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The Effect of Medium Fidelity Simulation on Perceived Competence Level of Novice Nursing Students

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The Effect of Medium Fidelity Simulation on Perceived Competence Level
of Novice Nursing Students

by

Tracy D. Arnold

A capstone project submitted to the faculty of
Gardner-Webb University School of Nursing
in partial fulfillment of the requirements for the degree of
Doctorate of Nursing Practice

Boiling Springs

2012

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Abstract

This Capstone Project examined the effect of medium fidelity simulation on perceived competence level of novice nursing students. A convenience sample of 56 second-year associate degree nursing students enrolled in an Adult Medical-Surgical II nursing course and experiential laboratory course participated in this project. Students were divided into two separate groups based on course schedules: 27 students participated in the traditional laboratory experience, and 29 students participated in the instructor guided Mock Code simulation-based learning experience. Descriptive statistics were used to determine the overall mean of all student responses to each question on an altered version of the Perceived Competence Scale. Overall mean scores of perceived competence level demonstrated students had a fairly high level of perceived competence in relationship to the Mock Code despite the activity in which they were involved; however, students participating in the instructor-guided Mock Code simulation-based learning experience rated their overall perceived level of competence significantly higher ($m = 6.13$, $sd = 0.724$, $p < .05$) compared to students participating in the traditional laboratory experience ($m = 5.57$, $sd = .431$, $p < .05$). No significant difference was found among employed or non-employed students ($t(54) = -1.61$, $p > .05$). No significant relationship between student's age and total score on the Perceived Competence Scale was found.

Keywords: simulation, simulation-based learning experiences, critical thinking, competency, measuring competency, assessing competency, competency in nursing, clinical judgment

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CHAPTER I

INTRODUCTION

What does it mean to be competent? Some argue that competence (or the lack of) lies inside the individual and cannot be measured (O'Neill, Marks, & Reynolds, 2005). The 1999 report by the Institute of Medicine (IOM) revealed that 98,000 patients die annually due to medical-related errors (as cited in Fero, Witsberger, Wesmiller, Zullo, & Hoffman, 2008). The release of this report set a precedent that patient safety concerns are ever present. Some suggest that patient safety can be directly correlated with the critical thinking ability of the nurse (Fero et al., 2008). National organizations, such as the National Council of State Boards of Nursing (NCSBN) and The Joint Commission (TJC), have continually raised the patient safety standards expected in both the academic and healthcare settings (Fero et al., 2008). To ensure these standards are met, Schools of Nursing nationwide are challenged to incorporate innovative teaching strategies, such as the use of simulation-based learning experiences, to ensure nursing graduates are competent in delivering patient care upon graduation from pre-licensure programs. The IOM's, *To Err is Human* report, further supports the use of simulation-based learning experiences, stating "...health care organizations and teaching institutions should participate in the development and use of simulation for training novice practitioners, problem solving, and crisis management, especially when new and potentially hazardous procedures and equipment are introduced" (Kohn, Corrigan, & Donaldson, 2000, p. 179).

Problem Statement

Increased focuses on patient safety and increased patient acuity call for new nurse graduates to care for complex patient situations immediately upon entering the

workforce. Limited access to clinical sites has further warranted the lack of exposure to complex patient situations. These challenges have led nurse educators to consider alternative teaching methodologies that will ensure new nurse graduates can competently care for patients. Incorporation of simulation-based learning experiences into nursing curricula provides students with an opportunity to learn about and care for complex patient situations in a safe environment. The safety provided in this environment allows students to make mistakes and learn from these mistakes without the repercussions of harming a real patient. In addition, students can be exposed to situations they may not observe during a normal clinical rotation. Simulation-based learning experiences are gaining popularity in nursing education and have demonstrated increased levels of critical thinking among students; however, some faculty still prefer traditional teaching methodologies. The complex needs of today's society and limited access to clinical sites warrant nurse educators to adopt simulation-based learning experiences to ensure new nurse graduates are competent when entering the workforce.

Justification of Project

The National League for Nursing (2011) estimated there were approximately 1,800 pre-licensure programs in the United States in 2009. From these programs, it is estimated approximately 197,775 students successfully passed the National Council Licensure Examination for Registered Nurses (NCLEX-RN), with 155,290 passing on the first attempt (NCSBN, 2011). Passing the NCLEX-RN indicates the new nurse graduate is at least minimally competent to practice (O'Neill et al., 2005). According to Del Bueno (2005), only 35% of new nurse graduates meet expectations for entry level into clinical practice; however, the NCSBN states passing the NCLEX-RN indicates the new

nurse graduate's ability to demonstrate competence with 95% certainty (O'Neill et al., 2005). In December 2009, the NCSBN voted to increase the passing standard on the NCLEX-RN based on the need for an increased level of knowledge, skills, and abilities in the practice setting (NCSBN, 2009).

Trends in increasing patient acuity and standards set by governing bodies, such as TJC and NCSBN, call for new nurse graduates to be prepared to take care of complex patient situations. This places pressure on Schools of Nursing to continually evaluate competency level and clinical judgment among students to ensure they can safely care for the complex needs of today's patient population. Incorporation of simulation-based learning experiences in nursing curricula provides students with opportunities to participate in critical patient scenarios without causing harm to the patient (Radhakrishnan, Roche, & Cunningham, 2007) and may serve as an additional resource for nurse educators continuing to evaluate competency and clinical judgment among nursing students.

A review of the literature demonstrates there have been a variety of topics related to student involvement in simulation-based learning experiences studied over the last several years. Cato, Laster, and Peebles (2009) and Mattheos, Nattestad, Falk-Nilsson, and Attstrom (2004) explored the relationship between simulation and students self-assessment. Lasater (2007a) and Dillard et al. (2009) explored the relationship between simulation and the development of clinical judgment skills. In addition, other researchers have correlated critical thinking (Kaddoura, 2010) and confidence levels (Brannan, White, & Bezanson, 2008) among students participating in simulation-based learning experiences. However, despite these findings, there is still resistance among educators to

incorporate simulation-based learning experiences into curricula (Akhtar-Danesh, Baxter, Valaitis, Stanyon, & Sproul, 2009). Some argue that transitioning from traditional teaching modalities to simulation-based learning experiences and unfamiliarity with technological advancements contribute to the resistance of incorporation of simulation-based learning experiences in nursing curricula among nurse educators (Jeffries, 2007).

The lack of clinical settings, decreased amount of clinical time, and increased patient acuity place students in situations that require strong critical thinking skills and increased competency levels early in their education. Incorporation of simulation-based learning experiences during a student's course of study may help develop these skills (Akhtar-Danesh et al., 2009). Further assessment of factors influencing a student's competence level is needed. Some argue it is difficult to fully understand a person's reasoning abilities, thus making it difficult to measure actual competence (Benner, 2001). Additional data collection and projects may be helpful in continuing to support the use of simulation-based learning experiences to increase a student's perceived level of competency and critical thinking. In addition, projects such as this one may provide rationale for educators seeking additional funding for advanced technologies.

Statement of Purpose

The purpose of this project was to answer the question: Does a student's level of perceived competence increase with an instructor- guided Mock Code simulation-based learning experience compared to a traditional Mock Code laboratory experience? Melnyk and Fineout-Overholt's (2010) population, intervention, comparison, and outcome (PICO) format was used to further explain the question.

- Population (P): Second-year associate degree in nursing (ADN) students participating in a Mock Code as part of their laboratory experience in an Adult Medical-Surgical II nursing course.
- Intervention (I): Implementation of an instructor-guided Mock Code simulation-based learning experience to evaluate perceived level of competence.
- Comparison (C): Compare student perceived level of competence participating in an instructor-guided Mock Code simulation-based learning experience and traditional Mock Code laboratory experience.
- Observation (O): Students receiving an instructor-guided Mock Code simulation-based learning experience will have a higher level of perceived competence than students receiving a traditional Mock Code laboratory experience.

Assumptions

The following assumptions were made regarding the use of simulation-based learning experiences in nursing:

1. Limited clinical space warrants creative teaching methodologies to ensure students are exposed to complex patient situations.
2. Participation in a simulation-based learning experience enhances a student's learning experience by exposing them to situations they may not observe in a traditional clinical experience and/or prepares them for situations they may encounter in a traditional clinical setting.

3. Use of simulation-based learning experiences allows students to care for critical patients in a safe environment without the fear of harming a real patient.
4. Simulation-based learning experiences are effective in increasing a student's critical thinking, clinical judgment, self confidence, and psychomotor skills.

Theoretical Framework

Patricia Benner's theory of skill acquisition served as the theoretical framework for this project. Benner's theory has been used in a wide variety of settings to guide both academic and healthcare organizations in ensuring they are producing and employing competent nurses. Benner believes with adequate education and experience, one can move from the novice to expert level.

Benner's theory is derived from her adaptation of the Dreyfus' Model of Skill Acquisition and Skills Development and its application to nurses in the clinical setting. The Dreyfus Model was developed by studying pilots and chess players in emergency situations. According to the Dreyfus Model, there are five levels of skill acquisition: (1) Novice, (2) Advanced Beginner, (3) Competent, (4) Proficient, and (5) Expert. Benner's theory suggests nurses progress from novice to expert with experience and mastery of skills (Brykczynski, 2002).

A *novice* is described as a person with little or no experience related to a specific situation; a novice often needs guidance to ensure appropriate outcomes are met. *Advanced beginners* have been involved in enough real life patient situations to manage the problem at an acceptable level on their own or with the help of a mentor. A *competent* nurse is able recognize current problems in a situation and is able to foresee what may be important in the future. A *proficient* nurse is able to see the entire situation

(Brykczynski, 2002) and is able to recognize when a situation does not achieve an adequate outcome (Lyneham, Parkinson, & Denholm, 2008). The practice of the *expert* nurse is based on intuition; the expert nurse has a wide range of clinical knowledge and can easily recognize the unexpected (Brykczynski, 2002).

Benner (2001) defines competency as “an interpretatively defined area of skilled performance identified and described by its intent, function, and meaning” (p. 292). Benner believes clinical knowledge is gained through application of practical knowledge and clinical experience, thus moving each individual through the five levels of skill acquisition.

For the purposes of this project, Benner’s concepts of novice and competency were utilized. A *novice* nursing student was defined as a second-year ADN student participating in either the Mock Code simulation-based learning experience or the traditional laboratory experience. *Competency* was measured by the student’s score on the Perceived Competence Scale. These concepts are diagrammed in the Conceptual, Theoretical, and Empirical (CTE) structure in Figure 1.

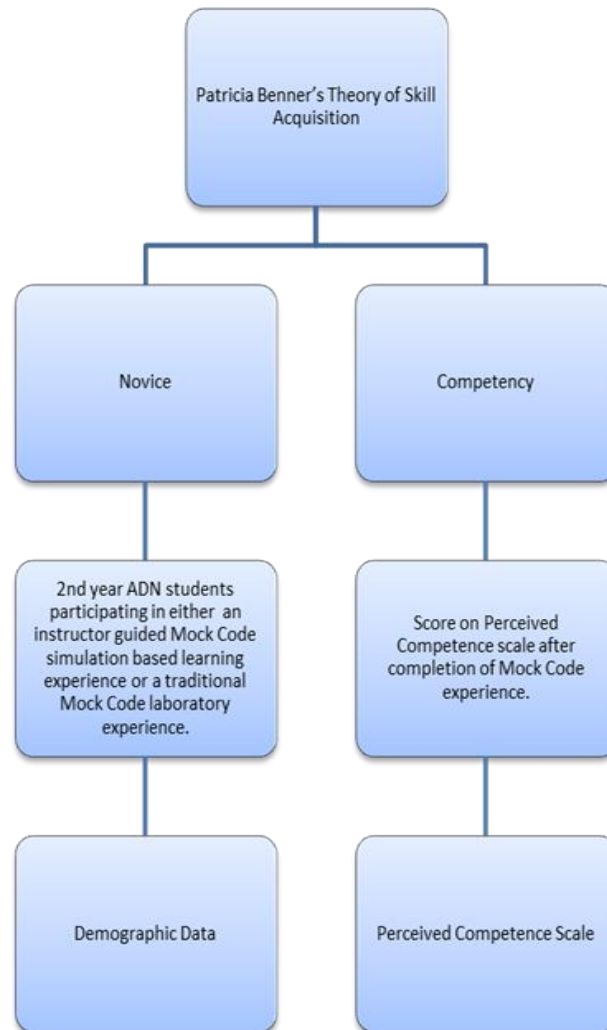


Figure 1. CTE Diagram relating Benner's theory to Capstone Project.

