NURSING STUDENT SATISFACTION AND SELF-CONFIDENCE AS RELATED TO HIGH FIDELITY SIMULATION

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ABSTRACT

RESEARCH PAPER: Nursing Student Satisfaction and Self-Confidence as Related to High-Fidelity Simulation

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Technology has become more sophisticated allowing for a more realistic environment in educational practice. The use of high-fidelity simulation (HFS) has become an increasing popular teaching strategy for both cognitive and behavioral healthcare. Research has indicated the nursing students using HFS have been shown to have positive outcomes (Smith & Roehrs, 2009), but little is known as to what factors contribute to the positive outcomes. The purpose of this study is to examine the factors that lead to two outcomes: nursing student satisfaction and self-confidence. This is a replication of Smith and Roehrs study. The theoretical framework for the study is Jeffries (2005, 2007) Nursing Education Simulation Framework. The sample size will include 75 senior BSN students from a large Midwestern university. Student satisfaction and self-confidence will be measured using two instruments developed by the National League for Nursing (NLN): Student Satisfaction and Self Confidence in Learning Scale and the Simulation Design Scale. The study will be approved by the Ball State University IRB prior to data collection. The findings of this study will provide information to help guide the development of HFS with nursing students.
Chapter 1

Introduction

Introduction

National accreditation standards demand nurse educators establish teaching strategies to address critical and reflective thinking skills for the assurance of patient safety and quality of care (Decker, 2007). Nursing, as it continues to evolve, has to be more focused on quality outcomes relating to patient care and must be driven by evidence-based practice. Recommendations include transforming nursing education from approach-based to evidence-based (Smith, 2008).

The role of the nursing instructor is to prepare the student nurse for the clinical experience allowing them to gain skills with confidence. With the health care complexity today, instructors are expected to better prepare the students for the clinical environment with fewer clinical sites, fewer instructors, and limited funding. The nursing students are expected to be better prepared and have less orientation than prior nursing students. Instructors are challenged to create more innovative ways to prepare the students (Jeffries, 2007).

Nursing students today are more technologically driven; challenging nursing instructors to develop solutions to promote skills, self-confidence, and critical thinking while being satisfied with the methods of instruction. Educators have a continual struggle
to teach reasoning and skills in the classroom and have those critical thinking skills translate to the clinical setting. They are challenged with finding new ways to educate the technology driven students (Wotton, Davis, Button, & Kelton, 2010). Nursing students are required to use their clinical experiences to help them gain knowledge for use at the bedside, but research shows that the two do not always correlate. Knowledge comes from experience. Thought is produced from experiences, and the thoughts are validated by repeated experiences (Hoadley, 2009).

New nurses need to draw on past experiences as they transition from nursing students to graduate nurses. However, past research has shown problems with such transitions. For example, Butler & Hardin-Pierce (2005) discovered recent graduates believed the school environment did not allow them the opportunity for enough clinical experience leading to low self-confidence. The researchers indicated low self-confidence can lead to high turnover rates. The authors pointed out that there is often a greater than fifty percent turnover rate within the first year as a new nurse. High turnover rates increase health care costs and have a negative effect on nursing.

High fidelity simulation (HFS) has been shown to be an effective tool to assist students with cognitive recall and clinical skills development. Simulators can replicate a realistic patient experience in a safe, effective environment (Wotton, et al., 2010). Students who have been given the opportunity to practice with HFS have found the experience to increase their confidence levels before participating in the clinical experience. The students are able to apply the classroom knowledge into the simulated clinical setting using HFS (Jeffries, 2008).
With a review of the literature, Weaver (2011) found that HFS increased knowledge, value, and realism with the nursing students. As the nursing professional practice increases in complexity, nursing instructors must use the most realistic technology to help prepare students for the clinical world.

**Background and Significance**

The clinical environment is complex with rapidly changing technology and advancements. Nurses must be able to respond quickly and confidently to the increasing patient acuity. Nurses need to not only know the basics of nursing, but must also be technologically advanced (Smith, 2008).

The nursing education environment must also adapt to the ever increasing acuity of the patient and the rapidly advancing technology while preparing students for the complex clinical environments. Nursing educators continue to seek innovative new ways to prepare students for the clinical environment; while clinical sites and funding have decreased. Research has suggested that high fidelity simulation is an approach to help students safely prepare for the clinical world. It has helped students adapt to the clinical setting; allowing them to practice with a simulated patient using clinical judgment while focusing on collaboration (Smith, 2008).

Low fidelity simulation (LFS) began with the advent of cardio pulmonary resuscitation (CPR) in 1960. In the 1980s, simulation was used in military and aviation individual and team training purposes in the event of critical events. In the 1980s, anesthesia educators began using mannequins for practice in a simulated environment. In the late 1990s, health care began using simulation mannequins that were more affordable and versatile. The instructors used the mannequins for competency assessment and on-
going education. Technology would soon revolutionize the way that healthcare would interact with the mannequins allowing for more realistic scenarios (Jeffries, 2007).

High fidelity simulation allows the instructor to fully immerse the student in a realistic environment where the student interacts with the patient. The patient will respond according to the actions of the student. Simulation can be used for individual or team practice. Students can develop verbal, clinical, and social skills with HFS. The realism of the environment allows the student to become more comfortable using the tools and equipment without putting an actual patient at risk (Jeffries, 2007).

Simulation allows instructors to meet all levels of students and learning styles. HFS also allows for opportunities for research. Research involving low and moderate simulation exists, but not a lot of research exists for high fidelity simulation (Hanberg, 2008). High fidelity simulation (HFS) continues to gain popularity as a teaching strategy for nursing education due to the realistic, interactive patient simulators. Nursing educators can reproduce patient scenarios for student practice in a safe, learning environment. Nursing students have stated that simulation has helped provide greater self-confidence and satisfaction, but little is known about the factors that lead to these two outcomes (Smith & Roehrs, 2009).

Problem Statement

Nursing instructors can allow the nursing students more experiences interacting with simulated patients through high fidelity simulation. High fidelity simulation (HFS) continues to gain popularity as a teaching strategy for nursing education due to the realistic, interactive patient simulators. Nursing educators can reproduce patient scenarios for student practice in a safe, learning environment. Studies have shown that using HFS
provides a positive outcome for students, but little is understood about the factors that lead to the positive outcomes (Smith & Roehrs, 2009).

Purpose

The purpose of this study is to examine the factors that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. This study is a replication of Smith and Roehrs’ (2009) study.

Research Questions

1. How satisfied are Bachelor of Science (BSN) nursing students with an HFS scenario experience?
2. What is the self-reported effect of an HFS scenario experience on BSN student self-confidence?
3. How do BSN nursing students evaluate an HFS scenario experience in terms of how well five simulation design characteristics are present in the experience?
4. Is there any correlation between the perceived presence of design characteristics and reports of satisfaction and self-confidence of BSN nursing students who take part in an HFS experience?
5. Is there any correlation between demographic characteristics of BSN nursing students and reports of satisfaction and self-confidence after an HFS experience?

Theoretical Model

Jeffries’ (2005, 2007) Nursing Education Simulation Framework (NESF) was designed to incorporate the teacher, student and educational practices; allowing for the
design, implementation, and evaluation of simulation. The model consists of five major components; teacher, student, educational practices, design characteristics, and outcomes. The model is learner-centric and combines immediate feedback and collaboration. The teacher acts as both a facilitator and evaluator rather than operating under a teacher-centered model. The students must be allowed to learn and find meaning on their own without the teacher instructing them. The teacher offers support and encouragement. The student is self-directed and responsible for their own learning in the safe, simulated environment. The educational practices incorporate many different learning styles including active learning where the student learns through problem solving and critical thinking. Also included in the model is feedback, student/faculty interaction, collaboration, high expectations, diverse learning, and time on task.

Five variables are listed under the component of outcomes; learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence. Knowledge acquisition and retention has been shown to more effective through the use of simulation versus classroom learning. Skill performance can be learned through repeated simulations because students practice in a safe learning environment with the potential harm to real patients.

Learner satisfaction can be measured through quantitative and qualitative measures. Satisfaction has been shown to be high among participants. By using classroom based knowledge, students apply critical thinking with the simulated patient. By increasing in skill performance when using simulation, students are more confident in themselves through critical thinking and problem solving (Jeffries, 2005).
**Definition of Terms**

Applying Jeffries’ (2005, 2007) Nursing Education Simulation Framework, this study proposes that using high fidelity simulation can lead to student satisfaction and self-confidence when used in nursing education. The identified essential terms and definitions serve as the foundation for this study.

**High Fidelity Simulation: Conceptual**

“A type of simulation that closely mimics reality by providing cosmetic fidelity, a realistic outward appearance of a live patient, as well as response fidelity, or the ability to simulate actual patient responses to interventions. These simulators actually breathe, talk, and have eye movements, palpable pulses, and other features that resemble physiologic features of actual patients” (Smith, 2008, p. 9)

**High Fidelity Simulation: Operational**

For this study, the Laerdal™ SimMan™ Universal Patient Simulator, a computerized high-fidelity simulator, will be used to replicate a medical-surgical case scenario. The patient in the scenario will be an elderly female admitted with exacerbation of Chronic Obstructive Pulmonary Disease (Smith & Roehrs, 2009).

**Student Satisfaction: Conceptual**

Student satisfaction will be defined as the students’ “responses to the simulation experience” (Smith, 2008, p. 9).

**Student Satisfaction: Operational**

For this study, Student Satisfaction will be defined as the mean scores obtained by participants on the satisfaction subscale of the Student Satisfaction and Self-Confidence in learning instrument (Smith & Roehrs, 2009).
Self-Confidence: Conceptual

Self-Confidence is defined as “people’s judgments of their capabilities to organize and execute course of action required to attain designated types of performance” (Smith, 2008, p. 9-10).

Self-Confidence: Operational

For this study, Self-Confidence will be defined as the mean scores obtained by participants on the self-confidence subscale of the Student Satisfaction and Self-Confidence in learning instrument (Smith & Roehrs, 2009).

Simulation Design Characteristics: Conceptual

Simulation Design Characteristics is defined as “features to consider when developing a simulation experience. According to the literature, five features are important and include objectives fidelity, problem-solving, learner support, and guided reflection” (Smith, 2008, p. 10).

Simulation Design Characteristics: Operational

Simulation Design Characteristics for this study will be defined as the “mean scores obtained by participants on each of the five subscales (objectives, fidelity/realism, problem solving, learner support, and guided reflection) on the Simulation Design Scale” (Smith, 2008, p.10).

Limitations

Due to the lack diversity among students, the small sample size, and the convenience sample, generalizability of the study is limited. This study was limited to one group of students from one part of the country. This study is also limited based on one medical/surgical scenario and the various students’ clinical history with the patient.
population. An additional limitation was that this study did not have a control group. The use of experimental designs can be used to establish better assumptions regarding cause and effect of factors related to the outcomes are needed. Additional limitations include the lack of different simulation manikins (static, intermediate-level) with varying diagnoses.

**Assumptions**

The following assumptions were made for this study:

- The Nursing Education Simulation Framework (Jeffries, 2005, 2007) is an accurate reflection of the two major outcomes being evaluated in this study; student satisfaction and self-confidence.

