not many studies available on this topic, which can lead to a bias in the literature. Further research in this area coupled with the effects simulation has on knowledge can lead to changes in the way nurses are educated and better patient outcomes. It is also vital to perform studies to determine the appropriate hourly ration of clinical to simulation time and faculty development (Rutherford-Hemming et al., 2016).

The study associated with this dissertation can be adapted to be a large-scale multi-site study, which will provide more insight into the effects simulation has on student learning outcomes. It also is important to adapt this study or create a new one examining the effects simulation training for nursing students has on patient outcomes. A future large-scale study to help establish simulation to clinical hour ratios would also be interesting.

Summary

In this chapter, the findings from the three manuscripts associated with this dissertation were discussed. The two major problems addressed in Chapter One, the need for a more complete definition of simulation and the need for more evidence the effect a repeating simulation experience has on student knowledge and clinical were addressed.

The findings from these manuscripts can have great implications on future research in the field of simulation, future nursing educational practices, and educational policies.

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APPENDIX A

PERMISSION TO USE LCJR

Skoronski, Laura <laura.skoronski@wilkes.edu>

Lasater Clinical Judgment Rubric

Kathie Lasater <lasaterk@ohsu.edu> Fri, Nov 25, 2016 at 8:08 PM
To: "Skoronski, Laura" <laura.skoronski@wilkes.edu>

Hi Laura,

Thank you for your interest in the Lasater Clinical Judgment Rubric (LCJR). You have my permission to use the tool for your project. I ask that you (1) cite it correctly, and (2) send me a paragraph or two to let me know a bit about your project when you've completed it, including how you used the LCJR. In this way, I can help guide others who may wish to use it. Please let me know if it would be helpful to have an electronic copy.

You should also be aware that the LCJR describes four aspects of the Tanner Model of Clinical Judgment—Noticing, Interpreting, Responding, and Reflecting—and as such, does not measure clinical judgment because clinical judgment involves much of what the individual student/nurse brings to the unique patient situation (see Tanner, 2006 article). We know there are many other factors that impact clinical judment in the moment, many of which are impacted by the context of care and the needs of the particular patient.

The LCJR was designed as an instrument to describe the trajectory of students' clinical judgment development over the length of their program. The purposes were to offer a common language between students, faculty, and preceptors in order to talk about students' thinking and to serve as a help for offering formative guidance and feedback (See Lasater, 2007; Lasater, 2011). For measurement purposes, the rubric appears to be most useful with multiple opportunities for clinical judgment vs. one point/patient in time.

Please let me know if I can be of help,

Kathie

Kathie Lasater, EdD, RN, ANEF, FAAN
Professor
OHSU School of Nursing, SN-4S
3455 SW Veterans' Hospital Rd.
Portland, OR 97239
(503)494-8325

APPENDIX B

PERMISSION TO USE KNOWLEDGE TOOL

Ms. Laura M. Skoronski

From: Jestin Carlson, MD <JCarlson@svhs.org>
Sent: Wednesday, January 27, 2016 8:36 AM
To: Ms. Laura M. Skoronski
Cc: Dr. Catherine P. Lovecchio R.N., MSN, Ph.D.
Subject: RE: Cardiac Arrest article

Dear Laura,
Absolutely. Thank you so much for your interest in our article. Please feel free to use and let me know if I can be of any assistance with the project and best of luck with your research.
Take care,
Jestin

From: Ms. Laura M. Skoronski [laura.skoronski@scranton.edu]
Sent: Tuesday, January 26, 2016 8:57 PM
To: Jestin Carlson, MD
Cc: Dr. Catherine P. Lovecchio R.N., MSN, Ph.D.
Subject: Cardiac Arrest article

Dr. Carlson,

My colleague and I found your article Undergraduate cardiac arrest team training very interesting and helpful. We teach nursing at the University of Scranton in Pennsylvania and we are looking to conduct a simulated cardiac arrest nursing lab for our senior level students this semester. In order to gain a better understanding of the effectiveness of this simulation, we would like to assess the change in knowledge of our students. We would like to request the use of your tool for our research study. We would be willing to share any of our data with you. Please let us know if you grant us permission to use your tool for our research study.
Thank you for your consideration of our request.