Concepts and Definitions

- Competency: "The application of knowledge and the use of affective, cognitive, and psychomotor skills required for the role of a nurse licensed by the Board and for the delivery of safe nursing care in accordance with accepted standards of practice" (Commonwealth of Massachusetts, 2012, p. 45). Because the term 'competency' is open to interpretation among scholars, it will be referred to as a compilation of critical thinking, clinical judgment, knowledge acquisition, and skill performance for this project.

- High fidelity simulation: Use of computer technology to replicate more complex physiological conditions, such as cardiogenic shock (Akhtar-Danesh et al., 2009).
- Medium fidelity simulation: “Use of computer technology to assist learners in developing competencies in skills, such as the identification of various heart, lung, and bowel sounds” (as cited in Akhtar-Danesh et al., 2009, p. 314).
- Mock code: For this project, a mock code represented cardiac resuscitation of a patient using a mannequin to practice emergency resuscitation procedures.
- Simulation-based learning experience: For this project, a simulation-based learning experience was defined as the use of technology, such as a mannequin, to replicate a realistic patient situation in which students can perform actual nursing skills in a safe environment (Smith & Roehrs, 2009).
- Traditional laboratory experience: The use of traditional teaching modalities such as lecture and task trainers to demonstrate skills.

Summary

Evaluation of critical thinking among novice nursing students is essential. The complex needs of today's patient population warrants new nurse graduates that are clinically competent. Compact curricula, limited clinical space, and limited exposure to complex patient situations warrant nurse educators to incorporate innovative teaching strategies that will promote critical thinking. Incorporation of simulation-based learning experiences into nursing curricula is one potential solution to this problem.

CHAPTER II

LITERATURE REVIEW

A literature review was conducted by searching a variety of databases and search engines. These databases included Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest, Area Health Education Center (AHEC) digital library, Medline, and the search engine Google. Key terms for the search included simulation, simulation-based learning experiences, critical thinking, competency, measuring competency, assessing competency, competency in nursing, and clinical judgment.

Conceptual Literature Review

A review of the literature shows there is great interest in simulation use among nursing educators. Various aspects of simulation have been studied and have shown positive impacts on the student nurse's skill level, competency, confidence, self-assessment, and critical thinking.

Simulation

Simulation and confidence. Gordon and Buckley (2009) used a descriptive study to evaluate fifty medical-surgical graduate students' perceived ability and confidence in responding to clinical emergencies. Students attended a series of live lectures reviewing management of clinical emergencies. Students then participated in two workshops focused on practicing technical skills related to clinical emergency management. In addition, all students participated in a teambuilding workshop focused on exploring various leadership styles. After the completion of all lectures and workshops, students participated in a high fidelity simulation representing a clinical emergency in a medical-surgical environment. Students were asked to complete a questionnaire prior to the initial implementation of the workshop and after completion of

the high fidelity simulation. At the conclusion of the study, students reported increased self-confidence in responding to clinical emergencies and improvement in technical and non-technical skills after participating in the high fidelity simulation.

Brannan et al. (2008) used a prospective, quasi-experimental, pretest and posttest comparison group to explore the use of a simulated experience on cognitive skills and confidence levels. One hundred and seven junior-year baccalaureate nursing students enrolled in an adult health nursing course participated in the study. Students attending the adult health course in the fall (group 1) received instruction through traditional teaching methods of lecture. Students attending the adult health course in the spring (group 2) received instruction using a simulation-based learning experience. Prior to either method being implemented, students completed the Acute Myocardial Infarction Questionnaire (AMIQ) to measure cognitive skills, a confidence level tool, and a demographic questionnaire. Both groups were exposed to content related to nursing care of a patient having an acute myocardial infarction. Group 1 received information through a traditional two-hour lecture; group 2 received the information through a simulation-based learning experience. Students in the simulation-based learning experience were divided into small groups and rotated through five stations during a two-hour time period. Following the traditional lecture and simulation-based learning experience, students were asked to complete an AMIQ posttest. Study results indicated students participating in the simulation-based learning experience demonstrated higher posttest scores on the AMIQ than students participating in the traditional lecture method; however, despite any significant findings, students participating in the traditional method lecture reported a greater increase in self-confidence.

Smith and Roehrs (2009) used a descriptive, correlational design to examine students' self-confidence and satisfaction following a high fidelity simulation-based learning experience. Sixty-eight junior-year baccalaureate nursing students enrolled in their first medical-surgical course participated in the study. As part of the course curriculum, all students attended a 56-hour skills laboratory during the first seven weeks of the course for skill development. During weeks nine and ten, students participated in a high fidelity simulation-based learning experience. Following the simulation, students were asked to complete a demographic questionnaire, the Student Satisfaction and Self Confidence in Learning Scale, and the Simulation Design Scale. Study results demonstrated students felt confident and satisfied with the simulation design and experience.

Blum, Borglund, and Parcels (2010) used a quasi-experimental study to explore self-confidence and clinical competence of 53 junior baccalaureate nursing students enrolled in a health assessment course and skills course. Students were randomly assigned to a control or intervention group. The control group attended a traditional laboratory experience where task trainers and student volunteers were used to demonstrate skill competency. The experimental group used a high fidelity simulator to demonstrate skill competency. At the end of the semester, both students and clinical faculty completed the Lasatar Clinical Judgment Rubric (LCJR); the LCJR is based on the four dimensions of noticing, interpreting, reflecting, and responding as described in Tanner's Clinical Judgment Theory. Researchers selected specific items from the LCJR to represent students' confidence levels and clinical competence level. Confidence levels were measured based on students' responses to calm/confident manner, well planned

interventions/flexibility, evaluation/self-analysis, and commitment to improvement. Clinical competence was measured using faculty ratings of students based on recognizing deviations from expected patterns, information seeking, prioritizing data, and clear communication. Both groups reported an increase in self-confidence and were evaluated by faculty as having increased clinical competence from the midterm to final; however, there was no significant difference in confidence levels or competence levels between the two groups. This study demonstrated confidence and clinical competence increased in both groups regardless of the teaching method used suggesting simulation may be more beneficial for students towards the end of program completion.

Simulation and clinical performance. Radhakrishnan et al. (2007) used a quasi-experimental pilot study to explore the effects of simulation on clinical performance. Twelve senior baccalaureate nursing students participated in the study. As part of the nursing curricula, all students were required to complete a 320-hour preceptorship during their capstone course. Students were randomly assigned to the intervention group or control group. The intervention group attended two simulation-based learning experiences throughout the semester in conjunction with the preceptorship experience. The control group only completed the preceptorship. At the end of the semester, both groups participated in a simulation-based learning experience in which they were required to care for two patients, one requiring emergency care. During the simulation, students were evaluated on safety, basic assessment, focused assessment, interventions, delegation, and communication. Students in the intervention group scored significantly higher in the areas of safety and basic assessment; however, there were no significant differences in the other categories.

Simulation and knowledge acquisition. Schlaiet and Pollock (2010) used a 2x2 cross over design to explore knowledge acquisition of students participating in simulated clinical experiences. Seventy-four baccalaureate nursing students participated in the study. All students completed a 25-question NCLEX-RN style pretest to determine current knowledge level. All students attended a traditional clinical experience (i.e. nursing home) first, and then participated in a simulated clinical experience or attended a simulated clinical experience first and then attended a traditional clinical experience. At the conclusion of the first clinical experience, students attending the traditional clinical experience participated in a traditional post-conference meeting. Students participating in the simulated clinical experience participated in a faculty-guided debriefing. Both groups then completed a posttest and switched to the second clinical experience. After completing the second clinical experience, students were debriefed as a group and completed a second posttest. The study concluded that students participating in the simulated clinical experience first and then the traditional clinical experience had reached a slightly higher level of knowledge acquisition than students participating in the traditional clinical experience and then the simulated clinical experience.

Simulation and critical thinking. Kaddoura (2010) explored the perceived role simulation played on critical thinking, learning, and confidence of new graduate nurses using an exploratory qualitative descriptive design, with a semi-structured interview method. A convenience sample of ten graduate nurses from an intensive care unit participated in the study. All participants were enrolled in a six-month critical care training program. Every three weeks, participants attended an eight-hour simulation-based learning experience for a total of eight days. Participants were exposed to high risk

situations as well as situations which are infrequent in the actual clinical setting. At the conclusion of the six-month training, participants were interviewed. Participants identified three important themes including simulation as an interactive teaching-learning process, increase in critical thinking skills, and increased awareness of safety among nurses and patients when practicing in a nonthreatening environment. Participants also reported an increase in confidence levels.

Lewis and Ciak (2011) explored the role simulation played on critical thinking, student satisfaction, and self-confidence using a quasi-experimental design. A convenience sample of 63 students enrolled in an obstetrical and pediatric course were included in the study. Students participated in a one-day simulation-based learning experience consisting of eight scenarios related to the care of obstetrical and pediatric patients. Using a pretest-posttest design, students were asked to complete a 20-question multiple choice pretest to assess baseline knowledge. Following the simulation-based learning experience, students were asked to complete the same test. One to two weeks after the simulation-based learning experience, students were asked to complete the Student Satisfaction and Self Confidence in Learning tool. While the pretest and posttest results showed a significant knowledge gain, results regarding critical thinking were inconclusive. Students did, however, report an increase in satisfaction and self-confidence in learning.

Simulation and clinical judgment. Dillard et al. (2009) studied the application and evaluation of clinical judgment through the use of a simulation-based learning experience in 25 nursing students enrolled in an adult health course. Students participated in a simulation-based learning experience caring for a heart failure patient.

The simulation was guided by Tanner's dimensions of noticing, interpreting, and responding, in which students were to use these dimensions to react to the patient's condition. In addition, the simulation was guided by six learning objectives established by the researchers. At the conclusion of the simulation, students were asked to complete a questionnaire related to the learning objectives of the simulation. Overall, students reported feeling like they understood the learning objectives of the simulation. Towards the end of the project, students were then assigned to a traditional clinical experience in which they were responsible for caring for a heart failure patient and were asked to journal about their clinical experience. The journaling activity was found to reflect a stronger representation of the student's clinical judgment abilities and allowed the faculty member to further evaluate each student's weaknesses.

Lasater (2007b) used a qualitative approach to explore students' experiences in the development of clinical judgment through the use of high fidelity simulation. A focus group of 15 junior-level baccalaureate students enrolled in a medical-surgical nursing course agreed to participate in the study. Students within the School of Nursing had been attending weekly simulation-based learning experience in place of one traditional clinical day. After several encounters with simulation-based learning experiences, students were asked to participate in a focus group to gather retrospective data. Students were asked questions regarding their clinical judgment development and experience with simulation-based learning experiences. Students identified that simulation helped bridge the gap between theory and real life experiences. Students felt the ability of the patient to respond immediately to nursing interventions made them more aware of the need to frequently monitor and assess. Additional areas students identified as positive benefits of

simulation were the ability to learn from others, collaboration with team members, and the ability to learn from mistakes without harming a real patient.

Competency

A brief literature review was conducted by searching a variety of databases and search engines to identify studies utilizing competency and its relationship to nursing. Objectivity in measuring competence among nursing students is lacking (Blum et al., 2010). The following studies discuss various methods researchers have used to assess competence and the various factors that affect competence among nursing students.

Perception of competence. In 2009, Marshburn, Engelik, and Swanson conducted a retrospective, descriptive correlation study among 265 new nurses to determine the relationship between measured competence and perceived competence. Participants were asked to complete both the Performance Based Development System (PBDS) assessment and the Casey Fink Graduate Nurse Experience Survey. The score on the PBDS assessment was used to determine actual competency level of the nurses. Specifically, PBDS measured three areas including problem management, communication, and technical skills. This study utilized the nurse's score on problem management and communication as the measurement of actual competence. The nurse's score on the Casey Fink Graduate survey was used to measure perceived competence. A positive correlation was found among nurses that scored as acceptable in the area of problem management on PBDS and their confidence in performing skills.