- The researcher-designed demographic instrument accurately depicts the study sample to assess the “correlation of demographic characteristics to student satisfaction and self-confidence” (Smith & Roehrs, 2009).

- The student nurse will provide honest answers to the instruments: Student Satisfaction and Self-Confidence in Learning Scale and the Simulation Design Scale.

- The sample size is large enough to determine the factors that lead to student satisfaction and self-confidence.

**Summary**

Nursing, as it continues to evolve, must be more focused on quality outcomes relating to patient care and needs to be driven by evidence-based practice. Nurses must have the knowledge, competency, and critical thinking skills to work in the technologically advanced clinical setting. Therefore, clinical instructors must ensure that
nursing education promotes knowledge and skill acquisition in a research-based practical setting. Educators are continually challenged to implement new teaching strategies to help students develop research-based skills in an environment that promotes satisfaction and self-efficacy (Smith, 2008).

Nursing instructors can allow the nursing students more experiences interacting with simulated patients through high fidelity simulation. HFS continues to gain popularity as a teaching strategy for nursing education due to the realistic, interactive patient simulators; where students can practice in a safe, learning environment. The purpose of this study is to examine the factors that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. This is a replication of Smith and Roehrs (2009) study using the Jeffries’ (2005) Nursing Education Simulation Framework. With the application of the framework, this study proposes that using high fidelity simulation can lead to student satisfaction and self-confidence when used in nursing education.
Introduction

National accreditation standards demand nurse educators establish teaching strategies to address critical and reflective thinking skills for the assurance of patient safety and quality of care (Decker, 2007). Students today are more technologically driven; challenging nursing instructors to develop solutions to promote skills, self-confidence, and critical thinking while being satisfied with the methods of instruction. High fidelity simulation (HFS) continues to gain popularity as a teaching strategy for nursing education due to the realistic, interactive patient simulators. Nursing educators can reproduce patient scenarios for student practice in a safe, learning environment. Studies show that using HFS provides a positive outcome for students, but little is understood about the factors that lead to the positive outcomes (Smith & Roehrs, 2009).

Purpose

The purpose of this study is to examine the factors that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. This is a replication of Smith and Roehrs (2009) study.
Organization of Literature

The organization of the literature review, used to support this study, is divided into four sections: (a) theoretical framework; (b) high fidelity simulation; (c) high fidelity simulation and nursing student satisfaction; and (d) high fidelity simulation and nursing student self-confidence. The chapter concludes with a summary.

Theoretical Framework

Jeffries’ (2005) Nursing Education Simulation Framework (NESF) is used in this study. This model presents an organization framework for designing, implementing, and evaluation of simulation. The model consists of five major components: teacher, student, educational practices, design characteristics, and outcomes. Under each of the five components, associated variables are included. All variables may not apply to each simulation, but give context to other potential variables. Each scenario is dependent upon student to teacher interactions.

Five variables are listed under the component of outcomes: learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence. Knowledge acquisition and retention has been shown to more effective through the use of simulation versus classroom learning. Skill performance can be learned through repeated simulations because students practice in a safe learning environment with the potential harm to real patients. Learner satisfaction can be measured through quantitative and qualitative measures. Satisfaction has been shown to be high among participants. By using classroom based knowledge, students apply critical thinking with the simulated patient. By increasing in skill performance when using simulation, students are more confident in themselves through critical thinking and problem solving (Jeffries, 2005).
The study by Smith and Roehrs (2009) focused on two of the outcomes of the Jeffries’ model, student satisfaction and self-confidence, with the factors that correlate with them. This framework provides the opportunity for researchers to design, implement, and evaluate simulation scenarios to evaluate the factors that lead to the two outcomes.

*High Fidelity Simulation*

Educators facilitating Advanced Cardiac Life Support (ACLS) courses use both didactic and practical methods to teach the participants life-saving protocols. However, people in need of life-saving measures continue to die. Hoadley (2009) hypothesized that the realism of high fidelity simulation (HFS) would enhance the participant’s cognition through experience and debriefing.

The purposes of the study were to determine the ACLS participant’s satisfaction level using HFS and test whether the participant tested higher, cognitively and behaviorally, compared to ACLS participants who used low fidelity simulation (LFS). This study used John Dewey’s experiential learning philosophy for the theoretical framework. According to this philosophy, memorization is not learning, but knowledge is gained from experience. With HFS, the participant not only learns the protocols of ACLS, but uses hands-on experience to react to the scenario. The scenario then reflects the actions of the participant (Hoadley, 2009).

Hoadley (2009) developed four hypotheses in terms of outcome scores for the ACLS course participants. The four hypotheses state that ACLS course participants who used HFS will have higher scores on the posttest, the ACLS Mega Code Performance Score Sheet, the Simulation Design Scale, and the Student Satisfaction and Self-
Confidence with Learning Scale when compared to those who used low fidelity simulation for ACLS practice.

The population for this study consisted of 53 health care providers in a Midwest medical center. The participants were randomized to the control or experimental groups during the registration process. Each course was limited to 30 participants due to physical restraints and instructor ratios (Hoadley, 2009).

All participants were given a pre-test upon admission to the program; along with a demographic questionnaire. All participants had an interactive learning session with the instructors on the first evening. When each of the groups met during the second evening, all participants in their appointed groups assessed the manikin. The LFS group received verbal assessment cues; while the HFS group received cues from the manikin. During the third evening, the participants completed the mega-code scenarios and took the written post-test (Hoadley, 2009).

Two of the tools used in the research came from the American Heart Association: the written post-test and the mega-code performance score sheet. Three resuscitation and skill testing experts established the content validity of this tool. The Simulation Design Scale (SDS) from the National League for Nursing was another tool used in the research. The SDS was a 20-item instrument that gauged the realism of the simulation design and the participant’s perception of importance of the features in the scenario. Ten content experts established the content validity of the SDS. Cronbach’s alphas reported as 0.92 for features and 0.96 for student’s perception of the importance of the attributes. The Student Satisfaction and Self-Confidence Tool developed by the NLN was also used. This tool measured students’ satisfaction with the simulation activities and students’
confidence in their abilities to care for patients. Nine clinical experts established the content validity of this tool. Cronbach’s alpha coefficient was 0.94 and 0.87, respectively (Hoadley, 2009).

The demographic data showed that all participants (n=53) held an advanced practice degree or specialty certification. For the male participants in the study, there were 62.5% (n=15) in the control group; 31.03% (n=9) in the experimental group. For the female participants in the study, there were 31.03% (n=9) in the control group; 68.97% (n=20) in the experimental group. The mean age was 35.5 years for control group participants (SD = 12.19) and 34.10 years (SD = 10.39) for participants in the experimental course. Years of experience: control, M= 10.26 years, SD = 9.97; experimental, M = 8.38 years, SD = 9.01. Thirteen control group participants (54.17%) reported working in a hospital setting; seven (29.17%) worked for an ambulance service; two (8.33%) worked in a private practice; and one each (4.17%) worked in a physician’s office or different health care delivery system. Fourteen participants in the experimental group (48.28%) worked in a hospital; seven (24.14%) worked for an ambulance service; five (17.24%) worked in a physician’s office; and three (10.34%) worked in an area not previously listed (Hoadley, 2009).

The first hypothesis was addressed using the ACLS post-test, where it was thought that the experimental group would have better post-test scores. Parametric t-tests were used to test to see if there were significant differences in the two groups. Results showed no significant differences in the pre-test (control, M = 79.06, SD = 19.88; experimental, M = 81.52, SD = 16.48). Neither group showed more knowledge than the other. For the post-test scores, there were no significant differences in the groups
(control, M = 87.67, SD = 9.28; experimental, M = 90.34, SD = 7.75); t (51) = -1.15, p = .26). The first hypothesis was not supported by this data (Hoadley, 2009).

The second hypothesis was tested using the ACLS mega-code performance score sheet. The inter-rater reliability for the mega-code performance score sheet between 12 raters was 1.00, indicating high rater agreement. The scores for the two groups were as follows: 24.70 (SD = 3.68) for the control group and 26.12 (SD = 2.51) for the experimental group. There were no statistical differences between the two groups; the second hypothesis was not supported (Hoadley, 2009).

The third hypothesis was tested using the SDS. The SDS is broken down into five subscales to rate satisfaction with features of simulated teaching methods; scores for the two groups were as follows: Objectives/Information (control: M = 23.17, SD = 1.93; experimental: M = 23.83, SD = 1.69), Support (control: M = 18.92, SD = 1.82; experimental: M = 18.66, SD = 2.01), Problem Solving (control: M = 22.96, SD = 2.31; experimental: M = 22.41, SD = 3.15), Feedback/Guided Reflection Information (control: M = 19.13, SD = 1.45; experimental: M = 19.31, SD = 1.26), Fidelity (Realism) (control: M = 9.13, SD = 1.39; experimental: M = 9.38, SD = 0.9). The second set of subscales rated perceptions of the importance of simulation elements: Objectives/Information (control: M = 23.00, SD = 2.23; experimental: M = 22.83, SD = 2.80), Support (control: M = 18.25, SD = 2.23; experimental: M = 22.83, SD = 1.71), Problem Solving/Feedback (control: M = 22.96, SD = 2.49; experimental: M = 21.38, SD = 3.16), Guided Reflection (control: M = 18.50, SD = 1.91; experimental: M = 18.66, SD = 1.7), Fidelity (Realism) (control: M = 9.08, SD = 1.32; experimental: M = 9.28, SD = 1.16). No
significant differences were noted between the two groups; the third hypothesis was not supported (Hoadley, 2009).

The fourth hypothesis was tested using the Student Satisfaction and Self-Confidence Scores. T-tests were used to test for significance between the two groups; no statistical difference was found: $M = 22.54$, $SD = 2.69$ for the control group and $M = 22.52$, $SD = 2.43$ for the experimental group. The fourth hypothesis was not supported (Hoadley, 2009).

ACLS knowledge is acquired through both didactic and experiential learning. This study did not show any statistical differences between the group using LFS or HFS. Using ACLS takes practice with the algorithms and critical thinking. Using simulation technology allows feedback from the manikin, therefore, allowing the scenario to be more realistic. Hoadley (2009) concluded that for future studies, the researcher could use the methodology of this study, but not debrief until after the data has been collected. One limitation cited by the researcher of the study was that all learners received the same debriefing; potentially where the true learning took place. Learning ACLS using HFS did not support the anticipated hypotheses of better knowledge, skills, satisfaction, or self-confidence.

National accreditation standards demand nurse educators establish teaching strategies to address critical and reflective thinking skills for the assurance of patient safety and quality of care. In her review of the literature, Decker (2007) found that high fidelity simulation was increasingly recognized as an educational strategy that enabled the participant to use critical and reflective thinking skills. Research had shown that the reality based high fidelity simulation allowed the participant to critically think, make
decisions, and act upon the decisions without fear of harm to a patient. The learner was allowed to assimilate learned textbook theories with nursing practice to provide safe patient care.