Sincerely,
Laura Skoronski, MSN, RN, Lab Staff
Catherine Lovecchio, PhD, RN, Associate Professor, Director of Undergraduate Nursing Program

APPENDIX C

PERMISSION TO USE NLN TOOLS

National League for Nursing

The Voice of Nursing Education

Tools and Instruments

Use of NLN Surveys and Research Instruments

The NLN's copyrighted surveys and research instruments are an important part of its research activities.

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1. It is the sole responsibility of the researcher to determine whether the NLN research instrument is appropriate to her or his particular study.
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The Voice for Nursing Education

National League for Nursing

LASATER CLINICAL JUDGMENT RUBRIC
Noticing and Interpreting

Effective NOTICING involves:	Exemplary	Accomplished	Developing	Beginning
Focused Observation	Focuses observation appropriately; regularly observes and monitors a wide variety of objective and subjective data to uncover any useful information	Regularly observes/monitors a variety of data, including both subjective and objective; most useful information is noticed, may miss the most subtle signs	Attempts to monitor a variety of subjective and objective data, but is overwhelmed by the array of data; focuses on the most obvious data, missing some important information	Confused by the clinical situation and the amount/type of data; observation is not organized and important data is missed, and/or assessment errors are made
Recognizing Deviations from Expected Patterns	Recognizes subtle patterns and deviations from expected patterns in data and uses these to guide the assessment	Recognizes most obvious patterns and deviations in data and uses these to continually assess	Identifies obvious patterns and deviations, missing some important information; unsure how to continue the assessment	Focuses on one thing at a time and misses most patterns/deviations from expectations; misses opportunities to refine the assessment
Information Seeking	Assertively seeks information to plan intervention: carefully collects useful subjective data from observing the client and from interacting with the client and family	Actively seeks subjective information about the client's situation from the client and family to support planning interventions; occasionally does not pursue important leads	Makes limited efforts to seek additional information from the client/family; often seems not to know what information to seek and/or pursues unrelated information	Is ineffective in seeking information; relies mostly on objective data; has difficulty interacting with the client and family and fails to collect important subjective data
Effective INTERPRETING involves:	**Exemplary**	**Accomplished**	**Developing**	**Beginning**
Prioritizing Data	Focuses on the most relevant and important data useful for explaining the client's condition	Generally focuses on the most important data and seeks further relevant information, but also may try to attend to less pertinent data	Makes an effort to prioritize data and focus on the most important, but also attends to less relevant/useful data	Has difficulty focusing and appears not to know which data are most important to the diagnosis; attempts to attend to all available data
Making Sense of Data	Even when facing complex, conflicting or confusing data, is able to (1) note and make sense of patterns in the client's data, (2) compare these with known patterns (from the nursing knowledge base, research, personal experience, and intuition), and (3) develop plans for interventions that can be justified in terms of their likelihood of success	In most situations, interprets the client's data patterns and compares with known patterns to develop an intervention plan and accompanying rationale; the exceptions are rare or complicated cases where it is appropriate to seek the guidance of a specialist or more experienced nurse	In simple or common/familiar situations, is able to compare the client's data patterns with those known and to develop/explain intervention plans; has difficulty, however, with even moderately difficult data/situations that are within the expectations for students, inappropriately requires advice or assistance	Even in simple of familiar/common situations has difficulty interpreting or making sense of data; has trouble distinguishing among competing explanations and appropriate interventions, requiring assistance both in diagnosing the problem and in developing an intervention