In 2005, Greenberger, Reches, and Riba studied the perception of technical competence among new nurse graduates in Israel. Two hundred and fifty-six new nurse graduates from four different degree programs (4-year academic program, 3-year diploma

program, 2-year accelerated program for graduates with a previous non-nursing degree, and 2-year licensed practical nurse to registered nurse program) were asked to self-report their competence level in relation to 53 skills in eight categories identified by the researchers. The graduates rated their competency level as fairly high; however, there were differences in levels of competency based on type of degree, opportunity of skills practice in nursing school, and previous healthcare experience.

Competence and educational preparation. Shin, Jung, Shin, and Kim (2006) used a non-experimental design study to compare 305 senior nursing students enrolled in an ADN, Bachelor of Science (BSN), or Registered Nurse (RN) to BSN program to compare critical thinking dispositions among students. Students were asked to complete both the California Critical Thinking Disposition Inventory (CCTDI) and the California Critical Thinking Skills Test (CCTST). Students in the BSN program scored significantly higher on critical thinking than students in the other programs. Baccalaureate students were also found to score significantly higher in the areas of analysis, evaluation, inference, deductive reasoning, and inductive reasoning. Students in the RN to BSN program were found to have the next highest level of critical thinking, followed by the ADN students.

Mentoring and competence. Komaratat and Oumtanee (2009) compared the competency level of new nurse graduates pre and post-implementation of a mentorship program. Using a time series design, 19 new nurse graduates were asked to complete the Nursing Competence Scale to evaluate nursing, human relationship and communication, decision making and problem solving, and quality development and assurance. In addition, 19 nurse mentors were placed through a training session related to

responsibilities of a mentor and were asked to complete the Mentorship Knowledge Scale and the Mentor's Activities Scale. Data analysis demonstrated the new graduates level of competency increased after participating in a mentorship program.

Perceived Competence Measurement Tools

A review of literature indicated there are few validated tools available to measure the perceived competence level of students in relation to educational experiences. The Perceived Competence Scale (PCS) was identified as a potential tool designed to be altered by the principal investigator so the particular behavior of interest could be assessed. Two studies were identified, Williams, McGregor, King, Nelson, and Glasgow (2005) and Williams, Niemiec, Patrick, Ryan, and Deci (2009), utilizing an adapted version of the PCS. Further explanation of the PCS can be found in Chapter III.

Perceived competence and diabetes. Williams et al. (2005) conducted a four-year study using the PCS to compare the effects of an interactive diabetes management program and general health risk appraisal program on the management of each participant's diabetes. Thirty-one healthcare providers and 591 patients agreed to participate in the study. Patients were asked to complete a series of questionnaires related to their disease process, support of healthcare provider, patient satisfaction, depression, and perceived competence related to their disease process (the PCS). Participants were also asked to provide a blood sample to measure hemoglobin A1c. For this study, the PCS was adapted to measure behavior characteristics related to diabetes. Participants reporting higher levels of perceived competence were found to maintain better glycemic control than participants with lower levels of perceived competence.

Perceived competence and smoking cessation. Williams et al. (2009) measured the effect a tobacco intervention program had on long-term tobacco abstinence in 1,006 smokers. Participants were asked to complete a questionnaire packet related to autonomous self-regulation and perceived competence and asked to have blood work drawn. Following completion of the questionnaire, participants were divided into a control and an intervention group. Participants in the control group were given information via handouts related to smoking cessation, results of blood work, local resources to facilitate smoking cessation, and they were asked to speak to their healthcare provider about their smoking and lab results. Participants in the intervention group received the same information as the control group; however, they were asked to meet with a counselor four times in the following six months to discuss their current health status. Following the conclusion of all interventions, participants were asked to complete the same questionnaires at six-month and 30-month intervals to assess autonomy of self-regulation and perceived competence. Results concluded participants receiving additional support and interventions related to smoking cessation had a higher level of perceived competence in regards to smoking cessation. For this study, the PCS was adapted to measure perceived competence related to the ability to stop smoking.

Theoretical Literature Review

A literature review was conducted by searching a variety of databases and search engines to identify studies utilizing Benner's theory related to simulation and/or competency. These databases included CINAHL, ProQuest, AHEC digital library, and the search engine Google. Three studies were identified that utilized the basic concepts of the five levels of skill acquisition: Meretojua and Leino-Kilpi (2003), Fero et al.

(2008), and Uys, Rhyn, Gwele, McInerney, and Tanga (2004). Only one study, Uys et al., was identified that utilized an in-depth application of Benner's theory.

In 2003, Meretoja and Leino-Kilpi surveyed 81 staff nurses and their nurse managers to assess competency level. The staff nurse and nurse manager were asked to complete a 73-item questionnaire based on the competency level of the staff nurse. The purpose of the study was to see if the nurse manager's evaluation of competency was consistent with how the staff nurse rated her own competency level. The study found that nurse managers rated the staff nurse as more competent, when compared to the staff nurse's own self-assessment.

The 73-item questionnaire utilized by Meretoja and Leino-Kilpi (2003) was divided into seven competence categories based on Benner's seven domains of nursing practice. These domains include the following: the helping role (seven questions), the teaching-coaching function (16 questions), the diagnostic and patient-monitoring function (seven questions), the effective management of rapidly changing situations (eight questions), the administering and monitoring therapeutic interventions and regimens (10 questions), the monitoring and ensuring the quality of healthcare practices (six questions), and organizational work-role competencies (19 questions). The nurses reported similar scores to their managers in the domains of the helping role and managing situations and diagnostic functions role. The managers also rated the nurses very high in the teaching-coaching role. The lowest scoring area was found to be ensuring quality of healthcare practices. The investigators justification for utilizing Benner's theory was not stated but can be assumed. Benner's theory is well versed in how nurses progress through the stages of novice to expert. Benner's research provides a strong foundation,

supporting nurses achieve competency through experience with real life patient situations.

Fero et al. (2008) administered the Performance Based Development System (PBDS) assessment to 2,144 newly-hired nurses. A *post hoc* retrospective analysis was conducted to determine the level of competency identified by PBDS, the relationship of n PBDS scores to years of nursing experience, and the relationship of PBDS scores to educational level. The results revealed that 24.1% of nurses did not meet expectations. Newly-hired nurses with the least amount of nursing experience were found to have the highest rate of not meeting expectations. However, there was a statistically significant difference among the various educational levels of experienced nurses. Nurses with more experience that were prepared at the associate and baccalaureate levels scored better on the exam than experienced nurses prepared at the diploma level.

Benner's five levels of competence (novice, advanced beginner, competent, proficient, and expert) were used by Fero et al. (2008). For the purposes of the study, the investigators specifically defined the concept of *novice* to be a new nurse graduate with limited experience and the inability to function independently. The other concepts of advanced beginner, competent, proficient, and expert were defined by Benner but not utilized in the study. The investigators felt the study supported Benner's conceptualization. Nurses with more experience were able to identify appropriate interventions on the PBDS assessment, supporting Benner's theory of nurse's progress from novice to expert with experience and mastery of skills (Brykczynski, 2002).

Uys et al. (2004) used a qualitative design to study the competency level of graduates from four universities utilizing problem-based learning (PBL) and from four

universities that did not utilize problem-based learning. A total of 49 graduates were included in the study. The graduate and their nurse manager were interviewed to gain an understanding of the graduate's level of practice. Both were asked a series of open-ended questions, with the answers tape recorded by the principal investigator. The primary question asked was, "Can you describe an incident which illustrates your/his/her problem-solving ability?" Based on the answers provided by the graduate and the manager, each incident was categorized as novice, advanced beginner, competent, or proficient. Graduates from the non-PBL groups had more incidents rated at the novice level than graduates from the PBL groups.

This study incorporated a comprehensive review of Benner's conceptual framework. The terms *novice*, *advanced beginner*, and *proficient* were carefully defined by the investigator to ensure that all incidents of problem solving described by the graduate or nurse manager were equally categorized. The investigators also defined the concept of *competence* as the advanced beginner stage.

Strengths, Weaknesses, Gaps, and Limitations

A review of the literature illustrates there have been countless studies regarding the use of simulation-based learning experiences in the academic setting and the need to facilitate critical thinking among nursing students. To deliver safe patient care, nurse educators must ensure new nurse graduates are competent and capable of handling complex patient situations. Researchers continue to challenge nurse educators to develop curricula that will enhance critical thinking among new nurse graduates (Shin et al., 2006).

The literature provides strong evidence that simulation-based learning experiences can positively influence the teaching-learning process. A wide variety of studies have evaluated a student's self-assessment (Cato et al., 2009; Mattheos et al., 2004), critical thinking (Kaddoura, 2010), clinical judgment skills (Lasater, 2007a; Dillard et al., 2009), and confidence (Brannan et al., 2008). Integration of simulation-based learning experiences into nursing curricula is well supported based on the diverse needs of today's patient population.

The most significant gap in literature is the lack of research studies involving the use of medium fidelity simulation and research among nursing students enrolled in associate degree and diploma programs. Historically, baccalaureate nursing graduates are said to demonstrate higher levels of critical thinking than associate degree nursing graduates (Shin et al., 2006). Despite this argument, both graduates complete the same licensing examination. For this reason, ensuring associate degree nursing students are adequately prepared to care for a complex patient situation is essential. Research measuring competency levels among associate degree nursing students utilizing simulation-based learning experiences is needed.

Significant limitations in the literature include small sample sizes and lack of generalizability to other degree programs, such as associate degree or diploma programs. In addition, many studies only exposed students to one simulation-based learning experience during the study.

This project seeks to address the gaps, weaknesses, and limitations found in the literature through incorporation of ADN students in simulation-based learning experiences. Few studies have been identified that focus on the use of simulation in

ADN programs. Additional projects are needed to further support the use simulation-based learning experiences across all degree programs. This project serves to add to the existing body of knowledge related to simulation-based learning experiences and further expand simulation across the nursing curricula. In addition, this project will incorporate the use of medium fidelity simulation, which is lacking in current studies.

CHAPTER III

METHODOLOGY

The purpose of this project was to determine if a student's level of perceived competence increased with an instructor-guided Mock Code simulation-based learning experience compared to a traditional Mock Code laboratory experience. The following chapter presents the design, setting, sample, methods, ethical considerations to protect human subjects, instrument, data collection procedure, and data analysis procedure used in this project.

Design

This project used a quasi-experimental posttest-only design with inferential analysis to compare the level of perceived competence among students participating in either a traditional Mock Code laboratory experience or an instructor-guided Mock Code simulation-based learning experience.

Setting

This project was conducted at a private, liberal arts, faith-based university located in the Piedmont region of Western North Carolina. Established in 1905 as a high school, the university grew to a junior college in 1928 and was officially designated as a university in 1993. The university offers nine academic departments, five professional schools, and serves approximately 4,300 students in both undergraduate and graduate studies.

Within the university, the School of Nursing offers five programs of study including an ADN, traditional BSN, RN to BSN, Masters of Science in Nursing (MSN), and Doctorate of Nursing Practice (DNP) to approximately 600 students. The ADN,

traditional BSN, RN to BSN, and MSN programs are fully accredited by the National League for Nursing Accrediting Commission (NLNAC), and the DNP program is currently under review for initial accreditation by NLNAC. The ADN and traditional BSN programs are offered in a traditional face-to-face classroom setting, the RN to BSN and MSN programs are offered online, and the DNP offers courses in a hybrid format. The School of Nursing offers two simulation labs equipped with low and medium fidelity manikins for use across all programs of study.

Sample

A convenience sample of 59 second-year ADN students enrolled in an Adult Medical-Surgical II nursing course and experiential laboratory course were included as potential participants in this project. Of the 59 students, two students were absent on the day of implementation, and one did not complete the survey. Fifty-six completed surveys were collected, resulting in a response rate of 93%. Of the returned surveys, 27 students participated in the traditional laboratory experience and twenty-nine students participated in the instructor-guided Mock Code simulation-based learning experience.

Sample size was determined by a statistical priori power analysis using the G*Power 3.1.3 software (Faul, Erdfelder, Lang, & Buchner, 2007). Desired power for the project was determined by setting a two-tailed alpha at 0.05 with a probability of rejecting the null hypotheses at 0.8 utilizing a large effect size. Due to the lack of availability of participants, it was necessary to utilize the large effect size ($r = 0.8$), yielding a sample size of 52. A medium effect size ($r = 0.5$) would have warranted a sample size of 128, and a small effect size ($r = 0.2$) would have warranted a sample size of 788.