The purpose of this study was to examine the thought processes of nursing students before and during a simulation exercise. This qualitative study used the grounded theory based on the Symbolic Interaction Theory to gain insight to the reflective and critical thought processes of the students. The students used the simulated exercise, based upon reality, and performed actions according to the situation. High fidelity simulation had been identified as an educational strategy, but research that positively identified a link between simulation and critical and reflective thinking was still needed. From her review of the literature, Decker (2007) concluded that more research was needed to assess the educational outcomes of simulation, its role across the curricula, and the debriefing experience that allowed for reflective thinking.

The study population included 114 senior nursing students in a baccalaureate program ranging in ages from 20 to 30 plus years old (one student would not give his exact age). The average age was 21 years old. Female students (n=101; 88.6%) were the majority over the male students (n=13; 11.4%). The population of students consisted of Caucasians (n=87; 76.3%), African-Americans (n=10; 8.8%), Hispanics (n=8; 7%), and Asian/Indians (n=9; 7.7%). All students were enrolled in an advanced pharmacology class and held an average GPA of 3.4. The students were selected due to their familiarity with the simulation learning environment (Decker, 2007).

The students self-selected groups of four or five for a total of 28 groups. The primary nurse was randomly assigned to one of the participants in each group. Each
group was given a scenario where a post-operative patient, a high fidelity simulator, was having difficulty breathing. The group was given the scenario, including physician’s orders and began total patient care. The patient and family member gave verbal cues to prompt the nursing action. The student was required to reposition the patient, elevate the head of the bed, perform a focused assessment, and teach the patient and family member proper use of the incentive spirometer. Following the simulated exercise, the researcher used audio tapes to record sessions of students during a focused debriefing (Decker, 2007).

The researcher gathered information through observation during the simulated scenario. The debriefing used open ended questions and was recorded, transcribed, and rechecked for accuracy. The researcher analyzed each recorded session line by line, by theoretical coding, to identify key phrases and patterns to discover if relationships existed within the data (Decker, 2007).

Through the observation of the researcher and by verbalization during the debriefing the students were placed into three categories: task oriented thinking, situation specific thinking, and critical thinking. Data emerging from the first theme showed that six groups (21.4%) demonstrated and/or verbalized task oriented thinking; reflecting a focus on accomplishing the tasks related to patient care. For example, students wanted to make sure the patient was comfortable, provide 100% oxygenation (even though the report stated that the patient had been previously diagnosed with COPD), and get the stat medications delivered. Situation specific thinking, the second theme to emerge, included eleven groups (39.3%) who organized the work flow based upon the current situation of the patient. These groups used past experiences to drive current process. For example,
students verbalized the feeling of quicker speed with experience, unsure of calling the physician, and reflecting on past clinical experience. Critical thinking was the final theme to emerge and included eleven other groups (39.3%), these groups verbalized the feeling of putting it all together. This group was the most successful at knowledge transfer, such as assessing the situation and reacting to it with the correct clinical response (Decker, 2007).

The students who were in the task oriented thinking group displayed a difficult time with knowledge transfer and skills competency. These students were unable to process past experiences and use it with current clinical situations. These students also lacked self-confidence in decision making. The situational thinkers expressed the ability to use some past experiences and knowledge after verbal cueing. These students had difficulty identifying the problem and correlating with past knowledge. Critical thinkers were able to transfer past knowledge and experiences and demonstrate competency in the clinical situation. These students had high self-confidence (Decker, 2007).

A connection between theoretical knowledge (application of theory), skills competency, experiential knowledge, and mindset was found during the analysis of the data. Those who were able to critically think used the theoretical and experiential knowledge, skills, and mindset to accomplish the tasks while maintaining self-confidence. The researcher concluded that simulation was a useful tool to allow participants to use critical thinking and reflection. Simulation always allows the experience of experiential knowledge. It was predicted that the nurse could use the experiential knowledge gained during the use of the simulation to complete tasks safely and efficiently when working with actual patients (Decker, 2007).
The use of one university in a single, qualitative research project was a limitation of the study. The researcher also recommended future longitudinal studies should evaluate high fidelity simulation as a learning methodology; fully integrated into the curriculum (Decker, 2007).

Advanced cardiac life support (ACLS) courses teach health care providers life-saving protocols and techniques to use in emergent situations. When using ACLS, health care workers must use critical thinking skills in an efficient manner. To do so, the protocols must be taught and then practiced in a safe learning environment. The low fidelity simulation (LFS) mannequins used do not provide feedback to the participant. Relying on the instructor to provide the needed feedback, allows for a gap in the flow of practice (King & Reising, 2011).

High fidelity simulation (HFS) uses realistic mannequins that provide real-time feedback to the participant and will react accordingly to procedures. The use of HFS when teaching ACLS has not been well documented. The purpose of this research was to evaluate the effectiveness of teaching ACLS using HFS (King & Reising, 2011).

The setting for the quasi-experimental research study was a large Midwestern university. A convenience sample of 49 senior baccalaureate nursing students who had been through the critical care course, but had not had ACLS training were recruited. Demographic data was not obtained. The students were randomly split into two groups. The control group of 25 students learned ACLS using LFS mannequins. The experimental group consisting of 24 students learned ACLS using HFS mannequins (King & Reising, 2011).
ACLS is a 12 hour course facilitated over two days. Both groups were taught using video based teaching. Each group practiced using mannequins, but the control group used LFS while the experimental group used HFS. After the groups learned and adequately practiced, they were given a 25-question multiple-examination provided by the American Heart Association (AHA). Their skills were evaluated using the ACLS Mega-Code Testing Checklist, provided by the AHA. The scores were tabulated according to correct procedures used out of the possible correct. The initial data for the immediate results for the Mega-Code Testing Checklist was not recorded (King & Reising, 2011).

All of the students returned to the simulation lab two weeks and then two months following the initial training. When the students returned, they met in their initial groups: HSF and LFS. They were then evaluated using the Mega-Code Testing Checklist for four scenarios. All participants also completed the post-test at the two week and two month intervals (King & Reising, 2011).

To test for differences between the HFS and LFS groups, a repeated-measures analysis of variance was used. The written test showed no significant differences between the groups: immediately, at two weeks, or two months. The LFS group had an overall test grade of 94%; while the HFS group had an overall 95% grade (King & Reising, 2011).

The mega-code checklist was used to evaluate the percentage of correct procedures used during the scenarios. The HFS completed 15 of 24 (62.5%) scenarios without error versus the LFS who completed 3 of 24 (12.5%) without error. The average percent correct by scenario (by group averages) per interval were as follows: for Scenario 1 at the 2 week interval (LFS = 84.33, HFS = 96) and the 2 month interval (LFS = 88,
HFS = 94); scenario 2 at the 2 week interval (LFS = 76.33, HFS = 98) and the 2 month interval (LFS = 72.33, HFS = 100); scenario 3 at the two week interval (LFS = 78.33, HFS = 98) and the 2 month interval (LFS = 88, HFS = 94); scenario 4 at the 2 week interval (LFS = 84, HFS = 98), and the 2 month interval (LFS = 92.67, HFS = 100) (King & Reising, 2011).

High fidelity simulation showed equally effective in learning outcomes compared to low fidelity simulation when teaching ACLS. According to this research study, HFS may have been more effective at teaching the mega-code skill performance needed for ACLS. The researchers concluded HFS may be a more effective means for teaching ACLS because it incorporates audio, visual, and tactile methods (King & Reising, 2011).

Limitations of this study included a small sampling size in a single facility. Suggested future studies would use the same methodology, but contain a multi-facility comparison using a greater population. Additional studies could compare the efficacy of using HFS to teach ACLS comparing senior nursing students and new nurses (King & Reising, 2011).

Educators have a continual struggle to teach reasoning and skills in the classroom and have those critical thinking skills translate to the clinical setting. They are challenged with finding new ways to educate the technology driven students. Research has shown that nursing education has promoted skills, self-confidence, and critical thinking. Research has also shown that these abilities do not directly correlate to the bedside. Students have learned better through patient interaction and experience (Wotton et al., 2010).
High fidelity simulation (HFS) has the potential to assist students with cognitive recall and clinical skills development. Universities are challenged to make the classroom learning environment translate to safe, effective clinical care. With the advent of the high fidelity simulators, educators are able to produce more realistic patients for the skills training. The purpose of this evaluative research was to analyze the perceptions of upper classmen nursing students to the implementation of three high fidelity simulations into an established clinical course. Decision making concepts was the organizing framework for the study (Wotton et al., 2010).

The convenience sample included 300 third-year nursing students who were enrolled in a clinical nursing course. The students were further subdivided into groups of 3 or 4. The students were involved in three separate scenarios: scenario 1 (n=297), scenario 2 (n=271), and scenario 3 (n=250) (Wotton et al., 2010).

The instruments used to gather data included an evaluation tool that contained 11 questions rated on a 5-point Likert-type scale and three open-ended questions. Although it was not indicated in the published work, the tool appeared to be developed by the researchers. The students rated various aspects of the simulated scenario; including if the scenario was enjoyable, aroused curiosity, held their attention, held relevance to what they were learning, and if they gained any knowledge. Three of the questions related to the experience of the debriefing and its helpfulness. The three open-ended questions asked for positive and negative feedback. The three questions queried the students to tell what they had learned from the simulation. The data was analyzed using SPSS software (Wotton et al., 2010).
Prior to the scenarios with the simulation, students were involved with online tutorials, laboratory sessions, and clinical practice. Students were scheduled for 45 minutes to work through three separate scenarios; the three scenarios were angina, hypovolemia, and pneumothorax. The students were organized into small groups of three or four. The scenario began with an instructor playing the role of the RN. The students had 15-20 minutes to work with each of the three scenarios. Following the scenario, the students spent 15-20 minutes debriefing with an instructor. During the debriefing, the participants reflected on the priority of the interventions, the ethical and legal concerns, the management of the individuals and team, and tried to correlate the pathophysiology, pharmacology and the care the patient received (Wotton et al., 2010).

The results of the study were quantitative and qualitative due to the three open-ended questions. Greater than 90% of the students enjoyed working with the high fidelity simulator in all three scenarios (question one). Most of the students (mean = 94.7%) reported that their attention was held throughout the scenarios (question 2). The students found the scenarios consistently challenging (mean=92.4%) (question three). Students believed that the simulation was closely related to the learning (mean=94%) (question four) and found the simulation useful for learning (mean=95%) (question six). According to the participants, 92% stated that the sessions aroused curiosity and provided opportunities to explore different concepts (question five). Many of the students (mean=31.5%) felt lost at times in the scenario (question seven). Of all the students, 97% believed they could use the knowledge they gained from their experience and apply it to a clinical setting (question eight). More than 95% of the students felt that the feedback sessions were helpful with patient management (question 9), helped develop rationale for
action and response to patient (question 10), and helped them understand actions of medications (question 11) (Wotton et al., 2010).

Feedback from the open-ended questions indicated that the simulations would have been better if they would have had more time to get familiar with the HFS. Students also indicated that the simulations could have been improved with more complexity, team interactions, and smaller groups. Greater than 90% of the students rated this experience as enjoyable. Enjoyment had been shown, in previous studies, to be a positive link between learning and retention. Debriefing was also found to be helpful with knowledge acquisition (Wotton et al., 2010).