LASATER CLINICAL JUDGMENT RUBRIC
Responding and Reflecting

Effective RESPONDING involves:	Exemplary	Accomplished	Developing	Beginning
Calm, Confident Manner	Assumes responsibility: delegates team assignments, assess the client and reassures them and their families	Generally displays leadership and confidence, and is able to control/calm most situations; may show stress in particularly difficult or complex situations	Is tentative in the leader's role; reassures clients/families in routine and relatively simple situations, but becomes stressed and disorganized easily	Except in simple and routine situations, is stressed and disorganized, lacks control, making clients and families anxious/less able to cooperate
Clear Communication	Communicates effectively; explains interventions; calms/reassures clients and families; directs and involves team members, explaining and giving directions; checks for understanding	Generally communicates well; explains carefully to clients, gives clear directions to team; could be more effective in establishing rapport	Shows some communication ability (e.g., giving directions); communication with clients/families/team members is only partly successful; displays caring but not competence	Has difficulty communicating; explanations are confusing, directions are unclear or contradictory, and clients/families are made confused/anxious, not reassured
Well-Planned Intervention/Flexibility	Interventions are tailored for the individual client; monitors client progress closely and is able to adjust treatment as indicated by the client response	Develops interventions based on relevant patient data; monitors progress regularly but does not expect to have to change treatments	Develops interventions based on the most obvious data; monitors progress, but is unable to make adjustments based on the patient response	Focuses on developing a single intervention addressing a likely solution, but it may be vague, confusing, and/or incomplete; some monitoring may occur
Being Skillful	Shows mastery of necessary nursing skills	Displays proficiency in the use of most nursing skills; could improve speed or accuracy	Is hesitant or ineffective in utilizing nursing skills	Is unable to select and/or perform the nursing skills
Effective REFLECTING involves:	**Exemplary**	**Accomplished**	**Developing**	**Beginning**
Evaluation/Self-Analysis	Independently evaluates/ analyzes personal clinical performance, noting decision points, elaborating alternatives and accurately evaluating choices against alternatives	Evaluates/analyzes personal clinical performance with minimal prompting, primarily major events/decisions; key decision points are identified and alternatives are considered	Even when prompted, briefly verbalizes the most obvious evaluations; has difficulty imagining alternative choices; is self-protective in evaluating personal choices	Even prompted evaluations are brief, cursory, and not used to improve performance; justifies personal decisions/choices without evaluating them
Commitment to Improvement	Demonstrates commitment to ongoing improvement: reflects on and critically evaluates nursing experiences; accurately identifies strengths/weaknesses and develops specific plans to eliminate weaknesses	Demonstrates a desire to improve nursing performance: reflects on and evaluates experiences; identifies strengths/weaknesses; could be more systematic in evaluating weaknesses	Demonstrates awareness of the need for ongoing improvement and makes some effort to learn from experience and improve performance but tends to state the obvious, and needs external evaluation	Appears uninterested in improving performance or unable to do so; rarely reflects; is uncritical of him/herself, or overly critical (given level of development); is unable to see flaws or need for improvement

APPENDIX E

TOOL TO ASSESS KNOWLEDGE

Data collection tool for knowledge.

True or False - Please circle your answer

1. In a patient crisis, I should obtain the patient's cardiac rhythm by placing the ECG leads on the patient and then turning the defibrillator to the "Monitor" setting T/F
2. Only nurses, who have had basic arrhythmia training, can defibrillate a patient. T/F
3. It is necessary to place defibrillator pads on a patient having chest pain. T/F
4. Once the code team arrives, my role is complete and I can leave the room. T/F
5. I can continue CPR while the AED is assessing the patient's rhythm. T/F

Fill in the Blank – Please write in your answer

6. The medication, _____, can be given every 3 to 5 minutes in a cardiac doe for a patient in ventricular tachycardia.
7. List the first three tasks that need to be completed when discovering a patient in crisis

   1._____
   2._____
   3._____

Multiple Choice – Please circle your answer.