Methods

As part of the Adult Medical-Surgical II nursing course, all second-year ADN students were required to participate in a Mock Code during their experiential laboratory nursing course. The Mock Code laboratory experience was based on introducing students to clinical emergencies, including the use of an automated external defibrillator (AED), use of current cardiopulmonary resuscitation (CPR) procedures, use of a code cart, as well as recognizing arrhythmias and intubation of a patient. The Mock Code served as a learning experience only and did not impact student grades.

Preplanning

Traditionally, the information students received during the Mock Code was presented to students didactically by rotating through stations. This particular course arrangement was created by the Director of the ADN program, who also served as the principal investigator's preceptor, and had been used within the current course curriculum for the past six years. Each year the content within the stations were updated to include the most current evidence-based practice trends in nursing care. Since this was already developed, the principal investigator utilized this design setup to serve as the control group (i.e. the traditional laboratory experience) for this project; therefore, no additional preparation for the traditional laboratory experience was needed.

The current nursing curriculum, however, was deeply rooted in simulation-based learning experiences for students. Students were initially exposed to simulation-based learning experiences during their first year in the ADN program, often participating in weekly simulations throughout the program. For this particular Adult Medical-Surgical II experiential laboratory course, students experienced weekly simulations with the

exception of two days at the beginning of the semester in which content was covered didactically by rotating through stations, one of these days being Mock Code related content. Since simulation was already a familiar concept for students, the principal investigator worked with the preceptor to create a Mock Code simulation-based learning experience.

A simulation-based learning experience related to emergency cardiac care of a patient was developed by the principal investigator. The scenario incorporated the same concepts of defibrillation, CPR, rhythm recognition, and intubation procedures covered in the didactic portion of the traditional laboratory experience. The principal investigator's preceptor served as the content expert and reviewed the simulation prior to implementation. Several meetings were held with the preceptor to discuss content, and revisions were made to the simulation throughout the process.

Initial Testing of Simulation

Prior to implementation of the simulation-based learning experience, the principal investigator evaluated the design, layout, and technological factors associated with implementation of the simulation. Two students currently enrolled in the RN to BSN program, who recently graduated from the University's ADN program less than one year ago, assisted the principal investigator in testing the Mock Code simulation. An additional nursing faculty member observed the simulation and offered additional feedback.

Having been through the ADN program recently, the two RN to BSN students were comfortable with simulation and familiar with the design of a typical simulation-based learning experience. The two students were given the scenario and asked to react

to the patient as the situation unfolded. Through this initial testing phase, it was identified that students needed to review critical information, such as basic CPR and the current advanced cardiac life support (ACLS) algorithm, prior to attending the simulation-based learning experience. In addition, equipment placement and availability was evaluated to ensure the simulation progression would be realistic.

Implementation

Fifty-six students participated in a Mock Code laboratory experience. Prior to attending the Mock Code, all students received a three-hour lecture on the cardiac system, including recognition and treatment of arrhythmias. Per the course curriculum, students were automatically divided into two groups based on course schedules.

Implementation of the project took place over two days. Students normally scheduled for lab on day one served as the control group and participated in a traditional laboratory experience. Students normally scheduled for lab on day two served as the experimental group and participated in an instructor-guided Mock Code simulation-based learning experience. Participation in either the traditional laboratory method or instructor-guided Mock Code simulation was mandatory based on current curriculum standards; however, participation in the project and completion of the survey was optional for students in both groups.

The traditional Mock Code laboratory experience consisted of 27 students being divided into four groups. Each group of students rotated through four stations. The four stations included use of an AED, recognition of arrhythmias, use of a code cart, and intubation of a patient. An instructor was located at each station and discussed with students the components of the station. At each station, students received information via

traditional didactic methods, with little hands-on experience. At the conclusion of the traditional Mock Code laboratory experience, students were asked to complete a survey designed to measure their perceived level of competence.

The four stations are described in-depth below:

- Station 1: AED. Students were shown an AED and asked to attach the AED to an unresponsive patient. During this station, students were asked to perform one cycle of CPR while partnered with another student using a CPR task trainer manikin.
- Station 2: Intubation. An instructor discussed the proper equipment necessary to intubate a patient, including a laryngoscope, various size endotracheal tubes (ET), how to remove the stylette from ET tube, precautions to take during intubation including chipping of teeth, and how to auscultate lungs sounds for verification of placement. The instructor then demonstrated the proper way to intubate a patient using a task trainer airway management manikin.
- Station 3: Code Cart. An instructor discussed the various equipment and medication found in a code cart.
- Station 4: Arrhythmias. Students were taken to a traditional classroom setting where an instructor presented a PowerPoint presentation on recognition and interpretation of basic cardiac rhythms.

The instructor-guided Mock Code simulation-based learning experience consisted of students being divided into six groups. Twenty-nine students were present for the instructor-guided Mock Code simulation-based learning experience. Students were

divided into five groups of five students and one group of four students. Each group was asked to come to the simulation lab in one-hour intervals wearing their clinical uniforms. Instructions for participation were posted on the student's course website, along with the current ACLS algorithm for the student to review prior to coming to the Mock Code simulation based-learning experience.

Upon arrival to the simulation lab, students were briefed on roles and responsibilities of nursing staff involved in caring for a patient experiencing cardiac arrest. The instructor reviewed proper procedures for identifying cardiac arrest in an unresponsive patient, how to call a "Code Blue" in a hospital setting, and current CPR guidelines as established by the American Heart Association. Students were encouraged to ask each other for help during the simulation experience if they encountered a situation or procedure in which they were unfamiliar. In addition, if the entire group was unsure of how to proceed during the simulation, they were ensured the instructor would provide directions on how to proceed.

Each student in the group was asked to randomly select a badge labeled with one of four "roles". The roles included a primary nurse, two secondary nurses, a medication nurse, and a recorder. The primary responsibilities of each role are described below. However, each student was allowed to assist in any role during the actual simulation-based learning experience. The role of the primary nurse was to complete the initial patient assessment and to delegate tasks appropriately to other team members. The secondary nurses were responsible for assessing patient vital signs, reviewing current orders, and assisting the primary nurse with completion of the assessment. The medication nurse was responsible for administering all medications to the patient and

assisting the primary and secondary nurses when needed. The recorder was responsible for documenting all assessment findings, communicating with the healthcare provider, and recording administration of all emergency medications during the actual code.

At the beginning of the Mock Code simulation-based learning experience, the group was presented with a patient scenario (Appendix A), which helped set the stage for the Mock Code simulation-based learning experience (Appendix B). Students were prompted to read the scenario, enter the patient's room to complete an initial assessment, and respond to the patient's situation as he interacted with them. Students were provided with a current list of healthcare provider orders and a medication administration record. Equipment available to students included a code cart stocked with all emergency medications needed, intubation equipment, ambu bag, defibrillator, and a heart monitor. A Laerdal VitalSim® manikin was used.

The group was presented with a patient being discharged home following the placement of a cardiac stent. Upon assessment, the patient began complaining of chest pain. The students administered nitroglycerin for chest pain; however, upon reassessment, the patient experienced full cardiac arrest. Two students immediately began CPR, while the other students notified the healthcare provider and called a Code Blue. Students cycled through several rounds of CPR while waiting on the code cart and the defibrillator to arrive; students were encouraged to relieve each other during CPR to avoid fatigue. When the defibrillator arrived, students connected the defibrillator to the patient and were asked to interpret the cardiac rhythm displayed on the monitor. The monitor displayed the patient in ventricular tachycardia. Recognition of the rhythm prompted treatment of the rhythm with defibrillation and continuous CPR. The instructor

acted as the healthcare provider and provided students with the appropriate medical orders. After defibrillation and five rounds of CPR, students were asked to reassess the patient's rhythm, which progressed to ventricular fibrillation. Students defibrillated the patient, administered epinephrine, and continued CPR. After two rounds of defibrillation, the respiratory therapist (played by another nursing instructor) was paged to intubate the patient. Students were asked to assist the respiratory therapist with the intubation procedure. Students were asked to locate the laryngoscope, size 6 ET tube, and a stylette in the code cart. After successful intubation, the respiratory therapist left the room, and the students resumed CPR and ventilation of the patient using an ambu bag. Students were then asked to reassess the patient's rhythm, which remained in ventricular fibrillation. A third round of defibrillation and second dose of epinephrine was given, resulting in successful resuscitation of the patient. The Mock Code simulation-based learning experience was concluded at this point.

Following the conclusion of the Mock Code simulation-based learning experience, students were debriefed. During the debriefing session, students were asked how they felt about the simulation-based learning experience. In addition, the instructor reviewed additional information, such as precautions to take during intubation and proper ET placement, related to the skills performed during the simulation-based learning experience. Additional cardiac rhythms were discussed with the students along with their respective treatment plan.

At the conclusion of the debriefing, students were asked to complete a survey designed to measure their perceived level of competence related to the Mock Code.

Protection of Human Subjects

Permission to conduct the project was obtained from Gardner-Webb University Institutional Review Board (Appendix C). This project was deemed exempt due to minimal risk to participants. Each student completed a consent form (Appendix D) prior to completing the survey. Each student was given an additional copy of the consent form for his or her personal records. All participation was voluntary. No identifying data was placed on completed surveys, maintaining anonymity. Results were analyzed based on findings among the group; therefore, no individual results were reported. There were no risks associated with participation in this project, and there was no penalty associated with refusal to participate.

Instrument

The Perceived Competence Scale (PCS) was used to measure perceived competence of ADN students participating in either a traditional Mock Code laboratory experience or an instructor-guided Mock Code simulation-based learning experience. Created by Edward Deci and Richard Ryan, the PCS was designed to assess how people perceive their competence level related to a particular behavior of interest.

Rooted in Self-Determination Theory, the PCS has been used to address competence related to a variety of disciplines including education, environment, health care, psychopathology, virtual environments, sports, exercise, and physical education. According to the Self-Determination Theory (n.d.),

competence is assumed to be one of three fundamental psychological needs, so the feelings or perceptions of competence with respect to an activity or domain is theorized to be important both because it facilitates people's goal attainment and

also provides them with a sense of need satisfaction from engaging in an activity at which they feel effective. (para 1)

Designed as a four-item questionnaire, the PCS is based on a 7-point Likert scale with responses ranging from strongly disagree to strongly agree. The PCS is scored by analyzing how students rate themselves on each question with higher scores indicating a higher level of perceived competence. Internal consistency for the original PCS was determined by the authors to be greater than .8 (Self-Determination Theory, n.d.).

The PCS is designed to be altered by the principal investigator so the particular behavior of interest can be assessed. The PCS provides a root word or statement, and the principal investigator adds to the statement to specify the particular behavior of interest. The root words and/or statements are displayed in Table 1.

Table 1

Original PCS Root Words

Statements
1. I feel confident in my ability to...
2. I now feel capable of...
3. I am able to...
4. I am able to meet the challenge of...

The behavior of interest for this project was perceived competence related to participation in either an instructor-guided Mock Code simulation-based learning experience or a traditional Mock Code laboratory experience. Permission to use and alter the tool was obtained from the authors (Appendix E).

Alteration of Tool

The original version of the instrument (called PCS) was altered to measure perceived competence of students regarding participation in a Mock Code. The altered instrument, now called PCS-A (Appendix F), was validated by a panel of experts in the field of simulation. The principal investigator identified five simulation experts willing to participate in validation of this tool. Panel members were identified as nurse educators employed in both academic and clinical settings who were frequently involved with the use and development of simulation-based learning experiences in their respective setting. The panel members included three nurse educators employed in academia and two nurse educators employed in nursing practice.

Panel member number one was a nurse educator at a large community college in upstate South Carolina. She holds a MSN in nursing education and currently serves as an assistant nursing professor and lab coordinator in her academic setting. Panel member number one has been instrumental in simulation design and development within her academic setting. Her thesis research, *The Effect of High Fidelity Human Patient Simulation on Stress Levels of Associate Degree Novice Nursing Students*, is evidence of her expertise in this area.