The researchers concluded that the trouble of designing and implementing HFS was worth the positive feedback from the students. Students enjoyed working with the HFS as it brought more complexity to the skills lab. They did not feel overwhelmed or anxious about using HFS and believed that the scenarios helped in improving critical thinking. Greater than 95% of the students felt that the knowledge they gained would translate to the clinical setting. Furthermore, HFS allowed all students to experience scenarios they may not have normally encountered in the clinical setting (Wotton et al., 2010).

Collaboration between the students proved to be essential to managing the scenario effectively. Debriefing proved to be a vital aspect of the simulation; the students were corrected as mistakes were identified. According to the researchers, the true learning of the HFS experiences came from the debriefing as students were given insight by the faculty. The researchers felt that the simulation should be incorporated into the learning process as reinforcement to learning and not a stand-alone component. In this
research setting, HFS complemented the classroom learning as it helped bridge the gap from knowledge to practice (Wooton et al., 2010).

Communication is essential to nursing education and good nursing care especially in the psychiatric setting. Students may have anxiety related to the psychiatric clinical setting, but due to higher patient acuity and decreased clinical sites, educators are finding it difficult to adequately prepare students for the clinical setting. Evaluation of communication skills is difficult in the psychiatric clinical setting. The therapeutic relationship between the patient and nursing students can be jeopardized by a third party observer. A review of the literature revealed that faculty had used video recording, but the students verbalized anxiety and fear when being watched (Kameg, Howard, Clochesy, Mitchell, & Suresky, 2010).

The purpose of this study was to determine the self-efficacy of senior nursing students’ communication skills as they related to the patient with a mental illness. The research compared two delivery methods, traditional lecture and high fidelity human simulation (HFHS). The researchers would use HFHS as an educational tool to help address the fears and anxieties of nursing students as they related to the psychiatric patient. The framework for this study was Bandura’s Self-Efficacy Theory. (Kameg et al., 2010).

Senior level nursing students (n=38) from a private university located in western Pennsylvania were the sample in this study. The students were divided into two groups using a non-random assignment; using a quasi-experimental design. Group 1 (n=21) had 19 (90.5%) female and two (9.5%) male students. In this group, 1 (5%) student was African American/Black; while 20 (95%) students were European American/White. The
average age was 23.1 years old. All students (n=21) had previous experience with simulation, and 17 (81%) students had exposure to patients with mental illnesses. Group 2 (n=17) had 15 (88.2%) female and two (11.8%) male students. In this group, 1 (5.8%) student was African American/Black while 16 (94.1%) students were European American/White. The average age was 23.41 years old. Fifteen (88.2%) had previous experience with simulation, and 15 (88.2%) students had exposure to patients with mental illnesses. Half of the students were enrolled in the 7.5 week psychiatric nursing course, the other half were enrolled in community health nursing (Kameg et al., 2010).

Two variables were measured in this study. The independent variables were the two different types of teaching. The dependent variable was the students’ self-efficacy of communication. The self-efficacy of communication was measured using the visual analogue scale (VAS). The VAS is a self-reporting device that measured patient symptoms, affect, function, and quality of life. General self-efficacy was measured using the General Self-Efficacy Scale. The General Self-Efficacy Scale measured the perceived self-efficacy and the ability to cope with daily living and hassles. Self-efficacy was measured on a scale of 10-40, with 40 being the highest possible score. This scale’s validity rating measured by Cronbach’s alpha ranged from 0.76-0.90. Students were also asked to rate the simulation using the Simulation Evaluation Survey (SES) developed by Howard. The SES is a four point Likert-type survey with a validity rating of the with a Cronbach’s alpha for validity rating of 0.87 (Kameg et al., 2010).

Over the course of the research study, students in both groups attended the mandatory lecture on communication, simulated scenario, and video-recorded debriefing as required for enrollment; inclusion into the research was voluntary. Half of the students
were enrolled in the Nursing Care of Psychiatric Clients at the beginning of the study; the other half was enrolled in community health (Kameg et al., 2010).

The first group attended the two hour lecture and completed the initial VAS. The students were then oriented to the HFHS and given a full report about the patient. The participants were given alternating scenarios; one scenario involved depression/suicidal thoughts and the other anxiety/substance abuse. An instructor used HFHS as the patient and communicated through a microphone from an adjacent room; allowing the scenario to be as realistic as possible. The communication from the instructor was unscripted. The student played the role of the nurse and engaged the patient in therapeutic communication based upon the components from the lecture. The students were video-taped during the scenario (Kameg et al., 2010).

Following the scenario, the instructors led debriefing. The students completed the second VAS and the Simulation Evaluation Survey. Upon rotation of the courses, the second group underwent the same procedure (Kameg et al., 2010).

The statistical package for the social sciences program was used to analyze and evaluate the data. A dependent t-test was performed to calculate and differences in self-efficacy between the two times. With all students (n=38) there was a statistical difference between evaluations (p=.000) following the simulation scenario. When the groups were divided, Group 1 experienced significant changes following the simulation (p=.005) as well as Group 2 (p=.036). The mean score for the Self-Efficacy Scale was 3.1381 for students in Group1 and 2.7353 for students in Group 2. A Pearson correlation assessed the relationship between the General Self-Efficacy Scale and the self-efficacy related to the initial communication (r=.419, p=.009) for all students. For group 1, (r=.578, p=.006)
revealed a significance and moderately strong correlation, but was not significant for Group 2 (r=.274, p=.288). According the results of the simulation survey, students responded well to the simulation (3.63) and felt the simulation should be included in the curriculum (3.58). The students also felt a strong correlation between knowledge gained during the simulation experience and the translation to the bedside (3.38). Students did not agree that the simulation experience could be substituted for clinical experience (Kameg et al., 2010).

The students in group 1 had a higher general self-efficacy than the students in group 2. The researchers were surprised by this finding considering the second group had an additional 7.5 weeks of community nursing before their turn with the HFHS. The study revealed that students’ self-efficacy of communication is heightened through the HFHS experience. The study supported the theoretical framework of Bandura’s Self-Efficacy Theory showing that through accomplishments, experience, verbal persuasion, and emotional arousal; self-efficacy of communication is improved. Overall, the students found the simulation experience was helpful and increased their confidence (Kameg et al., 2010).

The researchers identified some limitations in the study. One limitation when using HFHS was that the mannequin cannot change facial expressions nor express any other non-verbal communication; this is important with therapeutic communication. Other limitations to the study included a small sample size and lack of diversity among the participants. The researchers also expressed potential bias as the researchers was also the class instructors (Kameg et. al., 2010).
The results of the study showed that HFHS increased self-efficacy in communication and should be utilized in nursing education. Students responded positively to the simulation experience as an interactive method for creating teamwork while integrating technology into a safe, learning environment. The researchers suggested future studies replicating the methodology of the research, but recommended the inclusion of non-therapeutic and therapeutic communication techniques to better understand how student outcomes using HFHS correlates with therapeutic communication (Kameg et al., 2010).

Collaboration between physicians and nurses has been proven to decrease the risk of adverse outcomes for patients while increasing professional job satisfaction leading to high retention rates of nursing staff. The strategies to enhance collaboration between the disciplines are widely unknown. High fidelity simulation (HFS) is a teaching strategy that has been shown to offer a realistic patient setting in a safe environment. HFS was used in this study to allow the interdisciplinary teams to practice, without putting patients at risk (Maxson et al., 2011).

The purpose of this study was to determine if team training between the disciplines has been shown to affectively increase collaboration and communication. For this study, the researchers used TeamSTEPPS, an evidence-based framework developed by the Department of Defense. TeamSTEPPS involves four teaching and learning skills; leadership, situation monitoring, mutual support, and communication (Maxson et al., 2011).

The interdisciplinary team (n=28) consisted of nurses, surgical faculty, and surgical residents working together in the Mayo Clinic of Rochester, Minnesota. The
mean age of the participants was 34.2 years old, with the nurses slightly younger (mean=27.3) than the physicians (mean 34.5). Females accounted for the majority of the population (n=19); 18 of them were nurses and 1 was a physician. Only 3 physicians of the entire group had prior simulation experience (Maxson et al., 2011).

The instrument used for this study was the Collaboration and Satisfaction about Care Decisions (CSACD). The CSACD is an 8 question survey evaluated on a 7 point Likert-type scale and had a reliability rating of 0.90, indicating a high reliability. The 8 questions on the CSACD pertained to planning, collaboration, decision-making, cooperation, and satisfaction between nurses and physicians (Maxson et al., 2011).

Prior to the simulation exercises, the teams were asked to complete the CSACD survey. The scenarios consisted of postoperative complications in colon and rectal surgical patients. Prior to the simulation the roles and expectations were defined for the participants. The participants assessed the mannequin and interacted with the team, but the ultimate diagnosis was not revealed. The participants were video-taped during the scenario and stopped after 20 minutes. Following the scenario, the participants were led through debriefing where team principles were introduced. The video was used to play back segments of the scenario to enhance recall. The team member participated in two more scenarios, following this same format. With each debriefing session, a trained facilitator engaged the team in dialogue concerning teamwork. The participants retook the CSACD two weeks and two months following the initial simulation (Maxson et al., 2011).

To assess differences between physicians’ and nurses’ characteristics, the researchers used a Wilcoxon Rank Sum test and a Fisher Exact test for categorical data.
The survey were collated and summarized after each time. The primary analysis compared the pretest to the first posttest; to evaluate if HFS changed the participants’ perception of collaboration. The secondary analysis compared the first posttest to the second posttest to see if any changes occurred. Then a univariate analyses was performed to see if there was a change in perception from the primary analysis to the secondary analysis. Finally, a univariate analysis was performed to test for potential differences between the perceptions of nurses and physicians. Greater than 50% of the respondents were dissatisfied with the current decision-making process (median score of 3). Two weeks after the intervention, scores improved significantly (4.2 vs. 5.1, p<.002). Improvement continued at the two month mark (p<.002) with no significant changes (p=.24). The pretest summary trended toward significance (p=.06) with a difference in perceptions at two months (p=.04) (Maxson et al., 2011).

Outcomes of this study suggested better collaboration, teamwork, and communication between nurses and physicians team exercises using HFS. The researchers suggested that neither nurses nor physicians were satisfied with the current methods of communication which puts the patient at risk for adverse outcomes. A secondary outcome from this study was a better understanding about the challenges that the other discipline faces. Each discipline had a desire to improve effective communication in the future. Practice using HFS suggested better safety outcomes and team performance (Maxson et al., 2011).

Limitations of this study included having only one specialty practice may not be easily generalized to the entire nursing and physician population. Additionally, the residents in this study had fewer than 3 years experience; whereas, the nursing group had
1 to more than 10 years. Since this study did not have a control group, the Hawthorne effect may have played a role in the data results. The researchers suggested future studies that include randomization of staff or other problem-based learning (Maxson et al., 2011).