8. The first action I should take upon finding an unresponsive person is
   a. Call for help
   b. Assess airway, breathing, and circulation
   c. Obtain blood pressure
   d. Immediately check for a pulse
   e. Place the patient in a side-lying position

9. Healthcare providers who are able to perform defibrillation with an automatic external defibrillator (AED) include:
   a. Physicians
   b. Critical Care nurses
   c. Nurses who are arrhythmia trained
   d. Any individual trained in use of an AED
   e. All of the above

10. Mr. Smith is a 72 year old male admitted to your unit yesterday with dyspnea secondary to pneumonia. At 0800 his vital signs are stable with a respiratory rate of 22/minute and

SpO2 of 92% on 4L oxygen via nasal cannula. Upon entering the room at 1000, you observe that he is tachypnic with a repiratory rte of 40 and complaining of severe shortness of breath. Your initial responses to this situation should be done in the following order.

a. Obtain SpO2 reading, place patient in high-Fowler's position, increase oxygen to 15L with a facemask, obtain blood pressure and heart rate, activate the Rapid Response Team.
b. Activate the Rapid Response Team, increase oxygen to 15L with a facemask, place patient in high-Fowler's position, obtain Sp)2 reading.
c. Increase oxygen to 15L with a facemask, obtain SpO2 reading, activate the Rapid Response Team.
d. Check for breath sounds, increase oxygen to 15L with a facemask, activate the Rapid Response Team, place patient in high-Fowler's position. Obtain SpO2 reading

APPENDIX F

NLN SIMULATION DESIGN SCALE

Simulation Design Scale (Student Version)

In order to measure if the best simulation design elements were implemented in your simulation , please complete the survey below as you perceive it. There are no right or wrong answers, only your perceived amount of agreement or disagreement. Please use the following code to answer the questions.

Use the following rating system when assessing the simulation design elements:

1 - Strongly Disagree with the statement
2 - Disagree with the statement
3 - Undecided - you neither agree or disagree with the statement
4 - Agree with the statement
5 - Strongly Agree with the statement
NA - Not Applicable; the statement does not pertain to the simulation activity performed.

Rate each item based upon how important that item is **to you.**

1 - Not Important
2 - Somewhat Important
3 - Neutral
4 - Important
5 - Very Important

Item	1	2	3	4	5	NA	1	2	3	4	5
Objectives and Information											
1. There was enough information provided at the begining of the simulation to provide direction and encouragement.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
2. I clearly understood the purpose and objectives of the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
3. The simulation provided enough information in a clear matter for me to problem-solve the situation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
4. There was enough information provided to me during the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
5. The cues were appropriate and geared to promote my understanding.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
Support											
6. Support was offered in a timely manner.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
7. My need for help was recognized.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
8. I felt supported by the teacher's assistance during the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
9. I was supported in the learning process.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5

Revised December 22, 2004

Simulation Design Scale (Student Version)

Use the following rating system when assessing the simulation design elements:

1 - Strongly Disagree with the statement
2 - Disagree with the statement
3 - Undecided - you neither agree or disagree with the statement
4 - Agree with the statement
5 - Strongly Agree with the statement
NA - Not Applicable; the statement does not pertain to the simulation activity performed.

Rate each item based upon how important that item is to you.

1 - Not Important
2 - Somewhat Important
3 - Neutral
4 - Important
5 - Very Important

Item	1	2	3	4	5	NA	1	2	3	4	5
Problem Solving											
10. Independent problem-solving was facilitated.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
11. I was encouraged to explore all possibilities of the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
12. The simulation was designed for my specific level of knowledge and skills.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
13. The simulation allowed me the opportunity to prioritize nursing assessments and care.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
14. The simulation provided me an opportunity to goal set for my patient.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
Feedback/Guided Reflection											
15. Feedback provided was constructive.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
16. Feedback was provided in a timely manner.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
17. The simulation allowed me to analyze my own behavior and actions.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
18. There was an opportunity after the simulation to obtain guidance/feedback from the teacher in order to build knowledge to another level.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
Fidelity (Realism)											
19. The scenario resembled a real-life situation.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5
20. Real life factors, situations, and variables were built into the simulation scenario.	○ 1	○ 2	○ 3	○ 4	○ 5	○ NA	○ 1	○ 2	○ 3	○ 4	○ 5