The second panel member was also a nurse educator holding a MSN in nursing education and employed at a community college in Western North Carolina. She currently teaches in a licensed practical nursing program utilizing simulation within the curricula. Her expertise is evidenced by her service on North Carolina Council of Practical Nurse Educators and the North Carolina Board of Nursing Education and Practice Committees.

Panel member number three was a Masters prepared nurse educator at a nonprofit community hospital located in Western North Carolina. She has practiced as a Registered Nurse for over twelve years with five years of experience as a nurse educator. Her expertise is evidenced by her development and implementation of simulation-based learning experiences for hospital employees during annual competencies.

Panel member number four was a nurse educator at a nonprofit community hospital in Western North Carolina. She holds a MSN in nursing education and is currently enrolled in a DNP program. Her expertise is evident in her leadership of the design, development, and implementation of a simulation laboratory in her clinical setting. Her current responsibilities include incorporating simulation-based learning experiences in her educational role through staff competencies. Her expertise is evident in her DNP Project proposal, *A Multidisciplinary Code Response Team- A Simulation Preparation*.

Panel member number five serves as a nurse educator within an ADN program at a community college in Western North Carolina. She holds a MSN in nursing education and has been a leader in simulation design and development in her academic setting. Her expertise is evidence by her incorporation of simulation-based learning experiences in both the ADN and licensed practical nurse (LPN) to RN programs in her academic setting.

Following establishment of the expert panel, the principal investigator distributed the PCS-A via email. The initial four statements posed by the principal investigator on the PCS-A are displayed in Table 2.

Table 2

Original PCS-A Statements Proposed

Statements
<ol style="list-style-type: none"> 1. I feel confident in my ability to apply the information I learned today to real life experiences. 2. I now feel capable of implementing emergency, live saving measures when a patient is experiencing cardiac arrest. 3. I am able to remember the information I learned today. 4. I am able to meet the challenge* of caring for a patient in cardiac arrest. <p>*The word <i>challenge</i> is defined as implementing nursing interventions (i.e. attaching the patient to the defibrillator, administering cardiac medications, preparing the patient for intubation, etc) to care for a patient in cardiac arrest.</p>

Initial comments by the panel included suggestions regarding the wording of statements one and three. In statement one, the panel suggested replacement of the word “information” with “skills and knowledge” to more accurately reflect perceived competence. In addition, it was suggested to add the word “nursing” to “real life experiences” to further clarify this experiential laboratory experience was only related to nursing experiences and not personal experiences one may encounter in the community. Several comments were also made regarding the wording of statement three. It was suggested the word “remember” was difficult to measure. After consultation among the group, the word was changed to “recall,” which was felt to serve as a more accurate reflection of what the principal investigator was trying to measure.

After the suggested revisions were made, the survey was resent to the five panel members for additional revisions. Four of the panel members responded with no

additional suggestions. The fifth member of the panel did not respond. Based on this feedback, no additional changes were made, and the survey was finalized.

Following data collection, the PCS-A was analyzed for internal consistency reliability using Cronbach's alpha statistical test. The resulting score of .835 indicates a valid internal consistency for the PCS-A. Cronbach alpha scores greater than .7 are considered a valid measure of internal consistency (Nunnally, 1978).

In addition to the PCS-A, demographic information (Appendix G) was collected by a questionnaire created by the principal investigator. Demographic information of interest included age, work experience in healthcare, and previous educational degrees held by the student. It was felt these particular factors may influence a student's perceived level of competence.

Data Collection

Following completion of both the traditional Mock Code laboratory experience and the instructor-guided Mock Code simulation-based learning experience, students were educated on the principal investigator's project. Students were asked to complete a demographic questionnaire and the PCS-A. Students were informed that completion of the survey was anonymous and voluntary. Students were informed of their ability to withdraw from the project at any time and were made aware that participation in the project or declining participation in the project would in no way affect their course grade or their relationship with the University or School of Nursing.

Following this explanation, students were given a consent form to sign, a copy of the consent form for their personal records, the demographic questionnaire to complete, and the PCS-A to complete. Students were asked to sign the consent form and place it in

an envelope labeled “Consent Forms.” All consent forms were placed in the same envelope. Students completed the demographic tool and PCS-A. All surveys were placed in an envelope labeled “Completed Surveys.” All surveys were placed in the same envelope. Students that did not wish to participate in the project were allowed to submit blank copies of the consent form and survey so their anonymity would be protected. This procedure was followed on both day one and two of the project implementation.

Data Analysis

Data was entered into a personal computer utilizing an Excel spreadsheet. Analysis was completed by using the Statistical Packages for the Social Sciences 16.0 © (SPSS). Data was analyzed utilizing descriptive statistics and the independent samples *t* test. Data were analyzed for normality and homogeneity of variance and was found to meet the assumptions for the independent samples *t* test to be valid.

CHAPTER IV

RESULTS

The purpose of this project was to determine if a student's level of perceived competence increased with an instructor-guided Mock Code simulation-based learning experience compared to a traditional Mock Code laboratory experience. The following chapter presents the results of statistical analysis for this question.

Statistical Presentation

Of the 57 students present for their assigned project implementation days, 56 (93%) students completed the demographic questionnaire and PCS-A. The expected return rate for surveys delivered face to face has been established as 80-85% (Instructional Assessment Resources, 2011). The 93% return rate was considered adequate for this project.

Students' ages ranged from 19 to 50 with a mean age of 24.3 years ($sd = 6.9$). Of all students, 31 (55.4%) reported being employed as a healthcare professional, while 25 (44.6%) reported no work experience as a healthcare professional. Types of employment identified by students included certified nursing assistant I ($n = 12$, 21.4%), certified nursing assistant II ($n = 13$, 23.2%), home health aide ($n = 3$, 5.4%), emergency room technician ($n = 1$, 1.8%), medical assistant ($n = 1$, 1.8%), and cardiopulmonary assistant ($n = 1$, 1.8%). Of the total students, 51 (91.1%) stated the ADN would be their first college degree and five (8.9%) stated the ADN would be their second degree. Previous degrees held by students included criminal justice ($n = 1$, 1.7%), business ($n = 1$, 1.7%), accounting ($n = 1$, 1.7%), elementary education ($n = 1$, 1.7%), and photography ($n = 1$, 1.7%). The frequency distributions of the demographic variables of students are presented in Table 3.

Table 3

Frequency Distribution of Demographic Variables of All Students

Demographic Variable	<i>n</i>	%
Group		
Traditional Laboratory Experience	27	48.2
Simulation Based Learning Experience	29	51.8
Experience in Healthcare		
Yes	31	55.4
No	25	44.6
Type of Experience in Healthcare		
Certified Nursing Assistant I	12	21.4
Certified Nursing Assistant II	13	23.2
Home Health Aide	3	5.4
Emergency Room Technician	1	1.8
Medical Assistant	1	1.8
Cardiopulmonary Assistant	1	1.8
First Degree		
Yes	51	91.1
No	5	8.9
Type of Degree		
No Previous Degree	51	91.1
Criminal Justice	1	1.7
Business	1	1.7
Accounting/Finance	1	1.7
Elementary Education	1	1.7
Photography	1	1.7

Demographics of Control Group

A total of 27 (48.2%) students participated in the traditional Mock Code laboratory experience. Students' ages ranged from 20 to 41 with a mean age of 22.33 years ($sd = 4.9$). Thirteen (48%) reported being employed as a healthcare professional, while 14 (52%) reported no work experience as a healthcare professional. Types of employment identified by students included certified nursing assistant I ($n = 4$, 30.8%), certified nursing assistant II ($n = 6$, 46.1%), home health aide ($n = 1$, 7.7%), medical

assistant ($n = 1$, 7.7%), and cardiopulmonary assistant ($n = 1$, 7.7%) All 27 (100%) students reported the ADN would be their first college degree. The frequency distributions of the demographic variables of students in the control group are presented in Table 4.

Demographics of Experimental Group

A total of 29 (51.8%) students participated in the instructor-guided Mock Code simulation-based learning experience. Students' ages ranged from 19 to 50 with a mean age of 26.14 years ($sd = 8.1$). Eighteen students (62%) reported being employed as a healthcare professional, while 11 students (38%) reported no work experience as a healthcare professional. Types of employment identified by students included certified nursing assistant I ($n = 8$, 44%), certified nursing assistant II ($n = 7$, 39%), home health aide ($n = 2$, 11%), and emergency room technician ($n = 1$, 6%). Twenty-four (83%) students reported the ADN would be their first college degree, and five (17%) stated the ADN would be their second degree. Previous degrees held by students included criminal justice ($n = 1$, 3.4%), business ($n = 1$, 3.4%), accounting ($n = 1$, 3.4%), elementary education ($n = 1$, 3.4%), and photography ($n = 1$, 3.4%). The frequency distributions of the demographic variables of students are presented in Table 4.

Table 4

Frequency Distribution of Demographic Variables Between Groups

Demographic Variable	Traditional <i>n</i> (%)	Simulation <i>n</i> (%)
Experience in Healthcare		
Yes	13(48)	18(62)
No	14(52)	11(38)
Type of Experience in Healthcare		
Certified Nursing Assistant I	4(30.8)	8(44)
Certified Nursing Assistant II	6(46.1)	7(39)
Home Health Aide	1(7.7)	2(11)
Emergency Room Technician	0	1(6)
Medical Assistant	1(7.7)	0
Cardiopulmonary Assistant	1(7.7)	0
First Degree		
Yes	27(100)	24(83)
No	0	5(17)
Type of Degree		
No Previous Degree	27(100)	24(83)
Criminal Justice	0	1(3.4)
Business	0	1(3.4)
Accounting/Finance	0	1(3.4)
Elementary Education	0	1(3.4)
Photography	0	1(3.4)

Descriptive statistics were used to determine the overall mean of all student responses to each question on the PCS-A. Question 1: I feel confident in my ability to apply the skills and knowledge I learned today to real life nursing experiences. Of all students, responses ranged from ‘agree somewhat’ to ‘strongly agree’ with a mean score of 5.86 ($sd = .749$). Question 2: I now feel capable of implementing emergency, life-saving measures when a patient is experiencing cardiac arrest. Of all students, responses ranged from ‘undecided’ to ‘strongly agree’ with a mean score of 5.66 ($sd = .793$). Question 3: I am able to recall the skills and knowledge I learned today. Of all students,

responses ranged from ‘agree somewhat’ to ‘strongly agree’ with a mean score of 6.18 ($sd = .690$). Question 4: I am able to meet the challenge of caring for a patient in cardiac arrest. Of all students, responses ranged from ‘disagree’ to ‘strongly agree’ with a mean score of 5.77 ($sd = .972$). Results of the analysis of central tendencies for each question are displayed in Table 5.

Table 5

Means and Standard Deviations of PCS-A Questions for Total Sample (n=56)

Question	<i>M</i>	<i>SD</i>
1. I feel confident in my ability to apply the skills and knowledge I learned today to real life nursing experiences.	5.86	.749
2. I now feel capable of implementing emergency, life-saving measures when a patient is experiencing cardiac arrest.	5.66	.793
3. I am able to recall the skills and knowledge I learned today.	6.18	.690
4. I am able to meet the challenge of caring for a patient in cardiac arrest.	5.77	.972

Descriptive statistics were used to determine the overall mean score for the responses of students in the traditional laboratory group and the simulation-based learning group. Students participating in the instructor-guided Mock Code simulation-based learning experience rated their perceived level of competence significantly higher on each individual question of the PCS-A compared to students participating in the traditional laboratory experience. Table 6 displays the means and standard deviations of each question on the PCS-A between the two groups.

Table 6

Means and Standard Deviations of PCS-A Questions Between Groups

Question	Traditional (<i>n</i> =27)		Simulation (<i>n</i> =29)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. I feel confident in my ability to apply the skills and knowledge I learned today to real life nursing experiences.	5.63	.565	6.07	.842
2. I now feel capable of implementing emergency, life-saving measures when a patient is experiencing cardiac arrest.	5.37	.565	5.93	.884
3. I am able to recall the skills and knowledge I learned today.	5.85	.602	6.48	.634
4. I am able to meet the challenge of caring for a patient in cardiac arrest.	5.44	.892	6.07	.961

Frequency distributions were used to determine the range of responses on each question between the two groups. For all four questions, students participating in the instructor-guided Mock Code simulation-based learning experience rated their level of perceived competence consistently higher than students participating in the traditional laboratory experience. Figures 2 through 5 display the range of responses between the two groups on each of the four questions of the PCS-A.