High Fidelity Simulation and Nursing Student Satisfaction

Today’s nursing student has a variety of different learning methods; many expect technology driven education. High fidelity simulation (HFS) is a high technology learning tool that can simulate the patient experience in the learning environment. In their review of the literature, Fountain and Alfred (2009) found that educators are seeking innovative methods of teaching to help nursing students develop critical thinking skills required for holistic nursing.

The purpose of this study was to determine if learning styles influenced student’s satisfaction while using HFS. The framework used for this study is the theory of multiple intelligence learning. This theory identified multiple methods of learning such as linguistic, mathematical, spatial, kinesthetic, interpersonal, and intrapersonal intelligence (Fountain & Alfred, 2009).

The study used a convenience sample of 104 senior baccalaureate students who were completing their advanced medical-surgical course from three university campuses. All students had prior learning experience with HFS from earlier in the year. All three campuses had instructors who were trained in HFS and debriefing, and all ran the same cardiac case scenarios (Fountain & Alfred, 2009).

Prior to the simulation lab experience, the medical-surgical instructors lectured the students regarding acute coronary syndrome and dysrhythmias. The students were
given five common cardiac case studies and were told to complete them before their scheduled lab time (Fountain & Alfred, 2009).

The students were divided into groups of four or five and scheduled for a three hour simulation lab experience. The first 90 minutes of the simulation lab experience was used as a review for the different cardiac rhythms and pharmacology. During the last 90 minutes the students used HFS under the direction of the clinical instructors for the advanced medical-surgical course to apply the content they had recently learned. Upon completion of the lab, the students were asked to complete the Student Satisfaction and Self-Confidence in Learning Scale (Fountain & Alfred, 2009).

The Student Satisfaction and Self-Confidence in Learning Scale was developed by the National League for Nursing and was specifically used to measure a student’s satisfaction using HFS. The 13-item instrument was answered using a five point Likert-type scale. The satisfaction subscale consisted of five items that were added to measure satisfaction of HFS. The scale’s reported reliability using Cronbach’s alpha was (satisfaction=0.94 and self-confidence=0.87). In this study Cronbach’s alpha measured 0.91 for satisfaction and 0.84 for self-confidence. The scale was used in correlation with the entrance exam that was required of all nursing students at the three locations (Fountain & Alfred, 2009).

The data was analyzed using SPSS 14.0 in providing statistics, test of means, and correlations. The data was analyzed using six different learning styles (auditory, visual, social, solitary, oral dependent, writing dependent) and student satisfaction. The data was also used to compare the three different campuses to check for any significant variations between them. From the student population (n=78) 75% completed the form. From these
students 77% were identified as social learners; which highly correlated with student satisfaction \( (r=.29, p=.01) \). The other learning style that was highly correlated was solitary learning \( (r=.23, p=.04) \) (Fountain & Alfred, 2009).

There were no statistically significant differences among the three campuses. On the larger campus, the mean satisfaction score was 22. Mean satisfaction scores from the other two campuses were 22 and 24 \( (F = 2.7; df 2.75; p = .071) \) (Fountain & Alfred, 2009).

It is important for the student to be satisfied with the learning experience, because it increases the student’s opportunity for success. The students’ satisfaction using HFS was strong regardless of the two strongest learning methods; solitary or social. According to Fountain and Alfred (2009), the benefits of social learning included comparing, listening, networking, and interacting with others; HFS allowed the social learner to learn from others through discussion and problem solving. The benefits of solitary learning included self-reflection, watching others, and completing self-paced projects. The researchers concluded that small groups using HFS offered a safe environment that nurtured discussion, feedback, learning, and reflective evaluation; offering a role for the participant and the observer. HFS allowed the instructor to fully engage the students during experiential learning regardless of the student’s preferred method of learning.

Nursing, as it continues to evolve, continues to be more focused on quality outcomes relating to patient care. The profession is also driven by evidence-based practice. Nurses must have the knowledge, competency, and critical thinking skills to work in the technologically advanced clinical setting. Therefore, clinical instructors must
ensure that nursing education promotes knowledge and skill acquisition in a research-based practical setting. Educators are continually challenged to implement new teaching strategies to help students develop research-based skills in an environment that promotes satisfaction and self-efficacy. Recent literature suggested the use of high fidelity simulation (HFS) to promote a more realistic method of learning for patient-centered care. Because HFS is relatively new, limited research existed to support its use. The purpose of this study was to identify the elements that contributed to nursing satisfaction and self-efficacy when using HFS (Smith, 2008).

This study used the Nursing Education Simulation Framework (NESF) developed by Jeffries. The NESF allowed the researcher to evaluate four factors of simulation (student, teacher, educational practices, and design characteristics) and five outcomes (learning, skill performance, learner satisfaction, critical thinking, and self-confidence). The study focused on three objectives: to determine if there was a correlation between two of the outcomes (student satisfaction and self-efficacy) with the five simulation design factors (objectives, support, problem solving, guided reflection, and fidelity), to see if a relationship existed between the two outcomes and the demographic characteristics; and to see if there were differences in the outcomes if the student’s role in the scenario was different (participant or observer) (Smith, 2008).

The researcher used a nonprobability convenience sampling and included all junior level baccalaureate nursing students enrolled in a medical/surgical nursing course at a public western college. To be included in the study, students had to provide written consent. Of the eligible students (n=72), 68 students participated in the study. Although some of the students were in their second semester (n=35, 51.5%) and the others were in
their third semester (n=33, 48.5%), all students were enrolled in their first medical/surgical course. The population consisted mostly of female students (89.7%) with an average age of 23.4 years (SD=5.4). A majority (69.1%) of the students had no healthcare experience and almost half (47.1%) had no experience with HFS (Smith, 2008).

Two instruments developed by the National League for Nursing were used in this study; the Student Satisfaction and Self-Confidence in Learning Scale and the Simulation Design Scale. The Student Satisfaction and Self-Confidence in Learning Scale contained 13 self-reported items that were measured on a 5 point Likert-type scale that ranged from “strongly disagree” to “strongly agree.” Content validity had been reviewed by 10 medical/surgical nursing experts. A Cronbach’s alpha measuring internal consistency for the Satisfaction subscale, consisting of five items, was stated to be 0.94 indicating a strong reliability. For the Self-Confidence subscale, consisting of eight items, was stated to be 0.87, indicating moderate to strong reliability. The Simulation Design Scale consisted of 20 items that were measured on a 5 point Likert-type scale and evaluated five design features (objectives, support, problem solving, feedback, and fidelity). Students self-reported their perception of the five design features and then rated the importance of each. Content validity had been reviewed by 10 simulation experts. Cronbach’s alpha was reported to be 0.92 indicating a strong reliability in terms of internal consistency for the presence of the features (Smith, 2008).

To help randomize the assignments into groups of three or four, the students were allowed to self-register for the different sessions. When they reported for their scheduled time, the students were all oriented to the HFS and facilities. Each scenario was
scheduled for 20 minutes, followed by a 20 minute debriefing. The students were randomly assigned to two roles; nursing student or observer. All students were given a description of their role and a brief explanation of each role. To begin the scenario, the students were given a verbal report and patient chart. They were to conduct a full assessment and administer the 0800 medications. During the scenario, the students were to respond appropriately to verbal cues of shortness of breath, provided by the HFS. The scenario ended when the students completed all objectives or when the scenario progressed to 20 minutes. Only one group had to be stopped at 20 minutes, all other groups (n=17) completed the scenario in 15-20 minutes. After the scenario, all students participated in the instructor-led debriefing, and then completed the two instruments (Smith, 2008).

There were six questions posed by the researcher. The first question related to the students’ satisfaction with the HFS scenario. Score for the Satisfaction subscale ranged from 2 to 5 with a mean score of 4.5 (SD=0.49), indicating that the students were highly satisfied with this teaching method. Since the students were in two different semesters, a Mann-Whitney U was conducted to see if any statistical difference existed between the two semesters. The second semester averaged 4.51 (SD=0.41) and the third semester averaged 4.46 (SD=0.57). The difference was not found to be significant (alpha=0.05, z=0.13, p=0.990) (Smith, 2008).

The second question related to the self-reported effect the HFS scenario had on self-efficacy based on the Self-Confidence subscale. Score for the Self-Confidence subscale ranged from 1 to 5 with a mean score of 4.2 (SD=0.44), indicating that they felt confident in their ability to care for this patient. Since the students were in two different
semesters, a Mann-Whitney U was conducted to see if any statistical difference existed between the two semesters. The second semester averaged 4.3 (SD=0.40) and the third semester averaged 4.2 (SD=0.45). The difference was not found to be significant (alpha=0.05, z=1.393, p=0.164) (Smith, 2008).

The third question related to the five design features (objectives, support, problem solving, feedback, and fidelity). Guided Reflection had the highest mean score of 4.8 (SD=0.41) followed by Support (4.6, SD=0.46), Problem Solving (4.6, SD=0.42), Fidelity (4.6, SD=0.62), and Objectives (4.4, SD=0.53). Since the students were in two different semesters, a Mann-Whitney U was conducted to see if any statistical difference existed between the two semesters; there were no significant differences found (Smith, 2008).

The fourth question explored if a correlation existed between the perceived presence of the design characteristics and reports of satisfaction and self-efficacy. A Spearman’s rho was used to provide information relating to the strength and degree of the relationships between the variables. To denote a potential relationship between two variables, the score must be greater than 0.7. No significant relationship was found between the two outcomes (Satisfaction/Self-Confidence) and the design subscale; Objectives (0.614/0.573), Support (0.511/0.508), Problem Solving (0.547/0.558), Guided Reflection (0.452, 0.447), Fidelity (0.455/0.430). No significant differences were noted between the students in the different semesters (Smith, 2008).

The fifth question explored if a correlation existed between the demographic characteristics and report of satisfaction and self-efficacy. A Spearman’s rho correlation was used for this question. No significant relationship existed between any of the
demographic characteristics and the two outcomes (Satisfaction/Self-Confidence), Age (-0.104/-0.235), Gender (0.072/0.047), Previous Degree (-0.014/0.032), Health Care Experience (0.025/-0.051), Experience with Respiratory Disease Client (0.063/0.106), Simulation Experience (-0.037/0.047). No significant differences were noted between the students in different semesters (Smith, 2008).

Question six related to differences in reported level of satisfaction and self-efficacy in nursing students compared to their roles; nursing student or observer. A Mann-Whitney U was conducted for this question. The mean satisfaction score for the student who had the role of the nursing student was 4.46 (SD=0.55); slightly lower than the observer’s score of 4.52 (SD=0.41). The difference between the two scores was not statistically significant (z=0.221, p=0.825). The mean self-efficacy score for the student who had the role of the nursing student was 4.2 (SD=0.41); slightly lower than the observers score of 4.3 (SD=0.45). The difference between the two scores was not statistically significant (z=0.148, p=0.882) (Smith, 2008).

The results of this study indicated that the students were overall satisfied and confident with the HFS regardless of their semester or demographic data. This study supported the previous research of student satisfaction and self-confidence of using HFS as a method of learning. The researcher concluded that with HFS, instructors can use sophisticated equipment to replicate the complicated clinical setting allowing students to use knowledge, competency, and critical thinking skills in a safe learning environment (Smith, 2008).