Revised December 22, 2004

APPENDIX G

NLN STUDENT SATISFACTION AND CONFIDENCE IN SELF-LEARNING

Student Satisfaction and Self-Confidence in Learning

Instructions: This questionnaire is a series of statements about your personal attitudes about the instruction you receive during your simulation activity. Each item represents a statement about your attitude toward your satisfaction with learning and self-confidence in obtaining the instruction you need. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the numbers that best describe your attitude or beliefs. Please be truthful and describe your attitude as it really is, not what you would like for it to be. This is anonymous with the results being compiled as a group, not individually.

Mark:
1 = STRONGLY DISAGREE with the statement
2 = DISAGREE with the statement
3 = UNDECIDED - you neither agree or disagree with the statement
4 = AGREE with the statement
5 = STRONGLY AGREE with the statement

Satisfaction with Current Learning	**SD**	**D**	**UN**	**A**	**SA**
1. The teaching methods used in this simulation were helpful and effective.	○ 1	○ 2	○ 3	○ 4	○ 5
2. The simulation provided me with a variety of learning materials and activities to promote my learning the medical surgical curriculum.	○ 1	○ 2	○ 3	○ 4	○ 5
3. I enjoyed how my instructor taught the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5
4. The teaching materials used in this simulation were motivating and helped me to learn.	○ 1	○ 2	○ 3	○ 4	○ 5
5. The way my instructor(s) taught the simulation was suitable to the way I learn.	○ 1	○ 2	○ 3	○ 4	○ 5
Self-confidence in Learning	**SD**	**D**	**UN**	**A**	**SA**
6. I am confident that I am mastering the content of the simulation activity that my instructors presented to me.	○ 1	○ 2	○ 3	○ 4	○ 5
7. I am confident that this simulation covered critical content necessary for the mastery of medical surgical curriculum.	○ 1	○ 2	○ 3	○ 4	○ 5
8. I am confident that I am developing the skills and obtaining the required knowledge from this simulation to perform necessary tasks in a clinical setting	○ 1	○ 2	○ 3	○ 4	○ 5
9. My instructors used helpful resources to teach the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5
10. It is my responsibility as the student to learn what I need to know from this simulation activity.	○ 1	○ 2	○ 3	○ 4	○ 5
11. I know how to get help when I do not understand the concepts covered in the simulation.	○ 1	○ 2	○ 3	○ 4	○ 5
12. I know how to use simulation activities to learn critical aspects of these skills.	○ 1	○ 2	○ 3	○ 4	○ 5
13. It is the instructor's responsibility to tell me what I need to learn of the simulation activity content during class time..	○ 1	○ 2	○ 3	○ 4	○ 5

Revised December 22, 2004

APPENDIX H

DEMOGRAPHIC QUESTIONNAIRE

Demographic Data Questionnaire

Please take a few minutes to complete this form: This information will be kept confidential.

1. Age _____

2. Gender

   - o Male
   - o Female

3. Have ever been involved in a code situation?

   - o Yes
   - o No

4. Have you ever participated in high fidelity simulation before?
   - o Yes
   - o No

5. Do you currently or have you ever worked in health care before?
   - o Yes
   - o No

APPENDIX I

PARTICIPATION CONSENT FORM

Consent Form for Participation in a Research Study
University of Scranton

Title of Study Examining knowledge, clinical judgment, and attitudes of senior nursing students in an interprofessional simulation

Description of the research and your participation

You are invited to participate in a research study conducted by Laura Skoronski. The purpose of this research is to determine what effects student participation in an interprofessional simulation has on knowledge, clinical judgment and attitudes.