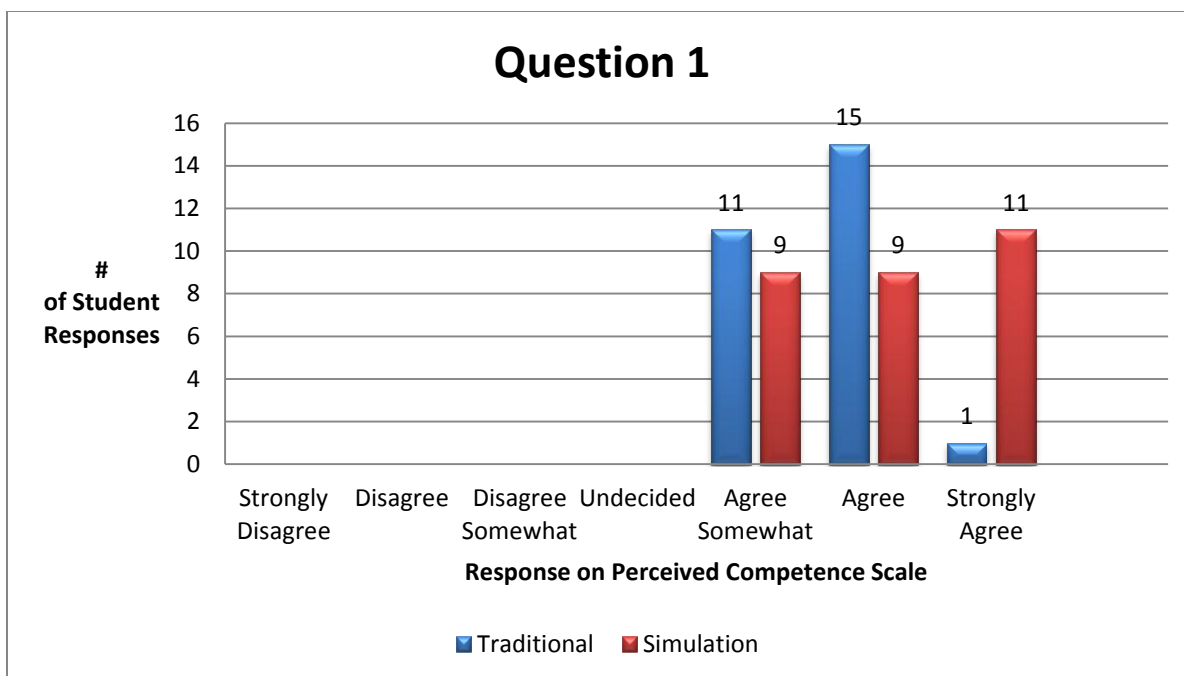


Figure 2. Student Responses to Question 1 on PCS-A.

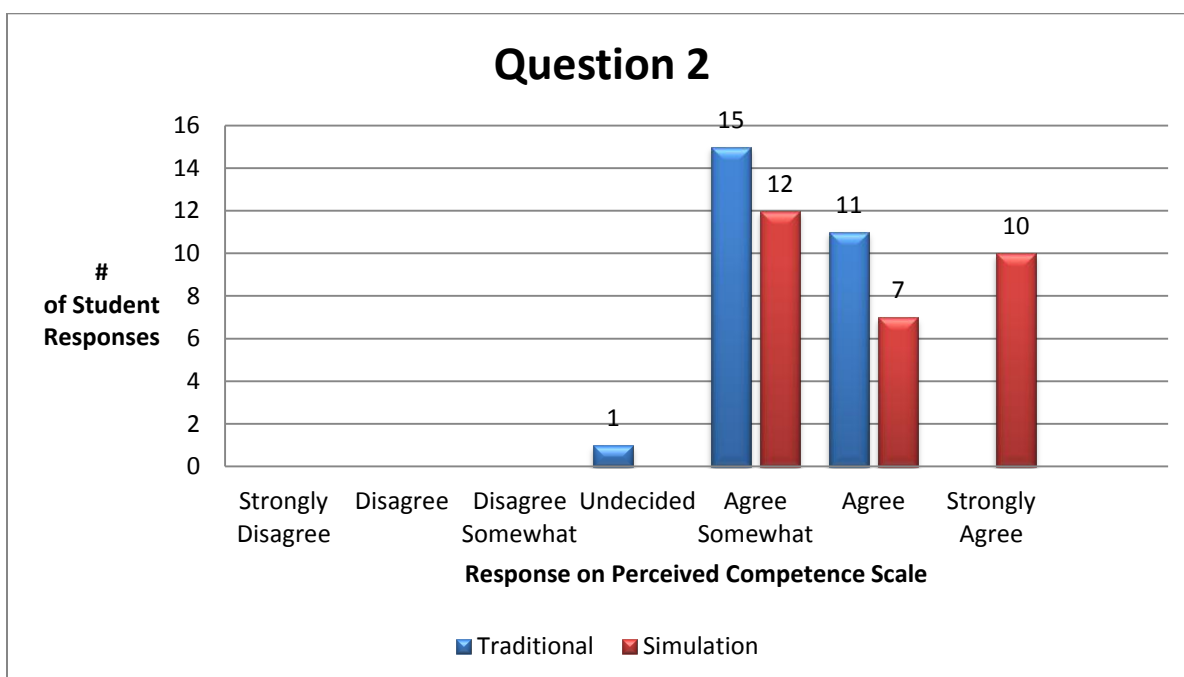


Figure 3. Student Responses to Question 2 on PCS-A.

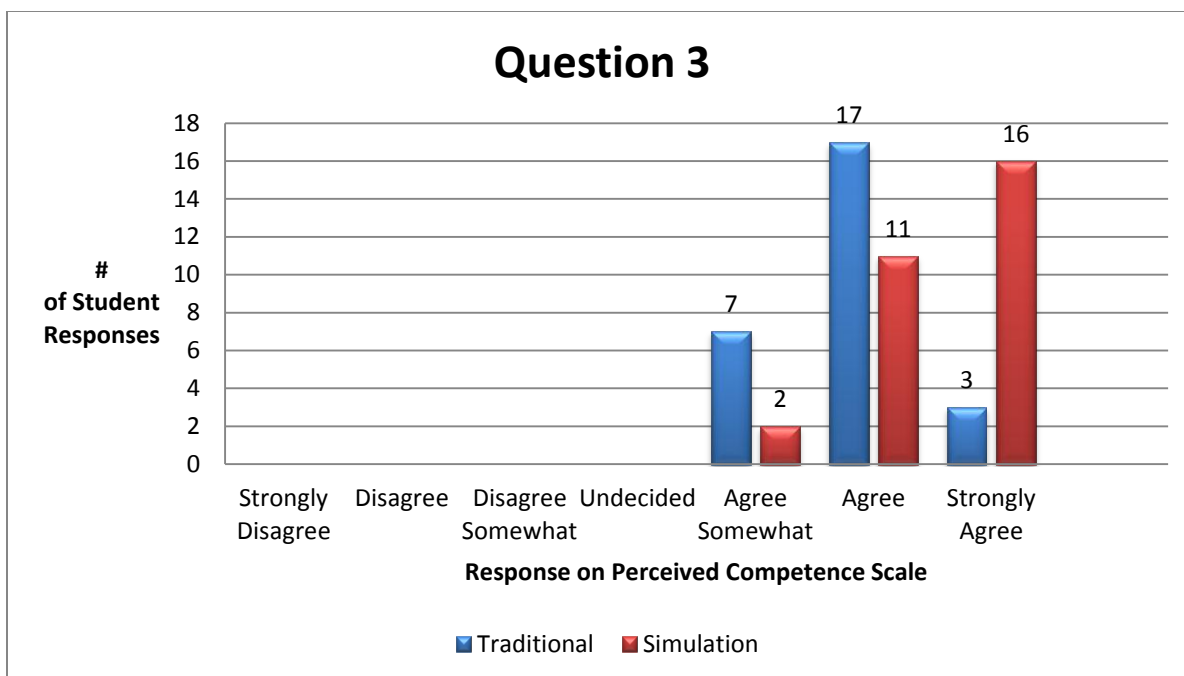


Figure 4. Student Responses to Question 3 on PCS-A.

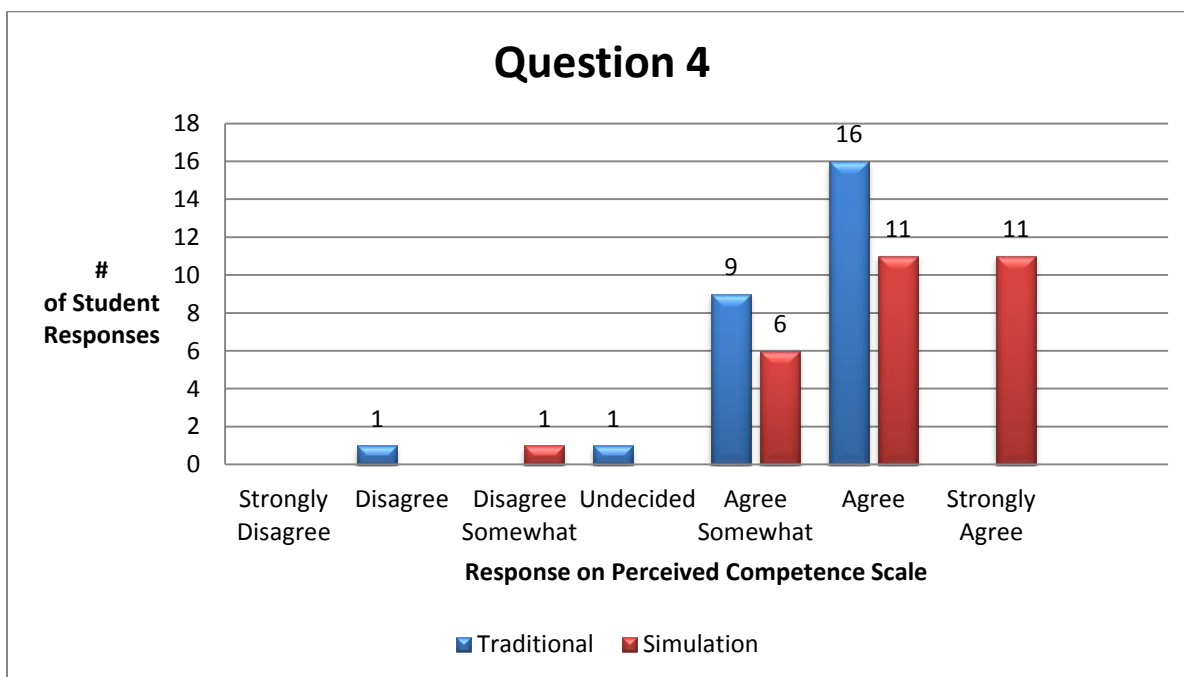


Figure 5. Student Responses to Question 4 on PCS-A.

Three assumptions underlie the independent samples t test: independence, normal distribution, and homogeneity of variance (Lani, 2009; Munro, 2005). To meet the assumption of independence, the independent variable must be categorical and contain two levels. The data for the project of perceived competence following participation in a traditional Mock Code laboratory experience or an instructor-guided Mock Code simulation-based learning experience is classified categorical in that the measures are from two groups, the experimental and the control group. The data is representative of two levels in that two separate groups contributed scores to the data and each subject could contribute just one score to one of the two groups. The design of this project allowed for students to participate in only one of the two groups, providing two mutually exclusive groups.

To meet the assumption of normal distribution, the distribution of the dependent variable should be normal. The data for the project of perceived competence following participation in a traditional Mock Code laboratory experience or an instructor-guided Mock Code simulation-based learning experience was analyzed for distribution using the Stem and Leaf plot and measures of skewness. The data met this assumption without transformation. The skewness statistic for each question was not greater than ± 1.96 .