This study was limited by a small sample size and lack of diversity among the participants. The study was also limited to one part of the country with students who had
only one patient diagnosis and one experience with HFS. Smith (2008) suggested future studies include larger population sizes comparing different simulation manikins (static, intermediate-level) with varying diagnoses. Future studies could also include more diversity among the students from different parts of the country. Additionally, this study addressed only two of the outcomes (Student Satisfaction and Self-Efficacy), future studies could focus on the other three outcomes (knowledge, performance, and critical thinking).

High fidelity simulation (HFS) allows students to become more engaged in their surroundings which may stimulate learning. HFS has been shown to build self-confidence in nursing students; dealing with patient care in a safe, learning environment. Through HFS, students may gain knowledge while helping to potentially develop their critical thinking skills. Students may practice an assessment and then act upon their findings; while engaging in an interactive environment (Guhde, 2011).

When simulation in nursing programs began, the nurse educator relied on simple scenarios to guide education, but as simulation becomes more common in nursing education, scenarios have become more involved. This evolution of high fidelity leads instructors to ask if both simple and complex scenarios have value. Simple scenarios require students to work independently which leads to self-reflection. With complex scenarios, students may learn from each other and act as a team (Guhde, 2011).

This purpose of this pilot study was to evaluate the students’ perception of selected scenarios to see if critical thinking, assessment, and satisfaction was better with complex or simple scenarios. For the framework of this study the researcher used the nursing education simulation framework developed by Jeffries (Guhde, 2011).
The students (n=134) in this study were in a medical-surgical course rotation; enrolled in their junior year of a baccalaureate program. The medical-surgical rotation was a 7.5 week course that included weekly four hour lectures, two hour lab experiences, and 12 hour clinical experiences; the lab experiences included four hours of simulation. The simple scenarios were task related, such as a blood transfusion reaction. These simple scenarios were designed more for the individual; not a group design. In the complex designs, the scenarios required team participation. The simple scenarios had simple solutions; whereas the complex scenarios required more involved solutions. Each of the four simple scenarios lasted 30 minutes (total of two hours), while the two complex scenario lasted one hour each (total of two hours). For the first four weeks, the students participated in the simple scenarios. For the last two weeks, the students participated in the complex scenarios for a total of six weeks. For the simple scenarios, students were able to assess the high fidelity patient simulator in groups of four or five, but acted independently. The simulator was set according to particular criteria to match a case study given to each student. After the assessment, the students were asked to complete three questions in which they had to answer what they would do first, problems identified, and the appropriate nursing actions. The students then selected a partner to give a nurse to doctor report. Following the assignment, the instructors led the students through a 10 minute debriefing (Guhde, 2011).

The complex scenarios were more involved and focused on teamwork. The patient in the first scenario was a post-operative gastric bypass patient who became hypovolemic and suffered an asthma attack. The second scenario involved a patient who was post-operative hip surgery, who overdosed on his patient controlled analgesia and
suffered renal failure as a result. In these scenarios, five student roles were available; primary nurse, secondary nurse, nurse aide, family member, and respiratory therapist. Each student was provided instructions on their specific roles, and the instructor played any other role that was needed by phone. Five additional students observed the other students in their roles, and were given specific areas of focus. The simulator was programmed to act according to the assessment and actions of the students (Guhde, 2011).

The instrument used in this study was derived from the framework and consisted of a 5-point Likert-type scale. The students were asked to evaluate: the use of critical thinking skills to analyze the patient’s condition, the awareness of the importance of assessment, and if the assignment was a good learning exercise. The students completed a total of three surveys (one for the simple and one for each of the complex scenarios) (Guhde, 2011).

In this study, three variables were analyzed; thinking, assessment, and satisfaction. All six scenarios rated highly among the students for each variable. For the four simple scenarios, the means were high for each variable (thinking, 4.63 SD=0.5; assessment, 4.69 SD=0.57; satisfaction, 4.68 SD=0.57). The complex scenarios also rated highly for each variable (Bariatric: thinking, 4.73 SD=0.54; assessment, 4.78 SD=0.44; satisfaction, 4.78 SD=0.50), variable (Overdose: thinking, 4.71 SD=0.49; assessment, 4.78 SD=0.43; satisfaction, 4.75 SD=0.53). The total mean was 14.20 (SD=1.34); no variable rated <4.63 on a 5-point scale. The complex scenarios had higher means on all three variables compared to the simple scenarios. The variables were tested in
combination and individually using univariate analysis of variance. No significant
difference was found (p >0.05) (Guhde, 2011).

The qualitative comments were analyzed for a recurring theme. The students
found the various roles of the nurse (such as calling the physician) to be most meaningful
in the simple scenarios. For the more complex scenarios, the students noted that the other
roles helped foster communication and delegation. In all of the scenarios, the students
had an increased awareness for the importance of assessment and critical thinking. The
students felt that simulation should be included in all courses (Guhde, 2011).

Students found both assignments beneficial and contributed to the learning
process. Additionally, no significance was found between the variables of any of the
scenarios. Students found the simple scenarios to be beneficial so that every student could
experience the role of the primary nurse and make clinical decisions. The researchers
found that it was beneficial for the students not to discuss any findings in the simple
scenarios, allowing for each student to draw their own conclusions. The debriefings were
helpful to allow discussion and clarification of the concepts with the participants. The
complex scenarios allowed the students to experience other roles, while allowing
teamwork and delegation. The group was able to interact with both passive and disruptive
family members as the scenario allowed (Guhde, 2011).

The researchers concluded that both sets (simple and complex) of scenarios are
just as beneficial as the other. Limitations for the simple scenario included the limited
role of the primary nurse (delegating and teamwork). A limitation for the complex
scenarios was that not all participants experienced the primary nurse role. Another
limitation of this study was that all scenarios had to take place within the 7.5 week
timeframe while the instructors wished to have more time to space out the scenarios. The HFS scenarios ran concurrently with actual clinical time, where students may have learned from the clinical environment and not just the lab experience. One final limitation was that the data was self-reported, and, possibility, not representative of cognitive or behavioral changes (Guhde, 2011).

The researcher suggested, for future studies, to evaluate whether HFS complexity was appropriate for various students at different levels of their careers. Future studies could also base research on cognitive or behavioral changes instead of perceptions of experience (Guhde, 2011).

In conclusion, the outcome of this study suggested that students can learn from various complexities of simulation. By using a combination of scenarios, students may have the ability to experience many different roles; whereby, strengthening the learning process. HFS gave the student the opportunity to experience a more realistic opportunity; providing a better realization of the clinical environment (Guhde, 2011).

High Fidelity Simulation and Nursing Student Self-Confidence

Nurses in the clinical setting are faced with challenges where split decisions must be made effectively. To do this, nurses must have the self-confidence from past experiences. Nursing students need to have the opportunity to be faced with quick clinical decisions, but practice in a safe, learning environment. High fidelity simulation (HFS) offers the opportunity for a realistic, clinical setting where students can make decisions without the potential for patient harm (Bambini, Washburn, & Perkins, 2009).

Self-efficacy helps determine whether the individual feels they are capable of accomplishing a task. The higher the individual’s perception of self-efficacy, the higher
the goals they set for themselves. With greater perceived self-efficacy, an individual will have greater commitment and believe they can overcome barriers (Bambini et al., 2009).

The purpose of this study was to evaluate the effectiveness of using HFS as a teaching/learning method to increase the self-efficacy of nursing students. Bambini et al. (2009) developed three research questions; to evaluate whether simulation increases self-efficacy, to assess the students perception of simulation experience, and to understand what effect previous experience working with patients has on the student’s perceived level of clinical confidence.

This study, set in the mid-west, used a convenience sample of 112 first year baccalaureate nursing students over a four semester year; 224 students completed the rotation, but did not complete all the necessary requirements. Additionally, only 20 students completed the follow-up survey, so this data was not analyzed. Over half (57%) of the participants had previous healthcare experience and had a mean age of 24.85 years (SD=6.7) (Bambini et al., 2009).

The three instruments, used in the study, were surveys (pretest, posttest, follow-up) developed by the researchers. Each survey consisted of six questions that allowed the students to rate the simulation experience as a teaching method. The students could rate each question on a 10-point number scale ranging from “(1) not at all confident” to “(10) very confident”; higher scores denoted greater level of self-efficacy. Three open-ended questions were included on the posttest and follow-up surveys. A panel of obstetric nurses/educators served as experts to rate the content validity of the three surveys; Cronbach’s alpha (pretest, 0.817; posttest, 0.858) (Bambini et al., 2009).
Prior to the day at the simulation lab, the students were required to complete standard readings and video course work. As part of the undergraduate nursing requirements, all students were assigned a three-hour appointment in the simulation lab, but only those who wanted to participate in the research had to return the posttest. The students were given an overall explanation for the proceedings and then given time to complete the pre-survey. The lab time consisted of eight postpartum workstations that included low fidelity simulation (LFS) assessment, medium fidelity simulation (MFS) assessment with instructor input, HFS preparation, HFS, debriefing, newborn measurements and bathing, HFS baby assessment, and MFS fetal heart tones. The students rotated through the different workstations in groups of four (Bambini et al., 2009).

For the HFS workstation, the students performed an assessment for a postpartum patient; the scenario was designed for postpartum hemorrhage. The instructors watched from an adjacent room via closed-circuit television. Upon completion of the HFS scenario, students met with the instructors for debriefing. The instructors corrected any issue they witnessed, and allowed for any questions related to the care for the postpartum patient (Bambini et al., 2009).

Students rated self-efficacy on the pretests and posttests; a t-test was used to determine if there was a significant change between the two tests. The tests were evaluated using the Wilcoxon matched-pairs signed ranks test to determine changes in the levels of students’ self-efficacy when performing an assessment of the postpartum patient. Researchers used a comparison study similar of Glaser and Strauss to identify emerging themes from the open-ended questions (Bambini et al., 2009).
Results of the study showed a significant increase from pretest to posttest (pretest, N=112 Mean=28.6607 SD=7.7187; posttest, N=112 Mean=42.1429 SD=7.4542) (t=-20.878) where p<.01. The overall change in confidence in skills after simulation experience was measured in Mean Ranks (Negative=5, Positive=55.46, Test Statistic=2992.5, p<.001). Three themes emerged from the open-ended questions; communication (verbal and nonverbal), confidence, and clinical judgment. The students responded that they learned the importance of communication with the patient and the patient’s family. They felt more confident knowing what to expect and knowing how to work through potential issues. The students reported that they learned the importance of prioritizing a postpartum assessment; identifying abnormal findings, and how to intervene during an abnormal assessment (Bambini et al., 2009).

With the advancement of technology, nursing students have a better opportunity of experiencing realistic scenarios during skills practice. HFS allows the student to develop clinical judgment, without the fear of patient harm. The results of this study indicated that HFS allowed students to increase their confidence in performing clinical skills. HFS allowed the student to experience a variety of different scenarios and patient issues that the clinical environment may not allow. The researchers concluded that HFS could also be replicated for multiple students and practice; followed by a debriefing session where instructors facilitate learning through correction and student questions (Bambini et al., 2009).