All students are required to participate in the simulation. Your participation in the study will involve completing a pre- and post-test, a demographic questionnaire, and two attitude surveys.

Risks and discomforts

There are no known or foreseeable risks associated with this research.

Potential benefits

There are no known benefits to you that would result from your participation in this research. This research may help us to understand the benefits of a simulation experience and better educate future nurses.

Protection of confidentiality

This study is anonymous. We will not be collecting or retaining any information about your identity. The records of this study will be kept strictly confidential. Research records will be kept in a locked file, and all electronic information will be coded and secured using a password-protected file. We will not include any information in any report we may publish that would make it possible to identify you.

Voluntary participation

Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or to withdraw from this study.

Contact information

If you have any questions or concerns about this study or if any problems arise, please contact Laura Skoronski at 570-408-3870 or laura.skoronski@wilkes.edu. If you have questions about your rights as a research participant, contact Dr. Tabbi Miller-Scandle, IRB Administrator, Office of Research and Sponsored Programs, University of Scranton, 570-941-5824.

Consent

I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature_____ Date:_____

APPENDIX J

INVITATION TO PARTICIPATE IN STUDY

Dear Nursing Student,

You are being invited to participate in a study. You are being invited to participate in this study as the simulation experience is already part of your learning activates this semester.

The purpose of this research study is to assess knowledge gains and attitude changes after participating in a cardiac arrest simulation. In order to take part of this study, we ask that you complete a brief demographic questionnaire, pre-test for knowledge, post-test for knowledge, and post-survey for attitude. You will be given to complete the surveys in class and on your simulation day. This will take about 30 minutes of your time.

Your surveys will be coded by you so that your pre-simulation test and survey with your post-simulation test and survey can be matched. No member of the research team will know who you are or whether you have completed the surveys. Deciding to take part in the survey is your decision. Participating or not participating in the study will not have any impact on your grades or your status at school.

Please be aware that completion of the tests and surveys will signify your consent to participate in the study.

INFORMATION

Your participation in this study is voluntary; you may choose not to participate and there will be no penalty or consequence to your grades.

BENEFITS

Your participation in this research study will provide useful feedback that will guide the preparation of future nurses at the University of Scranton. The information collected as part of this study may be published in professional journals to better inform similar projects.

CONFIDENTIALITY

Your identity will be kept strictly confidential. You may choose to end your participation at any time during the study.

RISKS

This project does not involve any risks greater than those encountered in everyday life.

If you have any questions about your rights as a participant in this research, contact the IRB administrator, Dr. Tabbi Miller-Scandle, University of Scranton, tabbi.miller-scandle@scranton.edu (570-941-6353) or the DRB chair, Dr. Dona Carpenter, University of Scranton, dona.carpenter@scranton.edu (570-941-7673).

Thank you in advance for taking part in our study. Your participation is greatly appreciated.

Laura Skoronski, MS, RN
Catherine Lovecchio, PhD, RN

APPENDIX K

IRB APPROVAL FROM THE UNIVERSITY OF SCRANTON

Skoronski, Laura <laura.skoronski@wilkes.edu>

IRBNet Board Action
1 message

Tabbi Miller-Scandle <no-reply@irbnet.org> Mon, Jan 30, 2017 at 10:09 AM
Reply-To: Tabbi Miller-Scandle <tabbi.miller-scandle@scranton.edu>
To: Catherine Lovecchio <catherine.lovecchio@scranton.edu>, Laura Skoronski <laura.skoronski@wilkes.edu>

Please note that The University of Scranton IRB has taken the following action on IRBNet:

Project Title: [1001623-3] Examining knowledge, clinical judgment, and attitudes of senior nursing students in an interprofessional simulation
Principal Investigator: Laura Skoronski, MS