To meet the assumption of homogeneity of variance, the variances of the dependent variable for the two groups must be similar. Levene's test evaluates the assumption that the population variances for the two groups are equal (Munro, 2005). The data for the project of perceived competence following participation in a traditional Mock Code laboratory experience or an instructor-guided Mock Code simulation-based learning experience did not meet the assumption of homogeneity of variance. Data

analysis from Question 1, Question 2, and the total PCS-A score revealed significant Levene's Test for Equality of Variances. For these three measures, the t -value for unequal variances was utilized to determine significance.

Total mean PCS-A scores for the traditional laboratory group and simulation-based learning group were analyzed using an independent samples t test with equal variances not assumed. Students participating in the instructor-guided Mock Code simulation-based learning experience rated their overall perceived level of competence significantly higher ($m = 6.13$, $sd = .724$, $p < .05$) compared to students participating in the traditional laboratory experience ($m = 5.57$, $sd = .431$, $p < .05$).

An independent samples t test was conducted to evaluate the differences in mean score on the PCS-A based on the employment status of the student. No significant difference was found among employed or non-employed students ($t(54) = -1.61$, $p > .05$). Total PCS-A scores for employed students ($m = 5.71$, $sd = .59$) was not statistically significantly different from the scores for unemployed students ($m = 5.99$, $sd = .69$).

A Pearson correlation coefficient was calculated examining the relationship between student's age and total score on the PCS-A. The Pearson correlation coefficient was positive but was not statistically significant ($r = .19$, $p > .05$) indicating no relationship between the student's age and total score on the PCS-A.

CHAPTER V

DISCUSSION

This project explored the perceived level of competence between students participating in a traditional Mock Code laboratory experience and an instructor-guided simulation-based learning experience. This chapter presents the findings of this project and how they relate to nursing education.

Implication of Findings

Fifty-seven students participated in either the traditional laboratory experience or instructor-guided Mock Code simulation-based learning experience. Of these students, 56 agreed to complete the PCS-A. The high number of students agreeing to participate in the project may have been the result of instructor presence during the project. Students were expected, as a requirement of their nursing course, to participate in the activity but were not required to complete the PCS-A.

The two groups were similar in composition. The mean age of the students participating in the traditional laboratory experience (22.33 years) was similar to the age of students participating in the simulation-based learning experience (26.14). This tech savvy, Generation Y group tends to be composed of independent, high-performing individuals seeking creative opportunities to challenge themselves (Armour, 2005). In relation to this project, members of Generation Y relate well to technological advances when dealing with mastery of content; thus, simulation-based learning experiences provide a challenging experience for these students.

Fourteen students participating in the traditional laboratory experience were employed compared to the 18 students participating in the simulation-based learning

experience. Of the two groups, more employed students in the simulation group were certified nursing assistant I's (8) and certified nursing assistant II's (7) compared to the employed students in the traditional group (4 and 6 respectively). The other classifications of employment, emergency room technician, home health aide, medical assistant, and cardiopulmonary assistant, were evenly distributed between the two groups. The number of certified nursing assistants in the simulation group perhaps contributed to a greater level of perceived competence based on exposure to real life patient experiences in the workforce. It can be inferred that students with previous healthcare work experience may have been exposed to situations similar to the Mock Code simulation-based learning experience and, therefore, feel more comfortable dealing with these types of situations.

Five students participating in the simulation-based learning experience held previous degrees compared to no students participating in the traditional laboratory experience. Degrees held by students included both associate and baccalaureate degrees in criminal justice, business, accounting/finance, elementary education, and photography. It is unlikely the experience gained from these degrees, other than life experience, impacted the perceived competence level of students participating in the simulation-based learning experience due to the poor relationship of these degrees to healthcare.

Overall mean scores of perceived competence level demonstrated students had a fairly high level of perceived competence in relationship to the Mock Code despite the activity in which they were involved; however, students participating in the simulation-based learning experience consistently rated each question higher on the PCS-A. Overall, students in the simulation-based learning group selected *strongly agree* 48 times,

compared to students in the traditional laboratory group, who selected *strongly agree* only four times. More students participating in the traditional laboratory group selected *agree* (59) and *agree somewhat* (49) than students in the simulation based learning group who selected *agree* (38) and *agree somewhat* (29). This may be an indication that simulation-based learning experiences provide a unique approach to learning that helps reinforce content and promotes critical thinking, thus, increasing perceived competence among students.

This project concluded that students participating in the instructor-guided Mock Code simulation-based learning experience reported a higher level of perceived competence than students participating in the traditional laboratory experience. These findings were not unexpected based on the wealth of information already supporting simulation as a way to increase competency, critical thinking, and clinical judgment.

Application to Theoretical Framework

Benner's theory of Skill Acquisition formed the theoretical framework for this project. Benner's novice level of skill acquisition and concept of competency were utilized. All students participating in this project were classified as novice nurses; a novice nurse is described as a person with little or no experience related to a specific situation and often needs guidance to ensure appropriate outcomes are met (Brykczynski, 2002). This level of skill acquisition was appropriate for this project because students had little experience with Mock Code or cardiac emergency care. During both the traditional laboratory experience and instructor-guided simulation-based learning experiences, many students shared they had never been involved in an emergency situation during their previous clinical experiences. During both experiences, students

often had to be guided by the instructor to answer questions, to discuss equipment usage, and to discuss courses of treatment.

Benner's concept of competency was measured by the overall score on the PCS-A. Students participating in the instructor-guided Mock Code simulation-based learning experienced reported a higher level of perceived competency than students participating in the traditional laboratory experience. This is perhaps because the simulation-based learning experience provided students with hands-on approach to learning. Confucius once said, "I hear and I forget. I see and I remember. I do and I understand" (Myrko, 2008, para 8). Simulation-based learning experiences offer students the ability to fully engage and participate in a new learning experience. Students that have never been involved in CPR or administered emergency medications while other healthcare providers are intubating or continuing CPR have now experienced a simulated version of what they may expect when they enter the clinical setting.

Limitations

Limitations of this project include instructor influence, administration variance, content exposure, self-report, sample size, and setting.

Instructor presence may have served as a limitation for this project. The principal investigator served as the instructor during the instructor-guided Mock Code simulation-based learning experience. Having the principal investigator involved may have skewed students' perception of their perceived competence because of a pre-existing relationship between the principal investigator and the students. The principal investigator has served as a lead instructor for these students in other courses throughout their experience in the ADN program.

Administration variances between the traditional laboratory experience and instructor-guided Mock Code simulation-based learning experience could have served as an additional limitation of this project. On day 1 of the project implementation, students participated in the traditional laboratory experience. Four nursing instructors (one being the principal investigator) participated and interacted with students during the traditional laboratory experience. On day 2 of the project implementation, students participated in the instructor-guided Mock Code simulation-based learning experience. During the instructor-guided Mock Code simulation-based learning experience, the principal investigator served as the main instructor for the simulation-based learning experience. The variation of nursing instructors between the two implementation days could have influenced student responses to questions on the PCS-A.

The time and relationship of content exposure to the simulation-based learning experience may have served as an additional limitation of this project. Both groups received a three-hour lecture on the cardiac system, including recognition and treatment of arrhythmias prior to implementation of the Mock Code experience. Due to the course calendar arrangement, there was a one-day break between day one and day two of project implementation. During the one-day break, the group participating in the instructor-guided Mock Code simulation-based learning experience received an additional three-hour lecture on cardiac diseases. This may have potentially influenced students' perception of their own competence because they had been exposed to more information than the group participating in the traditional laboratory experience.

Self-report of perceived competence levels may have served as a fourth limitation of the project. Despite the anonymity of the PCS-A survey, it is possible that students

reported a higher level of perceived competence than was actually felt. Students may have felt their consent form and survey could have been paired up, linking their identity to their answer on the survey. In addition, a pre-existing relationship with the instructor could have influenced their scores.

The sample size was another limitation of this project. This project yielded a small sample size of 56 participants. Sample sizes of this nature are difficult to generalize among student-nurse populations. Overall, there were only a total of 59 students available for participation in this project. The principal investigator was limited to using a large effect size for statistical analysis based on the limited number of students enrolled in the course.

The limited setting was an additional limitation of this project. This project was restricted to one academic setting, in which students are exposed to simulation-based learning experiences on a weekly basis throughout the ADN curriculum. Time restrictions prevented the principal investigator from seeking multiple settings.

Implications for Nursing

Preparing new nurse graduates to deliver safe, competent care is essential to meet the demands of today's complex patient population. Organizations, such as TJC and NCSBN, continually raise the bar on standards of care expected to be performed among all healthcare providers, including nurses. This project served to add to the existing body of knowledge regarding use of simulation-based learning experiences in academic settings. Schools of Nursing are challenged with producing new nurse graduates who have strong critical thinking skills and clinical judgment abilities, which in turn, impact their overall level of competence. Simulation-based learning experiences have been

shown to positively impact a student nurse's self-assessment (Cato et al., 2009; Mattheos et al., 2004), critical thinking (Kaddoura, 2010), clinical judgment skills (Lasater, 2007a; Dillard et al., 2009), and confidence (Brannan et al., 2008). Incorporation of innovative teaching strategies, such as simulation-based learning experiences, are essential for nurse educators. Factors, such as limited clinical space, limited patient populations, and increased acuity levels, place students in unfamiliar situations early in their clinical experiences. However, students may not be equipped to respond to emergent clinical situations because of limited exposure to complex patient conditions. Simulation serves as a resource for allowing students to prepare for these complex situations in the safety of a controlled environment.

Recommendations

While this project did support that students participating in an instructor-guided Mock Code simulation-based learning experience reported a higher level of perceived competence than students participating in a traditional laboratory experience, further projects and/or research are needed to measure actual competence with simulation-based learning. Few objective measures of critical thinking exist in regard to simulation-based learning experiences. This project assessed perceived competence versus actual competence for this very reason. Some researchers have used critical thinking exams, such as the Health Education Systems, Inc (HESI) exam, to measure critical thinking before and after exposure to simulation-based learning experiences; however, these types of exams do not evaluate the student's critical thinking related to the content within the simulation. The aim of this project was to measure perceived competence as it related to cardiac emergencies within nursing.

Future projects utilizing simulation-based learning experiences and their effects at multiple intervals throughout the semester are needed. This project measured perceived competence after just one simulation-based learning experience, as many others have done. Measuring perceived competency at multiple intervals may be more useful in determining the role simulation-based learning experiences play on the critical thinking abilities of the novice nursing student.

In addition, future projects utilizing larger sample sizes among varying levels of degrees are needed. More studies have been done utilizing simulation among baccalaureate nursing students than students enrolled in diploma or ADN programs. Traditionally, baccalaureate students are reported to have higher levels of critical thinking; however, upon graduation, all students graduating from pre-licensure programs take the same licensing exam. The intense curriculum utilized by ADN programs call for nurse educators to ensure every learning experience prepares the ADN graduate to be able to critically think and care for the diverse needs of the current patient population. Simulation-based learning experiences may assist nurse educators in bridging this gap.

The small sample sizes prove problematic for generalizing results among all nursing students and across degree programs. The small sample sizes displayed in the literature review and lack of research among ADN programs presents unique opportunities for programs to join forces and further explore critical thinking and the use of simulation-based learning experiences. For example, North Carolina community colleges with ADN programs participating in the Curriculum Improvement Project (CIP) should work together to further explore these areas.

Conclusion

With the heightened focus on patient safety by governing bodies, continual evaluation and preparation of new nurse graduates that can critically think is essential. The current student population, Generation Y, creates unique challenges for nurse educators to engage students and optimize learning experiences. Simulation-based learning experiences have demonstrated the ability to successfully foster knowledge acquisition among students.

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APPENDIX A

Patient Scenario for Mock Code Simulation

Patient Scenario

Kenneth Barlow is a 60-year-old male who presented to the Emergency Department complaining of chest pain. He is a long distance truck driver and is currently several hours from home. He has a history of hypertension and smokes 2 packs of cigarettes a day. Yesterday Mr. Barlow had a cardiac catheterization. The cardiac catheterization showed a 95% blockage in the proximal portion of the left anterior descending coronary artery resulting in placement of a stent. Mr. Barlow was kept overnight on the telemetry unit for observation and is now being discharged home.

APPENDIX B

Mock Code Simulation

Simulation: Mock Code

Kenneth Barlow is a 60-year-old male who presented to the Emergency Department complaining of chest pain. He is a long distance truck driver and is currently several hours from home. He has a history of hypertension and smokes 2 packs of cigarettes a day. Yesterday Mr. Barlow had a cardiac catheterization. The cardiac catheterization showed a 95% blockage in the proximal portion of the left anterior descending coronary artery resulting in placement of a stent. Mr. Barlow was kept overnight on the telemetry unit for observation and is now being discharged home.