One limitation of this study was that the students’ experiences may have differed from group to group depending upon the instructor’s input. The surveys were self-reported which may have varied reliability. For future studies, the author suggested
research to evaluate the prioritization and provision of safe patient care. The researcher also suggested future studies to evaluate the application of theoretical knowledge to the contextual experience (Bambini et al., 2009).

Nurse educators are tasked with creating a learning environment that helps develop critical thinking skills in new nurses. Educators are unable to replicate all potential circumstances students may encounter as future nurses. High fidelity simulation (HFS) has been shown to be a teaching strategy that helps replicate a more realistic patient experience. It has been shown to more fully engage the nursing students in a safe, learning environment while increasing their confidence and decision making ability (Kaddoura, 2010).

The purpose of this study was to evaluate the perception of newly graduated nurses’ when using HFS to develop critical thinking, learning, and confidence. This study used a convenience sample of 10 newly graduated nurses who were being trained to work in a critical care setting. These new nurses were asked to participate because they were the most recent graduates to begin their careers in the study’s chosen New England hospital. The participants ranged from 22 to 32 years old with an average age of 25 (SD=3.94). All graduates were English speaking women, with a majority (90%) being white Americans. One participant was of Hispanic descent (Kaddoura, 2010).

The critical care training lasted six months, in that time the 10 participants were instructed using HFS for one 8 hour day every 3 weeks; for a total of 8 days. The participants practiced realistic scenarios, developed by the researchers, using HFS in a non-threatening learning environment, before they were allowed any patient care experience. The scenarios included cardiac defibrillation, cardioversion, hemothorax,
pneumothorax, and other low-volume, high-risk scenarios. Following the simulations, the students participated in an instructor-led debriefing. Upon completion of their training, the participants participated in a recorded semi-structured, private interview. The interview was audio taped and transcribed (Kaddoura, 2010).

The data from the interviews was gathered and analyzed to evaluate any common themes. Three common themes emerged. The first theme, “just-in-time learning of cognitive and psychomotor skills,” described how the simulated scenarios resembled realistic patient care in an interactive learning environment that enhanced critical care knowledge and critical thinking. Thus, the more realistic the scenario, the better chance the nurse had to use critical thinking for nursing interventions. The simulations allowed the participants to think more holistically about the patient and helped bridge the gap from theory to practice (Kaddoura, 2010).

The second theme, “fostering critical thinking and leadership skills through feedback on simulation,” described how the immediate feedback the participants received helped sharpen their skills through video playback and debriefing. The scenarios allowed the participants to work as a group through teamwork, cooperation, and delegation (Kaddoura, 2010).

The third theme, “safety in a nonthreatening learning environment,” described how the nurses felt safe in the learning environment where no patients could be harmed. This established confidence among the participants, because they were able to practice their skills, without the fear of making mistakes. The nurses felt that if they had the same situation in the clinical environment, they would be more confident having experienced it
before with HFS. The participants stated that the scenarios helped them work through stressful situations allowing for better stress management (Kaddoura, 2010).

The results of this study suggested that using HFS helped recent graduate nurses gain clinical knowledge, practice critical care skills, and develop critical thinking skills. Immediate feedback from the instructor and fellow nurses allowed the participants to learn from their mistakes while enhancing critical thinking skills. HFS helped the participants bridge the gap between theory and practice. The nurses learned proper techniques for critical care and identified opportunities for improvement. The participants practiced in a safe, learning environment reducing anxiety which allowed critical thinking and problem solving without patient harm (Kaddoura, 2010).

One limitation of the study related to the small population size (n=10), from one hospital setting. The small sample size may have limited generalizability to the larger nursing population. The researcher recommended further HFS studies to validate it as a teaching-learning strategy to evaluate the impact of nurses’ learning. Another recommendation for research was the replication of this study methodology with a greater sample size and male/female mix. Future studies could also include the use of quantitative measurements to quantify nurses’ confidence and critical thinking skills using HFS (Kaddoura, 2010).

Interdisciplinary learning in health care education is commonly thought to be fundamental, though little research exists which identifies the assumed positive outcomes. Creative teaching methods using the use of high fidelity simulation (HFS) in healthcare education; nursing, medical, and/or interdisciplinary are needed to support
collaboration. Reese, Jeffries, and Engum (2010) explored the effects of clinical simulation to develop nursing and medical student collaboration.

The purpose of this study was to illustrate the use of HFS to support collaboration between nursing and medical students in an education setting. The researchers posed five questions. Questions focused on students’ perceptions of the educational practices used in the simulation, students’ self-confidence in caring for a surgical patient, students’ satisfaction with simulation as an instructional method, students’ perceptions of the nursing and medical student collaboration, and investigating differences in the perceptions of educational practices between the nursing and medical students. The theoretical framework for this study was the Nursing Education Simulation Framework (NESF) developed by Jeffries (Reese et al., 2010).

The population consisted of senior-level baccalaureate nursing students and third-year medical students from a large Midwestern university. The sample consisted of 15 third-year advanced cardiac life support (ACLS) certified medical students and 13 senior nursing students all who had completed didactic and clinical instruction caring for postsurgical and cardiac patients. Evenly divided between male and female the ages of the participants varied, 29% were between the ages 18 and 24; 43% were between the ages of 25 and 30; 11% were between the ages of 31 and 36; and 18% were over the age of 37. A liberal mix of participants included 79% Caucasian, 11% Asian, 4% African American, and 4% Latino. At 61% those participants with very little experience with simulation learning outweighed the 18% which indicated no previous experience with simulation learning (Reese et al., 2010).
The features of the simulation design, student satisfaction, and self-confidence were measured. A 20 item Simulation Design Scale (SDS) with five subscales designed as a five-point Likert-type scale was developed from Jefferies’s earlier research with scores ranging from 1 (strongly disagree) to 5 (strongly agree). Based on Cronbach's alpha reliability coefficient, reliability for this instrument based on previous studies is 0.92. A Satisfaction and Self-Confidence Scale was also used in the study. This scale was used to measure the student’s self-confidence when taking care of a post-operative patient with dysrhythmias. Reliability of this instrument based on previous study was 0.87. To measure collaboration, a 12-item collaboration scale was used. This scale was based upon literature review and clinical expectations. To establish validity of the content, the scale was reviewed by experts from both medical and nursing education. Cronbach's alpha was used to measure internal consistency reliability and factor analysis was used to measure evidence of construct validity. Included in the collaboration scale were three open-ended questions analyzed using qualitative methods (Reese et al., 2010).

For each simulation scenario, a nursing student was paired with a medical student. Two students, one from each discipline, observed each scenario in an adjacent room using closed circuit television. Each pair of students received didactic and clinical education before the simulation. Following a review, the nursing student received a recorded report on the patient; the medical student received a verbal report on five individual patients from an off-going physician. The scenario was scheduled for 20 minutes and began with a full head to toe assessment by the nursing student. The scenario progressed to where the patient complained of midsternal chest pain and the cardiac monitor showed premature ventricular contractions (PVC). The nursing student was then
to collaborate with the medical student for diagnosis and intervention. Following the simulation, a 20 minute debriefing session was held with the participants and observers. The students received feedback on their performance. At the conclusion of the debriefing, the students completed the post-simulation survey instruments (Reese et al., 2010).

Results yielded that independent problem solving was facilitated ($M = 4.44$); the simulation was at an appropriate level of difficulty ($M = 4.46$); constructive feedback was provided ($M = 4.70$); and the feedback was provided in a timely manner ($M = 3.48$). Student ratings for overall self-confidence was high with an overall mean score of 4.09; student satisfaction of the collaborative simulation were high was an overall mean score of 4.336; and student response to the newly developed collaboration scale was high with a mean score of 4.4. Results also yielded no significant differences between nursing and medical students' perceptions of the simulation's educational practices, self-confidence, and satisfaction with the collaborative aspects of the simulation. Overall, the participants’ responses were positive supporting the use of clinical simulation as a method for providing clinical experience. The most important simulation design features were feedback and guided reflection which reinforced that it was pivotal in simulation development to ensure debriefing occurs immediately following the simulation and that there is adequate time for debriefing (Reese et al., 2010).

The overall results of this study yielded evidential support for interdisciplinary learning, the use of clinical simulation educational methods, and the viability of the Nursing Education Simulation Framework in designing high fidelity clinical simulations. Most students felt that interdisciplinary scenarios strengthened the practical aspect of simulation and would lead to greater collaboration among disciplines; while reducing
errors in the clinical setting. The researchers concluded that simulation could be used to help students, problem solve and put theory into practice (Reese et al., 2010).

Summary

Nursing educators are tasked with finding teaching strategies that will allow the students to take the knowledge gained in the classroom and apply it to the clinical setting. High fidelity simulation (HFS) gives instructors the opportunity to replicate realistic patient scenarios where students can practice what they have learned without the fear of real patient harm. HFS has been shown to lead to positive outcomes, but little is known about the factors that lead to the outcomes. The purpose of this study is to examine the factors that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. This is a replication of Smith and Roehrs (2009) study. The framework for this study was developed by Jeffries (2005) and is called the Nursing Education Simulation Framework (NEFS).

Jeffries’ (2005, 2007) framework, NEFS, is a tool to guide the instructor in designing, implementing, and evaluating simulation. The model consists of five major components: teacher, student, educational practices, design characteristics, and outcomes. Five variables are listed under the component of outcomes: learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence. Learner satisfaction can be measured through quantitative and qualitative measures. Satisfaction has been shown to be high among participants. By using classroom based knowledge, students apply critical thinking with the simulated patient. By increasing in skill performance when using simulation, students are more confident in themselves through critical thinking and problem solving.
The review of the literature was divided into three sections. The first section included studies that evaluated high fidelity simulation and students’ perceptions. The second section included studies that evaluated high fidelity simulation and nursing student satisfaction. The third section included studies that evaluated high fidelity simulation and nursing student self-confidence.

**High Fidelity Simulation**

Hoadley (2009) sought to determine the ACLS participant’s satisfaction level using high fidelity simulation and test whether the participant tested higher, cognitively and behaviorally, compared to ACLS participants who used low fidelity simulation. This study did not show any statistical differences between the group using low fidelity simulation or high fidelity simulation. Since, ACLS knowledge is acquired through both didactic and experiential learning, the learner must practice using algorithms and critical thinking. Using simulation technology allows feedback from the manikin, therefore, allowing the scenario to be more realistic. Hoadley recommended for further study, that researchers use the methodology of this study, but not debrief until after the data has been collected. Learning ACLS using high fidelity simulation did not support the anticipated hypotheses of better knowledge, skills, satisfaction, or self-confidence.

Decker (2007) examined the relationship between simulation and critical, reflective thinking among senior nursing students. This qualitative study, evaluated the thought methods of nursing students before and during a simulation exercise. A connection between theoretical knowledge (application of theory), skills competency, experiential knowledge, and mindset was found during the analysis of the data. Decker found that simulation was a useful tool for students to allow students to use critical
thinking and self-reflection. The participant can use the experiential knowledge gained from the simulation experience and apply it to the clinical setting. The students who used critical thinking demonstrated competency with clinical skills, therefore they had higher self-confidence. The researchers concluded future studies should evaluate high fidelity simulation as a learning methodology; fully integrated into the curriculum.

Using a quasi-experimental design, King and Reising (2011) evaluated the effectiveness of teaching ACLS using high fidelity simulation. The study found that high fidelity simulation was equally effective in learning outcomes compared to low fidelity simulation when teaching ACLS. According to this research study, HFS may have been more effective at teaching the mega-code skill performance needed for ACLS. The researchers concluded HFS may be a more effective means for teaching ACLS because it incorporates audio, visual, and tactile methods. Additional studies could compare the efficacy of using HFS to teach ACLS comparing senior nursing students and new nurses.

Using qualitative and quantitative methods, Wotton et al. (2010) analyzed the perceptions of upper classmen nursing students to the implementation of three high fidelity simulations into an established clinical course. The study found that the students enjoyed the challenge and complexity simulation brought to the skills lab. The researchers felt that the feedback gained from the students was well worth the trouble of simulation. Students felt that the knowledge gained from working with simulation would translate to the clinical setting. The authors believed that debriefing was integral to the simulation experience, because they identified and corrected actions immediately after they happened. The researchers felt that the use of high fidelity simulation was a complement to classroom learning.
Kameg et al. (2010) evaluated the self-efficacy of senior level nursing students’ communication skills as they related to the patient with a mental illness. The study used two delivery methods of teaching, traditional lecture and high fidelity simulation. The study showed that high fidelity simulation increased self-efficacy in communication. The students learned how to communicate as a team and responded positively to the learning experience. The researchers suggested that further studies include the use of non-therapeutic and therapeutic communication techniques to better understand how student outcomes using HFHS correlates with therapeutic communication.

Maxson et al. (2011) used Team STEPPS as a framework to analyze how high fidelity simulation can be used for collaboration between physicians and nurses. Outcomes of this study suggested better collaboration, teamwork, and communication between nurses and physicians through team building exercises using high fidelity simulation. Results of this study suggested that neither nurses nor physicians are satisfied with the current methods of communication and puts the patient at risk for adverse outcomes. A secondary outcome from this study was a better understanding about the challenges that the other discipline faces. Each discipline had a desire to improve effective communication in the future. Practice using high fidelity simulation suggests better safety outcomes and team performance. Maxson suggests that future studies include randomization of staff or using high fidelity simulation as a comparison versus other problem-based learning.

*High-Fidelity Simulation and Nursing Student Satisfaction*

Fountain and Alfred (2009) explored the relationship between different learning styles and student satisfaction when using high fidelity simulation. This study found that
students have a greater opportunity for success if they are satisfied with the learning method. The study found that most students could be classified in one of two categories of learning: social or solitary. High fidelity simulation was a good learning tool for both types of students. Those who were social gain from the experience of team interactions, while those who were solitary gained from the experience of performing tasks, self-reflection, or watching others. High fidelity simulation allowed the instructor to engage all students regardless of their preferred learning methods.

Using the Nursing Education Simulation Framework developed by Jeffries (2005), Smith (2008) focused on three objectives to determine if there was a correlation between two of the outcomes (student satisfaction and self-efficacy) with the five simulation design factors (objectives, support, problem solving, guided reflection, and fidelity), to see if a relationship existed between the two outcomes and the demographic characteristics; and to see if there were differences in the outcomes if the student’s role in the scenario was different (participant or observer). The results of this study indicated that the students were overall satisfied and confident with the HFS. This study supported the previous research of student satisfaction and self-confidence of using HFS as a method of learning. The researcher concluded that with HFS, instructors can use sophisticated equipment to replicate the complicated clinical setting allowing students to use knowledge, competency, and critical thinking skills in a safe learning environment. Smith suggested that future studies have a larger, more diverse population. Additionally, future studies could also include the other three outcomes: knowledge, performance, and critical thinking.
Guhde (2011) evaluated the perception of students using high fidelity simulation scenarios to see if critical thinking, assessment, and satisfaction were better with complex or simple scenarios. Through qualitative means, students found both assignments to be beneficial. No significant differences were found between the variables. Students found the simple scenarios to be beneficial because every student had the opportunity to be the primary nurse and draw their own conclusions. The more complex scenarios allowed students to collaborate as a team and experience other roles. For future studies, Guhde suggested varying degrees of complexity for simulation for different students at different levels. Future studies could also base research on cognitive or behavioral changes instead of perceptions of experience. Students found satisfaction through the different complexities of simulation.

*High-Fidelity Simulation and Nursing Student Self-Confidence*

Bambini et al. (2009) evaluated the effectiveness of using high fidelity simulation as a teaching/learning method to increase the self-efficacy of nursing students, understanding that with greater perceived self-efficacy, an individual will have greater commitment and believe they can overcome barriers. The results of this study indicated that high fidelity simulation allowed the students to increase their confidence in performing clinical skills. With high fidelity simulation, students were able to practice multiple scenarios that otherwise may not exist in the clinical setting, whereby increasing their self-efficacy. The authors recommended that future studies evaluate prioritization and provision of safe patient care. They also suggested studies to evaluate the application of theoretical knowledge to contextual experience.
Kaddoura (2010) evaluated the perception of newly graduated nurses when using high fidelity simulation to develop critical thinking, learning, and confidence. The results of this study suggested that using high fidelity simulation helped nurses gain clinical knowledge, practice critical care skills, and develop critical thinking skills. High fidelity simulation helped bridge the gap between theory and practice. The nurses were able to practice proper techniques and received immediate feedback without the fear of patient harm. For future studies, Kaddoura suggested that high fidelity simulation be evaluated as a teaching/learning strategy to analyze the impact of nurses’ learning.

Reese et al. (2010) illustrated the use of high fidelity simulation to support collaboration between nursing and medical students in an education setting. The results of this study supported the use of high fidelity simulation for interdisciplinary learning and validated the use of the Nursing Education Simulation Framework developed by Jeffries. Students felt that the interdisciplinary scenarios strengthened the practical aspect of simulation and would lead to greater collaboration among disciplines while reducing errors in the clinical setting. The researchers concluded that simulation could be used to help students, problem solve and put theory into practice.
Chapter III

Methodology

Introduction

High fidelity simulation (HFS) continues to gain popularity as a teaching strategy for nursing education due to the realistic, interactive patient simulators. Nursing educators can reproduce patient scenarios for student practice in a safe, learning environment. Studies show that using HFS provides a positive outcome for students, but little is understood about the factors that lead to the positive outcomes (Smith & Roehrs, 2009). This is a replication of the study conducted by Smith and Roehrs to examine the factors that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. This chapter defines the research questions, population, sample, setting, methodology, and procedures developed for this study.

Research Questions

1. How satisfied are Bachelor of Science (BSN) nursing students with an HFS scenario experience?

2. What is the self-reported effect of an HFS scenario experience on BSN student self-confidence?
3. How do BSN nursing students evaluate an HFS scenario experience in terms of how well five simulation design characteristics are present in the experience?

4. Is there any correlation between the perceived presence of design characteristics and reports of satisfaction and self-confidence of BSN nursing students who take part in an HFS experience?

5. Is there any correlation between demographic characteristics of BSN nursing students and reports of satisfaction and self-confidence after an HFS experience?

Population, Sample, and Setting

The population for this study will include a convenience sample of junior level BSN students (N = 75) enrolled in a large Midwestern university. The students will be in their first medical-surgical rotation.

Protection of Human Subjects

Appropriate approvals will be acquired from the Ball State University Institutional Review Board and the participating university’s review board, prior to the start of this study. Ethical standards will be maintained throughout the course of this study. All participation will be voluntary and will not affect the grades of the participating students. Informed consents will be obtained from each participant. Students may withdraw consent at any time throughout the study. All documents will be coded to assure confidentiality.
**Procedures**

After Ball State University’s Institutional Review Board approves of the study, the participating university will be contacted by the researcher and the study will be explained. After the university’s institutional review board approves of the study, the researcher will meet with the faculty who will facilitate the scheduling of the participants. The participants will have received seven weeks (56 hours) of didactic skills laboratory, and will have been introduced to a variety of different skills including caring for the patient with respiratory disease. The participants will have practiced with high fidelity simulation. The students will participate in groups of four. Two students will assume the role of the nurse, and two students will observe. The high fidelity simulator will be used as the patient and will be controlled from a remote location by a trained instructor.

The two students in the role of the nurses will complete a head to toe assessment of an elderly female diagnosed with exacerbated chronic obstructed pulmonary disease. Following the assessment, the two nurses will give medicines as ordered. The patient’s status will deteriorate into respiratory distress, and the nurses will need to act accordingly. The two observers will be provided clipboards to note their observations. The scenario will conclude when the patient returns to baseline or when 20 minutes has passed; whichever comes first. Following the scenario, the students will participate in a debriefing session; afterwards they will be given the opportunity to fill out the research study instruments.

**Design**

This study will use a descriptive, correlation design to measure two outcomes of the Nursing Education Simulation Framework; student satisfaction and self-confidence
Demographic characteristics and simulation design characteristics will be examined for correlation to the two outcomes. The demographic data will be self-reported by the participants using a researcher-designed demographic instrument.

**Instrumentation**

Two instruments, developed by the National League for Nursing, will be used for this research study; Student Satisfaction and Self-Confidence in Learning Scale and Simulation Design Scale. Content Validity of the instruments was established by a panel of 10 medical/surgical experts. Both instrument are self-reported and use a five point Likert-type scale. The Student Satisfaction and Self-Confidence in Learning Scale is a 13 item scale with a reported Cronbach’s alpha of 0.94 for the Satisfaction subscale and 0.87 for the Self-Confidence subscale. The 20 item Simulation Design Scale has a Cronbach’s alpha of 0.92 and consists of five subscales (Objectives, Support, Problem-Solving, Feedback, and Fidelity). A researcher-designed demographic tool will also be used.

**Intended Method for Data Analysis**

For each of the research questions, all data entries will be assessed for data entry errors or outliers. The descriptive statistical analysis (mean and standard deviation) will be used to measure the effects of the simulation experience on the two outcomes; student satisfaction and self-confidence. Additionally, the study will use bivariate statistics (Spearman’s rho) and multiple linear regression to test for significant statistical differences.

**Summary**

The design, methodology, and procedures are defined in this chapter. This is a replication of the study conducted by Smith and Roehrs (2009) to examine the factors
that correlate with two positive outcomes, satisfaction and self-confidence, when using high fidelity simulation. A descriptive, correlation design will be used to measure two outcomes of the Nursing Education Simulation Framework; student satisfaction and self-confidence. Data collection will be gathered from 75 junior level students enrolled in their first medical-surgical rotation at a large Midwestern university. Two instruments, developed by the National League for Nursing, will be used for this research study; Student Satisfaction and Self-Confidence in Learning Scale and Simulation Design Scale. The descriptive statistical analysis (mean and standard deviation) will be used to measure the effects of the simulation experience on the two outcomes; student satisfaction and self-confidence. Additionally, the study will use bivariate statistics (Spearman’s rho) and multiple linear regression to test for significant statistical differences.
References