Submission Type: Revision
Date Submitted: January 28, 2017

Action: APPROVED
Effective Date: January 30, 2017
Review Type: Full Committee Review

Should you have any questions you may contact Tabbi Miller-Scandle at tabbi.miller-scandle@scranton.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org

CURRICLUM VITAE

LAURA SKORONSKI

PERSONAL INFORMATION

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West Wyoming, PA. 18644
(570) 407-2221
skoronskil3@yahoo.com

Office Address: Nursing Department
N226 Stark Learning Center
Wilkes University
84 West South Street
Wilkes-Barre, PA. 18766
laura.skoronski@wilkes.edu

DEGREE – Institutions:

PhD	May 2018	Ph.D. in Nursing University of Wisconsin – Milwaukee Milwaukee, WI
MSN	December 2014	Masters of Science in Nursing Education Georgetown University, District of Columbia
BSN	May 2010	Bachelors of Science in Nursing University of Scranton Scranton, PA

CERTIFICATION AND LICENSURE

RN Licensure	Expires October 2019
BLS	Expires September 2018
ACLS	Expires June 2018
PALS	Expires August 2018
NRP	Expires November 2018

CLINICAL SPECIALTY

Emergency Nursing
Nurse Education

EDUCATIONAL EXPERTISE

Nurse Educator Preparation
Curriculum Development
Educational Administration
Simulation Development and Preparation
Simulation Administration
Nursing Research
Science of Nursing

ACADEMIC AND CLINICAL EXPERIENCE

August 2017 – Present	Assistant Professor Clinical: Trauma/Step-Down Unit, Medical-Surgical Unit, Cardiac Step-Down Unit Classroom: Nursing Practice II Wilkes University Wilkes-Barre, PA
August 2016 – May 2017	Faculty of Practice Clinical: Intensive Care Unit, Physical Assessment Laboratory, Cardiac Step-Down Unit Classroom: Nursing Practice II Wilkes University Wilkes-Barre, PA
May 2016 – Present	Registered Nurse (Per Diem) Moses Taylor Hospital Emergency Department Scranton, PA
February 2015 – May 2016	Part-Time Faculty Classroom: Family Health Clinical: Intensive Care Unit, Physical Assessment University of Scranton Scranton, PA
August 2013 – May 2016	Nursing Laboratory Educator/Supervisor University of Scranton Scranton, PA
October 2010 – April 2014	Registered Nurse Moses Taylor Hospital Emergency Department Scranton, PA

June 2009 – October 2009 Student Nurse Extern, Operating Room
Regional Hospital of Scranton
Scranton, PA

PROFESSIONAL AFFILIATIONS

Professional Organizations

2013 - Present National League of Nursing
Member

2009 - Present Sigma Theta Tau International
Member 2009- Present
Officer 2014- 2016

Professional Development (examples of recent activities)

2018 Update for Healthcare Professionals: Management of Tardive Dyskinesia and Chorea Associated with Huntington's Disease

2017 Stop the Bleed

2017 Deficits and Disability in Acute Ischemic Stroke

2017 Collaborate Nursing Network: Medical Marijuana – Myths and Medicine

2016 Nursing Education Consortium of NEPA: Managing Incivility

2016 2016 Midwest Nursing Research Society Conference

2014 2014 Philadelphia National Simulation User Network Conference

2014 Quality Improvement in acute stroke care: Tracking measures and metrics to help identify program gaps and improve patient management

2014 The role of EpiPen (epinephrine) and EpiPen Jr (epinephrine) auto-injectors for patients at risk for anaphylaxis

2014 Discover what's different in the treatment of acute coronary syndrome (ACS)

Posters and Presentations

2017 Poster Presentation: PSNA Educational Workshop
"Knowledge and Attitudes of Senior Nursing Students in a Repeating Cardiac Code Simulation"

Updated March 2018