Student Action	Sim Man Response	Prompts/Instructor Facilitation	
Student nurse gets VS and performs first assessment	Sim Man displays: <ul style="list-style-type: none"> • RR 26 • HR 120 • BP: 160/90 • SpO2: 88% on RA • T: 98.6 • Lungs sounds clear • Peripheral pulses strong • Short of breath Voice: <ul style="list-style-type: none"> • “My chest feels tight.” • Rates pain as “8” 	The student should start a complete assessment. When patient c/o CP, the student should do a focused assessment addressing severity, location, and duration.	
Student should review HCP orders. Places patient on 2L NC and administers 1 nitroglycerin	Voice: <ul style="list-style-type: none"> • “The pain is getting worse! Please help me! This medication is not working!” Sim Man displays: <ul style="list-style-type: none"> • No response • RR: 0 • HR: 0 • BP: 0 • SpO2: 0 	If student does not administer nitro, have patient ask for something for pain. After administration of nitro, the patient will become increasingly restless and become unresponsive.	When patient becomes unresponsive, instructor to discuss how to call a Code Blue and how to start CPR. Students will begin CPR.
Student should call “Code Blue” and begin CPR	Sim Man displays: <ul style="list-style-type: none"> • No response 	Students should perform several rounds of CPR, waiting for the	

		Code Team to arrive	
Student should recognize the need for IV access.	Sim Man displays: <ul style="list-style-type: none"> No response 	<ul style="list-style-type: none"> Have student start IV 	
Students should connect patient to defibrillator	Sim Man displays: <ul style="list-style-type: none"> Ventricular Tachycardia 	<ul style="list-style-type: none"> Code team arrives with crash cart and defibrillator Apply defibrillator 	Instructor to review ACLS algorithm
Student should recognize that patient is in a shockable rhythm.	Sim Man displays: <ul style="list-style-type: none"> Ventricular Tachycardia 	<ul style="list-style-type: none"> Places pads on chest Stand clear announced Give 1 shock Pulse check 	Have student charge defibrillator to 200 joules
Student continues CPR	Sim Man displays: <ul style="list-style-type: none"> Ventricular Fibrillation 	<ul style="list-style-type: none"> Continue CPR (5 rounds) 	
Student continues CPR	Sim Man displays: <ul style="list-style-type: none"> Ventricular Fibrillation 	<ul style="list-style-type: none"> Check rhythm Give 1 shock Resume CPR (5 rounds) Give 1 mg epinephrine IVP while doing CPR 	Have student charge defibrillator to 200 joules
Respiratory therapist to enter and perform intubation. Student to assist.	Sim Man displays: <ul style="list-style-type: none"> Ventricular Fibrillation No response RR: 0 HR: 0 BP: 0 SpO2: 0 	<ul style="list-style-type: none"> Two students continue CPR, while other students assist respiratory therapist with intubation. 	Respiratory therapist will ask students for appropriate equipment to aide in intubation.
Student continues CPR	<ul style="list-style-type: none"> Resume simulation Remains in Ventricular Fibrillation 	<ul style="list-style-type: none"> Check rhythm Stand clear announced Shock delivered Pulse check Give 	Have student charge defibrillator to 200 joules

		epinephrine	
Student should reassess patient's condition.	Sim Man displays: <ul style="list-style-type: none">• Converts to Normal Sinus Rhythm with ST elevation	Student should recognize conversion of heart rhythm.	

SIMULATION ENDS

[illegible]

MEDICATION ADMINISTRATION RECORD**Kenneth Barlow**
5/4/1952

MR#: 146893570

Admission Date: 1/31/12	Attending MD: Jones	Room: 4155
Allergies: NKA	Birthdate: 5/4/1952 Gender: Male	Height: 5'10 Weight: 384 lbs

Medication Name (Dose, Route, Schedule)	Day 0700-1859		Night 1900-0659
	Day Shift 0700-1459	Evening Shift 1500- 2259	Night Shift 2300-0659
Nitroglycerin 1 tab SL every 5 minutes x 3 as needed for Chest Pain			

INITIALS	SIGNATURE/TITLE	INITIALS	SIGNATURE/TITLE	INITIALS	SIGNATURE/TITLE

APPENDIX C

IRB Approval



THE INSTITUTIONAL REVIEW BOARD
of
GARDNER-WEBB UNIVERSITY

This is to certify that the research project titled
Perceived Level of Clinical Competence of Associate Degree Nursing Students

being conducted by Tracy Arnold

has received approval by the Gardner-Webb University IRB.

Date 12/16/11

Exempt Research

Signed *Cindy Miller*
Department/School/Program IRB Representative
Victoria Walker
Department/School/Program IRB Member

Expedited Research

Signed _____
Department/School/Program IRB Representative

Department/School/Program IRB Member

IRB Administrator or Chair or Institutional Officer

Non-Exempt (Full Review)

Signed _____
IRB Administrator

IRB Chair

IRB Institutional Officer

Expiration date 12/16/11

IRB Approval:

 X Exempt Expedited Non-Exempt (Full Review)

APPENDIX D

Consent Form

Participant Consent Form

You are being asked to participate in a project comparing perceived level of clinical competence among students participating in a traditional Mock Code laboratory experience and an instructor-guided Mock Code simulation-based learning experience led by Tracy Arnold, MSN, RN. You have been selected for inclusion in this project because you are enrolled in a Medical-Surgical II course covering Mock Codes as part of your curriculum.

PROCEDURE:

All students enrolled in the Medical-Surgical II course will participate in a Mock Code. Based on course schedules, half of the students will participate in a traditional laboratory experience using lectures, handouts, and task trainers to explore various components of a Mock Code. The other half of the students will participate in an instructor-guided Mock Code simulation-based learning experience in which a hands-on approach will be used to explore various components of a Mock Code.

At the conclusion of the Mock Code, you will be asked to complete an anonymous demographics questionnaire and clinical competence survey. The survey will allow you to reflect on your perceived level of clinical competence based on the method of teaching you received during the Mock Code.

PARTICIPATION:

Completion of the survey is anonymous and voluntary. You may withdraw from the project at any time. Participation in the project or the decision not to participate in the project will in no way affect your course grade or relationship with the University. There is no associated compensation or extra credit for participating in this project.

CONFIDENTIALITY:

Survey completion will be based on anonymous submissions. No identifying data will be associated with either the demographic tool or survey.

RISKS:

There are no identifiable risks associated with your participation in this project.

BENEFITS:

The perceived benefit of participating in this project is that you:

- a) Advance your knowledge of Mock Code through participation in a variety of teaching-learning methods.
- b) Contribute to the body of nursing knowledge regarding simulation use in nursing curricula.

QUESTIONS:

If you have any questions, please ask them at this time. If questions arise during the course of your participation in this project, you may contact the principal investigator Tracy Arnold at 704-406-4359. If at any time you question the rights of students involved in this project, you may contact the Institutional Review Board committee.

If you agree to participate in this project, please complete the information below:

I have read the above information and I consent to participate in this project. I have asked all the questions I have at this time and they have been answered to my satisfaction.

Your Signature _____ Date _____

Your Name (printed) _____

APPENDIX E

Permission to Use Tool

From: Ed Deci [deci@psych.rochester.edu]
 Sent: Monday, December 10, 2011 12:19 AM
 To: Tracy D Arnold
 Subject: Re: selfdeterminationtheory.org: PCS-A

That would be fine to do.

Ed Deci

On 12/9/11 9:24 PM, "Tracy D Arnold" <tarnold@gardner-webb.edu> wrote:

Is it appropriate to alter the likert scale? My committee is asking that all numbers be assigned a measurement. This is what I have proposed.

1. Strongly disagree
2. Disagree
3. Disagree somewhat
4. Undecided
5. Agree somewhat
6. Agree
7. Strongly agree

Thanks for your assistance.
 Tracy

Tracy Arnold, RN, MSN
 Nursing Instructor
 Gardner-Webb University
 PO Box 7268
 Boiling Springs, NC 28017
 704-406-4359
 704-406-3919 FAX
tarnold@gardner-webb.edu

From: Ed Deci [deci@psych.rochester.edu]
 Sent: Monday, December 05, 2011 6:02 PM
 To: Tracy D Arnold
 Subject: Re: selfdeterminationtheory.org: PCS-A

You have our permission to use the perceived competence scale in your research.

Ed Deci

On 12/5/11 3:09 PM, "Tracy D Arnold" <tarnold@gardner-webb.edu> wrote:

Hi Ed,

Thanks for the information. Do I have to have specific permission from you to use the tool and to change it to fit my study?

Thanks,
Tracy

*Tracy Arnold, MSN, RN
Nursing Instructor
Gardner-Webb University
704-406-4359*

----- Forwarded message -----

From: **Ed Deci** <deci@psych.rochester.edu>
Date: Mon, Dec 5, 2011 at 12:52 PM
Subject: Re: selfdeterminationtheory.org <<http://selfdeterminationtheory.org>> : PCS-A
To: Drew Hanson <drew@immersyve.com>

The scale was developed for health care. Then we just changed it to refer to different behaviors. The reliability and validity are in the various articles that have used it. There was never a validation article, per se. Validity means primarily that it predicts what it would theoretically be expected to predict. All the studies do this and probably report reliability.

Ed Deci

----- Forwarded message -----

From: **Tracy Arnold** <tarnold@gardner-webb.edu <<http://tarnold@gardner-webb.edu>> >
Date: Mon, Dec 5, 2011 at 9:17 AM

Subject: selfdeterminationtheory.org <<http://selfdeterminationtheory.org>>
<<http://selfdeterminationtheory.org>> : PCS-A
To: drew@immersyve.com <<http://drew@immersyve.com>>

This is an enquiry email via <http://selfdeterminationtheory.org/> from:
Tracy Arnold <tarnold@gardner-webb.edu <<http://tarnold@gardner-webb.edu>> >

My name is Tracy Arnold, and I am a DNP student at Gardner-Webb University. I am inquiring about using the Perceived Competence Scale (PCS-A) in my doctoral research. It is my understanding that the PCS-A is to be adjusted to fit the research topic at hand. I have seen the PCS-A "tweaked" in other studies but was wondering how I could find the "original" version.

Also, are there any validity and reliability psychometrics available or are those established by the primary researcher since the tool is altered to meet the researchers' needs?

Thanks for your assistance,

Tracy



Edward L. Deci

Professor of Psychology and
Gowen Professor in the Social Sciences

Department of Psychology

University of Rochester

P.O. Box 270266 (for U.S. mail)

355 Meliora Hall (for couriers)

Rochester, NY 14627

phone: 585-275-2461

fax: 585-273-1100

email: deci@psych.rochester.edu <<http://deci@psych.rochester.edu>>

website: <http://selfdeterminationtheory.org>

APPENDIX F

Perceived Competence Scale

Perceived Competence Scale (PCS-A) Questionnaire

Please indicate to which extent each statement is true for you by circling the appropriate number.

1. I feel confident in my ability to apply the skills and knowledge I learned today to real life nursing experiences.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

2. I now feel capable of implementing emergency, life-saving measures when a patient is experiencing cardiac arrest.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

3. I am able to recall the skills and knowledge I learned today.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

4. I am able to meet the challenge* of caring for a patient in cardiac arrest.

*The word *challenge* is defined as implementing nursing interventions (i.e. attaching the patient to the defibrillator, administering cardiac medications, preparing the patient for intubation, etc.) to care for a patient in cardiac arrest.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

APPENDIX G

Demographic Data Form

Demographic Data Form

Select the appropriate answer that most accurately reflects you and your experience in the Mock Code.

1. I participated in the:
 - a. Traditional Mock Code laboratory experience
 - b. Instructor-guided Mock Code simulation-based learning experience
2. What is your age? _____
3. Have you ever been employed as a health care professional (i.e. CNA, medication aide, surgical tech, LPN, etc)
 - a. No
 - b. Yes. If yes, specify: _____
4. Is this your first degree from a college or university?
 - a. Yes
 - b. No. if no, specify what other degrees you have:
