HIGH-FIDELITY NURSING SIMULATION AND THE IMPACT ON SELF-CONFIDENCE AND CLINICAL COMPETENCE OF SENIOR NURSING STUDENTS

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Abstract

RESEARCH PAPER: High-Fidelity Nursing Simulation and the Impact on Self-Confidence and Clinical Competence of Senior Nursing Students

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Expectations are high for the novice nurse to provide safe and competent care for patients. Nursing faculty are increasingly innovative with curriculum design to prepare entry-level nurses to meet the demands of the profession. Two factors that predict success in nursing practice are self-confidence and clinical competence (Blum, Borglund, & Parcells, 2010). This project is designed to examine the relationship between participation in high-fidelity simulation (HFS), self-confidence and clinical competence in clinical settings of senior nursing students. The target population will be senior nursing students enrolled in a Midwestern university Bachelor of Science in Nursing program. Evidence-based practices (EBP) will be applied to development of an HFS case scenario to enhance self-confidence and clinical competence. The theoretical framework for the project will be Tanner’s Clinical Judgment Model (Blum et al, 2010). Lasater’s Clinical Judgment Rubric (Blum et al., 2010), based on Tanner’s model, utilizes Likert-type scales to quantify faculty and student’s perceptions of self-confidence and clinical competence. Outcomes of this research will help nursing faculty better use HFS with senior students facilitating transition from student to confident, competent, novice nurses.
Chapter I

Introduction

High Fidelity Simulation (HFS) is becoming one of the most commonly applied teaching-learning methodologies in nursing education (Garrett, MacPhee, & Jackson, 2010). To effectively use HFS in nursing education, faculty must understand advantages of the methodology (Garrett et al., 2010).

HFS was first introduced to students in anesthesia medicine in 1969, using manikins to practice endotracheal intubation (Howard, 2010). Advancements in HFS and medical education were noted in 1988 with crisis management and technical skills (Howard, 2010). Although methods of HFS change with technological improvements, the benefit of using simulation in nursing education is clearly the ability to expose students to patient care situations in a safe environment (Tuoriniemi & Schott-Baer, 2008). More recently in 1999, the Institute of Medicine supported the use of HFS in education of nursing students addressing human error in health care and patient safety (Tuoriniemi & Schott-Baer, 2008).

Realistic, quality HFS in medical education comes with a price. Teaching with HFS in nursing education is time-consuming and labor-intensive (Tuoriniemi & Schott-Baer, 2008; Beyer, 2009). Tertiary faculties are needed including specially trained nursing faculty and technical support (Tuoriniemi & Schott-Baer, 2008). Initial and
maintenance costs of HFS laboratories can be estimated up to one million dollars (Tuoriniemi & Schott-Baer, 2008). Many healthcare education programs and patient care settings describe the use of HFS as an effective teaching strategy. Howard (2010) reported that students in undergraduate nursing programs responded positively to this methodology. Medical care facilities used HFS in new graduate orientation, aimed at reducing level of anxiety during critical emergencies (Howard, 2010). The National Council of State Boards of Nursing, faculty and students support HFS as an effective learning tool showing potential in fostering self-confidence and clinical competence (Cant & Cooper, 2009).

HFS has been developed to enhance or replace traditional real-life clinical experiences. Specialized patient care areas can offer limited opportunities for students. Emergency departments, cardiac catheterization labs and obstetrics are examples of specialized patient care units that may limit number of student participants and clinical experiences based on limited space and other resources (Smith, 2009). HFS has potential to offer an effective approach in clinical nursing education by exposing student to critical events that occur infrequently during traditional clinical experiences. Examples of infrequently occurring critical events are myocardial infarction, pneumothorax, airway emergencies, cardiac arrest (Howard, 2010) and obstetrical emergencies (Beyer, 2009). Research also noted that “students may retain knowledge longer when it is attained in a simulation compared to the traditional lecture” (Beyer, 2009, p. 88).

Health care is challenged to provide quality patient care. According to Blum, Borglund, & Parcells (2010) caring attributes of professional self-confidence and clinical competence embrace crucial decisions and quality patient care. HFS has been described
as an innovative way to foster student self-confidence and clinical competence during patient care (Blum et al., 2010). Therefore, faculty must apply HFS, an innovative teaching strategy, to enhance and promote student self-confidence and clinical competence.

The goal in HFS practice is to develop student self-confidence and clinical competence that will result in safe nursing practice. Tanner’s Clinical Judgment Model has been utilized as a framework in research evaluating the relationship between HFS and development of student self-confidence and clinical competence (Blum et al., 2010; Dillard, Sideras, Ryan, Carlton, & Siktberg, 2009). Tanner’s Model underlines clinical judgments through noticing, interpreting, responding and reflecting during HFS performance (Blum et al., 2010). Evaluation of student self-confidence and clinical competence has been further quantified in research by Lasater’s Clinical Judgment Rubric (Blum et al., 2010; Lasater, 2007). Presuming self-confidence and clinical competence as integral components for development of clinical judgment and provision of quality nursing care, faculty and students will respond to Likert-type items using the continuum of perceived level of clinical judgment development: (a) beginning, (b) developing, (c) accomplished, or (d) exemplary.

The impact of HFS on student self-confidence and clinical competence is still unclear (Garrett et al., 2010). Results in the research by Howard (2010) indicate students learned more during clinical lab practice using HFS compared to students presented with traditional case studies. However, Blum et al. (2010) did not find any significant difference in self-confidence and clinical competence between those who used HFS and those that used the traditional approach. Variation in knowledge development in nursing
education using HFS validates the need for continued research evaluating HFS and student self-confidence and clinical competence. Thus there is support for a replication of the Blum et al. (2010) study.

Background and Significance

Nursing education faces challenges of a national nurse shortage, critically inadequate numbers of faculty and a wide variety of methodologies for teaching-learning experiences for nursing students (Dillard et al., 2009). Despite the large number of nursing programs using HFS there is little standardization in implementation for clinical training (Dillard et al., 2009). Dillard et al. (2009) suggests that lack of standardization may be largely due to the need for faculty development in the use of HFS in nursing curricula (Dillard et al., 2009). Dillard et al. reviewed 109 studies that reported improved student self-confidence in clinical practice after HFS learning. In fact, there is much controversy as to when and how to introduce this method, questioning the effectiveness in teaching novice learners (Dillard et al., 2009).

HFS is an effective teaching strategy at all levels in education according to Pacsi (2009). The future of HFS in nursing education appears promising in the development of student self-confidence and clinical competence in a risk free environment. Research reflects the need to investigate HFS and application in nursing education, therefore studies are necessary to expand and validate previous findings specific to HFS methodology (Pacsi, 2009). In order to effectively use clinical simulation in nursing education, research must be conducted and the resultant evidence applied by nursing faculty to improve student self-confidence and clinical competence. HFS will provide students with learning opportunities that will foster student self-confidence and clinical
competence by focusing on essential caring elements of quality patient care (Blum et al., 2010).

In the past 15 years, health care education has utilized simulation as a method of teaching in an attempt to foster student’s clinical decision making through standardized patient case scenarios (Kaplan & Ura, 2010). Clinical simulation is a new concept for many instructors and the focus for restructuring nursing curricula (Caramanica & Feldman, 2010). Nursing care is increasingly complex and requires advanced critical thinking with high levels of self-confidence and clinical competence. When the impact of HFS is better understood through research, faculty will utilize the methodology appropriately to enhance self-confidence, clinical competence, and clinical judgment in both educational and clinical settings (Caramanica & Feldman, 2010).

HFS in nursing curricula provides a safe, risk-free environment for learning yet little is known about the effect on student self-confidence and clinical competence as well as transference to the clinical setting (Cant & Cooper, 2010). It is imperative that more research be conducted to examine the relationships between HFS, self-confidence, and clinical competence to facilitate the transition from nursing student to novice nurse.

Nursing faculty has an essential role in education to facilitate student learning that will result in positive patient outcomes (Blum et al., 2010). Capturing clinical opportunities for students can be challenging for nursing faculty. HFS can fill the gap in available clinical experiences that add to the body of knowledge necessary to facilitate growth in student self-confidence and clinical competence. Further study is needed to validate findings from the Blum et al. study, and improve student learning resulting in quality patient care.
Problem Statement

HFS is fast becoming one of the most common methodologies in nursing curricula (Blum et al., 2010). However there is a paucity of research exploring the impact on self-confidence, clinical competence and the transference of the caring attributes to the clinical setting. There also is little research that examines the appropriate implementation of the methodology to enhance development of the caring attributes (Dillard et al., 2009). How does nurse faculty improve entry-level nurses’ training to foster a higher degree of self-confidence and clinical competence, which will effectively make nursing practice safer in real-life situations (Blum et al., 2010)?

Purpose of Study

The purpose of this study is to examine the relationships between use of HFS and caring attributes of self-confidence and clinical competence of senior nursing students that in turn facilitate the transition to novice practicing nurse. This study is a replication of study conducted by Blum et al. (2010). Once the phenomenon of HFS in learning is understood, nurse faculty can better use HFS to apply knowledge to patient care scenarios that effectively help students achieve desired clinical outcomes. Student self-confidence and clinical competence is evaluated after participating in an HFS through self-evaluation and faculty evaluation.

Research Questions

1. Does participation in an HFS improve self-confidence and clinical competence of senior nursing students?
2. Does participation in an HFS increase self-confidence and clinical competence more than traditional task trainer/student demonstration methodology?

**Conceptual Framework**

Tanner’s Clinical Judgment Model is the conceptual framework for investigation of the relationships between HFS and the development of the caring attributes self-confidence and clinical competence (Blum et al., 2010). The conceptual framework consists of thinking processes of nursing students when making clinical judgments: noticing, interpreting, responding, and reflecting (Dillard et al., 2009). An assumption of the model is that adapting to a clinical situation requires calling upon self-confidence and clinical competence to improve function and decrease stress of student nurses. The model builds skills that are important in students as well as skilled nurses in forming clinical self-confidence and clinical competence in a HFS case scenario or in the clinical hospital setting.

Tanner’s Model is the foundation of Lasater’s Clinical Judgment Rubric and together they allow measurement of growth and integration of knowledge, self-confidence and clinical competence (Lasater, 2007). A quantitative means is provided to measure and evaluate change in self-confidence and clinical competence as students move from a laboratory setting to clinical practice (Lasater, 2007). Students who participate in a HFS case scenario specific to obstetrical nursing and the preeclamptic patient will be able to provide faculty information about the two caring attributes to evaluate growth in student clinical judgment (Dillard et al., 2009). Applying Tanner’s
model with Lasater’s (2007) rubric will guide examination of relationships between HFS, clinical self-confidence and clinical competence (Blum et al., 2010).

**Conceptual Definitions**

**High-fidelity simulation.** Moderate-fidelity simulation mannequins with computerized capabilities mimic heart and lung sounds of mannequins reacting to students’ assessment (McNelis et al., 2009). High-fidelity simulation provides a higher degree of technology that may include pharmacologic and physiologic interventions (McNelis et al., 2009).

**Student self-confidence.** According to Blum et al. (2010) self-confidence is defined as a caring attribute promoting trust and respect in the nurse-patient relationship. Crooks et al. (2005) claim that self-confidence increases as students move through stages of feeling, knowing, doing, and reflecting. The evolution in caring attributes is then theoretically transferred from laboratory practice to the clinical setting.

**Student clinical competence.** Clinical competence is the appropriate application of knowledge, experience, and skills to a specific situation (Blum et al., 2010). Clinical competence is the sum of the actions by the learner to provide quality patient care (Garrett et al., 2010; Lasater, 2007; Smith & Roehrs, 2009).

**Operational Definitions**

**Student self-confidence.** Self-confidence is measured by student responses to four Likert-type items from the four subscales of Lasater’s Clinical Judgment Rubric. The four subscales based on Tanner’s model, noticing, interpreting reflecting, and responding, are a quantitative reflective score of perceived level of clinical confidence ranging from 1 to 4, with 1=calm/confident manner, 2=well-planned interventions/
flexibility, 3= evaluation/self-analysis, and 4= commitment to improvement (Blum et al., 2010).

**Student clinical competence.** Clinical competence is measured through student and faculty responses to four Likert-type items from the four subscales of Lasater’s Clinical Judgment Rubric. The four subscales based on Tanner’s model (noticing, interpreting reflecting, and responding) are a quantitative reflective score of perceived level of clinical confidence ranging from 1 to 4, with 1=expected patterns, 2=information seeking, 3= prioritizing data, and 4= clear communication (Blum et al., 2010). Responses will be used to determine the relationship between a senior nursing student’s participation in HFS as compared to traditional task trainer/student demonstration and perceived self-confidence and clinical competence in a clinical setting (Blum et al., 2010).

Data will be analyzed using SPSS. An alpha level of 0.05 was determined to indicate statistical significance. Descriptive statistics will be completed on all variables including demographic characteristics. Measures of central tendency and variability will be calculated. Pearson correlation coefficients will be utilized to look at relationships between variables. Independent samples T-tests will be completed to look for differences between groups prior to the study. Independent samples T-tests also will be used to examine for differences between the two groups (HFS, traditional) on self-confidence and clinical competence and between faculty responses and those of students in each group.

**Limitations**

Limitations of this study include a convenience sample of limited size. Generalization will be limited because it includes only senior nursing students from one
university in one geographic area. An additional limitation is the focus on a specific patient condition in the simulation. History may be a limitation because of previous experience with traditional methodology.

Assumptions

1. HFS case scenario practice will improve senior nursing student self-confidence and clinical competence.
2. HFS experience as compared to traditional methodology will increase student self-confidence and clinical competence in clinical settings at a higher level.
3. HFS provides students with a safe, risk-free environment to apply knowledge and skills to clinical judgments involved in patient care situations.

Summary

The study will examine the relationships between use of HFS and caring attributes of self-confidence and clinical competence of senior nursing students. The study will measure the care attributes of self-confidence and clinical competence that impact the level of clinical judgment as the student moves from the clinical laboratory to the clinical setting.

This is a replication of a study by Blum et al. (2010). The simulation case scenario will be specific to obstetrical nursing and the preeclamptic patient (see Appendix A). The HFS obstetrical case scenario was chosen because students have limited opportunity in the traditional clinical setting to provide care in this type of situation. The study will provide information related to change in student self-confidence and clinical
competence and therefore level of clinical judgment through use of HFS as compared to traditional methodology to improve transference to a clinical setting.
Chapter II: Literature Review

Introduction

HFS was first introduced to anesthesia students and healthcare education in 1969 (Howard, 2010). Clearly, HFS in a learning environment provides students with realistic experiences without risk of harm to the patient (Larew, Lessans, Spunt, Foster, & Covington, 2006). There is optimism that HFS will prove as beneficial to the training of nurses as it is to other health professionals (Garrett et al., 2010). Lasater (2007) stated that because of the increasingly complex roles that nurses are expected to fulfill, a need exists for more highly developed critical thinking skills. Nursing programs should introduce HFS into curricula in a manner that maximizes potential learning and development of critical thinking (Lasater, 2007) and clinical judgment (Dillard et al., 2009). This chapter will include a critique of pertinent research which addresses HFS and the relationship between participation in high-fidelity simulation, self-confidence and clinical competence in clinical settings.

Research Questions

1. Does participation in an HFS improve self-confidence and clinical competence of senior nursing students?
2. Does participation in an HFS increase self-confidence and clinical competence more than traditional task trainer/student demonstration methodology?

**Purpose**

The purpose of this study is to evaluate the impact of HFS on student self-confidence and clinical competence in comparison to traditional methodology. Once the phenomenon of HFS in learning is understood, nurse faculty can use HFS effectively to help students achieve desired clinical outcomes as evidenced by high quality, safe patient care. Student self-confidence and clinical competence is evaluated after participating in an HFS through self-evaluation and faculty evaluation. Student self-confidence and clinical competence will be assessed based on existing knowledge as applied to an HFS obstetrical case scenario.

**High Fidelity Simulation in Nursing Education**

Evidence is favorable toward using the pedagogy of HFS in the training of nurses. A study by Lasater (2007) revealed that students enjoyed the experience of seeing the results of their interventions during the HFS case scenario. Evidence suggests that essential learning took place during HFS practice in a safe environment fostering student self-confidence and clinical competence (Larew et al., 2006; Lasater, 2007). According to Lasater (2007), HFS case scenarios increased student knowledge pulling together theory, clinical application and critical thinking.

The framework applied in the study was traditional for qualitative data analysis (Lasater, 2007), Lasater’s Interactive Model of Clinical Judgment Development. Concepts identified throughout were student self-confidence, critical thinking and clinical
judgment. Lasater (2007) used a mixed methods approach in the research design. The study was largely qualitative applying researcher observation followed by quantitative instrumentation by identifying common themes formulated by student comments (Lasater, 2007). The work concluded with a qualitative method with a focus group. The intention behind the design was to gain the perception of student experiences (Lasater, 2007).

The study took place at Oregon Health & Science University School of Nursing. The setting was in a simulation laboratory replacing one day per week of traditional hospital clinical practicum. 48 junior level students enrolled in Nursing Care of the Acutely Ill Adult course were candidates for a focus group in this study. A convenience sample included 15 out of 39 traditional students, identified as being eligible to participate in this study. Of the 15 eligible student volunteers, only eight were available at the appointed time for the focus group. In this group of eight, all clinical sections were represented. Pre-simulation didactic learning was presented by nursing faculty in preparation for the scenario. Each student acted as the primary nurse at some point with delegation responsibilities to other team members. Systematic rotation of students was applied to allow even distribution of patient simulation exposures and interactive role responsibilities. A small gift with monetary value was offered as an incentive for student participation (Lasater, 2007). Consent was obtained from each student prior to simulation lab practice. Videotaping of the simulation sessions, each 90 minutes, provided accuracy of the analysis. Questions to Guide the Focus Group Discussion provided a guide to open-ended questions used to clarify student verbal responses during simulation. Data was organized, categorized to level of significance, and then evaluated specific to student
commentary. The findings were reinforced through repetitive observations captured during videography (Lasater, 2007).

The researcher identified a strong advantage of this methodology being the ability to offer a simulated patient clinical situation to nursing students that may not be available during traditional hospital clinical experiences (Lasater, 2007). The researcher recommends further research to explore relationships between use of HFS, effect on development of self-confidence and clinical competence, and how best to optimize this outcome. Lasater (2007) suggests that debriefing after simulation scenarios is a key factor in quality learning. Lasater (2007, p. 274) also adds “the depth of debriefing gives students a clear understanding of care standards that are expected” that will ultimately ensure quality patient care.

There are many reasons for nursing programs to embrace high-fidelity simulation. The value of this study provided an initial and intimate perspective of student experiences with HFS. HFS offers a more complete evaluation of students’ abilities rather than what might randomly occur in a clinical experience (Lasater, 2007). The results of this study provide evidence of the potential for HFS to support and affect the development of self-confidence and clinical competence in nursing students (Lasater, 2007).

HFS provides opportunities to exercise student abilities in clinical lab settings that are risk-free and accommodating to multiple learning styles (Fountain & Alfred, 2009). Fountain and Alfred (2009) identified a lack of creative methods of teaching nursing students theoretical, effective and perceptual motor skills. Additionally, they identify limited data relating the use of HFS to student learning style preferences. The purpose of this research by Fountain and Alfred (2009) was to explore how learning styles correlate
with student satisfaction when HFS is used in a baccalaureate nursing program (Fountain & Alfred, 2009).

The theoretical framework for this study was the Theory of Multiple Intelligence (Fountain & Alfred, 2009). Fountain and Alfred (2009, p. 96) found that the “theory of multiple intelligence learning can be measured through the administration of examination and the test scores can be used to predict student success throughout nursing curricula.” Pragmatic concepts noted were student learning styles and self-confidence (Fountain & Alfred, 2009).

The study was a quantitative and qualitative research design. Data was collected through an experiential learning lab activity which included HFS enhanced scenarios (Fountain & Alfred, 2009). All senior nursing students in their advanced medical-surgical course were included in the study. Sample population was a convenience sample of 104 senior baccalaureate nursing students was used, collected from three campuses of one school of nursing. Out of 104 nursing students, 78 respondents in their junior year participated in a HFS enhanced learning activity. Instructors had prior training and experience with HFS clinical labs specific to cardiac patient care scenarios (Fountain & Alfred, 2009).

Ground work for students included didactic content, case studies, emergent pharmacology and arrhythmias surrounding common cardiac problems. A timeline of 90 minutes was used for application of didactic content in a HFS situation. Fountain and Alfred (2009) used a 13 item 5 point Likert-type scale developed by the National League for Student Satisfaction and Self-Confidence in Learning. The scale was used to measure
student’s personal attitudes about HSF activities. Data analysis included descriptive statistics, means and correlations.

Fountain and Alfred (2009) had a 75 percent student response rate for the study. The researchers reported positive relationships between student preferred social learning \( (r=0.329, p=0.01) \), solitary learning \( (r=0.23, p=0.04) \) styles and student satisfaction with HFS. The most common learning style identified during the study was social (Fountain & Alfred, 2009). The most common learning style identified was social learning that had the strongest positive correlation with student satisfaction with HFS enhanced learning experiences (Fountain & Alfred, 2009). There were no significant differences between nursing campuses.

HFS as an experiential learning opportunity is an effective way in which to increase student ability to synthesize content with all types of learning styles (Fountain & Alfred, 2009). Findings from this study suggest that HFS appeals to the breadth of the learning spectrum for social and solitary learners alike (Fountain & Alfred, 2009). Fountain and Alfred claim that there is potential for using HFS to engage student learning and increase ability to synthesize critical content. Fountain and Alfred (2009, p. 98) stated “an interesting finding was that students with preference to solitary learning and those with a strong preference for social learning were satisfied with HFS enhanced learning experiences.” The researchers concluded that strengths of HFS identified in the study were student ability to share, observe others, and apply personal learning styles during HFS practices. Students benefit from this innovative learning strategy, allowing for application of critical didactic content, in a safe, nonthreatening learning environment (Fountain & Alfred, 2009).
With the increase in competition for clinical practice sites, short patient stays, and limitations placed on nursing programs, faculty are forced to seek innovative ways to deliver nursing practice opportunities that will result in a high level of learning and quality patient care. Advances in technology through HFS need to be evaluated by nurse faculty for better understanding of best learning practices, effectiveness and value in this learning environment (Smith & Roehrs, 2009).

Smith and Roehrs (2009) identified a need for the development of best practice approaches using HFS with nursing students. The researchers identified a lack empirical evidence that defines and standardizes best practice approaches for using HFS in nursing. The purpose of this study by Smith and Roehrs(2009) is twofold (a) examine the effects of a simulation experience and the outcome of student satisfaction, and (b) evaluate the effects of simulation experience and the outcome of student self-confidence.

The framework for this study (Smith and Roehrs, 2009, p. 75) was the “Nursing Education Simulation Framework, developed for designing, implementing and evaluating simulation used in nursing education.” Components of this framework included teacher factors, student factors, educational practices, design factors, and outcomes. Concepts studied were student satisfaction and self-confidence. Specific variables were (a) clear objectives, (b) clear information, (c) support during simulation, (d) suitable problem to solve, (e) time for guided reflection and feedback, and (f) fidelity or realism of the experience (Smith & Roehrs, 2009).

The study applied a descriptive correlational non-experimental design. The purpose of the study was to examine the relationship between HFS and student satisfaction and student self-confidence (Smith & Roehrs, 2009). Authorization to
conduct the study was granted by the University Institutional Review Board. Didactic content pertinent to the simulation scenario was required prior to clinical lab practice (Smith & Roehr, 2009).

A convenience sample was used in the setting of a Bachelors of Science Nursing program at a traditional public university in the Western United States. Students were enrolled in their first medical/surgical course. Simulation experience in the course was mandatory for students, but participation in the research study was not (Smith & Roehrs, 2009). The sample population consisted of 68 out of 72 junior students that agreed to participate in the study. All student skill sets include care of the patient with respiratory disorders.

Two instruments developed by the NLN (a) Nursing Student Satisfaction and Self-Confidence in Learning Scale (b) Simulation Design Scale (objectives, support, problem solving, guided reflection, fidelity) were applied to measure student satisfaction and self-confidence (Smith & Roehrs, 2009). Both scales are based on a 5-point Likert scales. Validity of content explored was reviewed by ten experts in medical/surgical nursing (Smith & Roehrs, 2009). Before data was collected, all potential error were analyzed using SPSS 15.0 (Smith & Roehrs, 2009). Data was collected surrounding five research questions applied to a 5-point Likert scale, 1 = strongly disagree and 5 = strongly agree.

The overall score for the Satisfaction subscale of the Student Satisfaction and Self-Confidence in Learning Scale was 4.5 suggesting that students were satisfied with HFS learning (Smith & Roehrs, 2009). Results for the Self-Confidence subscale of Student Satisfaction and Self-Confidence in Learning scale scored 4.2, suggesting student
confidence in ability to care for a patient with respiratory illness (Smith & Roehrs, 2009). The design characteristic Guided Reflection scored highest on the Simulation Design Scale resulting a 4.8, yet Smith and Roehrs (2009) disclose that there was not a strong correlation between any of the design characteristics in relationship to student satisfaction and self-confidence.

The researchers concluded that simulation methodology increases both student satisfaction and self-confidence. The results suggested there was a significant correlation between student satisfaction and self-confidence (Smith & Roehrs, 2009). Results revealed that students had positive feelings about the learning strategy (Smith & Roehrs, 2009). Smith and Roehrs (2009, p. 76) conclude “students were satisfied with this teaching method.” The researchers recommended further study in order to determine cause and effect of variables related to outcomes and use of HFS in nursing education. Smith and Roehrs (2009) end this study suggesting that faculty workloads be adjusted to allow time for HFS instead of simply adding it to current workloads. Adjusting faculty workloads will allow a concentrated effort toward HFS in nursing education to enhance student satisfaction and self-confidence (Smith & Roehrs, 2009).

Nursing programs that design a component of the curricula involving HFS must consider several factors (Dillard et al., 2009). The general consensus a review of the literature indicated research is needed to make an evidence-based determination on how best to plan and implement HFS in a nursing program. At this time, there is neither a standardized curricula nor a standardized method of assessment of students in the area of HFS (Dillard et al., 2009). Dillard et al. (2009) also state that HFS pedagogy in curricula requires good faculty development. Above all, faculty should be mindful that the purpose
of HFS is not to replace clinical interaction with a human client, but to provide additional opportunity to exercise students’ abilities in an environment that is risk-free and accommodates multiple learning styles (Dillard et al., 2009). The purpose of a study by Dillard et al. (2009) was to examine the effectiveness of a faculty development workshop focusing on evaluating students’ critical thinking during simulation. A gap was found to exist between what students learn in the classroom and apply in clinical practice. The research evaluated student learning after one simulation case exploring perceptions of students and faculty regarding impact of a simulation session and actual clinical practice (Dillard et al., 2009).

Dillard et al. (2009) used a combination of a quantitative and qualitative research design. The framework applied in this study was Tanner’s Model of Clinical Judgment and Lasater’s Clinical Judgment Rubric. The framework was selected and applied after observations were made by Dillard et al. (2009, p. 101) stating “change in teaching strategies, based on clinical simulations using Tanner’s Model of Clinical Judgment and Lasater’s Clinical Judgment Rubric was perceived by faculty as an approach that could be understood, applied, and enhanced teaching.”

In a collaborative effort, two schools of nursing work to: (a) provide faculty development regarding the evaluation of students’ clinical judgment, (b) evaluate student clinical judgment during HFS practice, and (c) determine evaluation of clinical judgment and faculty and student perceptions of HFS learning (Dillard et al., 2009).

Sixteen faculty members attended a workshop facilitated by two experts in the use of Tanner’s Model of Clinical Judgment and Lasater’s clinical Judgment Rubric. The Cervero model served as the framework for faculty evolution during this study. In 1988,
work by Cervero states “implementation of learning varies based on motivation of the participant, the nature of change, the organizational environment, and the workshop itself” (Dillard et al., 2009, p. 101). Faculty Evaluation of Workshop was the measuring tool applied to the seminar with subscales, organizational environment, motivation of faculty, educational program and change, educational program, and instructor performance, applying a Likert-type scale of 1 to 5, with 5=strongly agree/expert. Based on average of scores faculty perceived the workshop positive, gain skill sets required to understand and evaluate student learning during HFS scenarios (Dillard et al., 2009).

Following the faculty workshop, a convenience sample of 68 students enrolled in a junior adult health course was used along with faculty that facilitated the simulation (Dillard et al., 2009). Lasater’s Clinical Judgment Rubric measured and evaluated student performance paralleled with audiovisual recoding of responses to HFS practice. Concepts investigated were clinical thinking, student learning and clinical practices (Dillard et al., 2009). Student’s completed a Student Self-Evaluation of Simulated Learning scale to measure self assessment after simulated learning applying a Likert-type scale using 1=did not get it at all to 4=totally got it (Dillard et al., 2009). Lastly, faculty measured student performances using a novice-to-expert scale (noticing, interpreting, responding, reflection) 1 = novice to 5 = expert scale (Dillard et al., 2009).

Data were gathered from faculty and student evaluations and student reflective statements. Although there was no p value reported, the reliability of instrument was reported, r=0.94 (Dillard et al., 2009).

The researchers concluded that HFS facilitates student learning (Dillard et al., 2009). HFS improved faculty identification of student performance deficits and strengths
during lab simulation practice. Programs instituting HFS should introduce it into curricula in a manner that maximizes potential learning, development of critical thinking and clinical judgment (Dillard et al., 2009) complete evaluation of students’ abilities rather than what might randomly occur in a clinical experience (Dillard et al., 2009). Findings from Dillard et al. (2009) support the importance of HFS and the contribution in student self-confidence and clinical competence. According to the results of this study, HFS facilitates student learning (Dillard et al., 2009). The study clearly enhanced faculty identification of student performance deficits and strengths during lab simulation practice. The authors recommend further research to improve the marriage of student self-confidence and clinical competence using HFS in nursing education. Final recommendations by Dillard et al. (2009) are for future application of research applying Clinical Judgment Model into course syllabi, course assignments and evaluations.

Research conducted by Hauber, Cormier, and Whyte (2010) explored quality of student decisions and comparing any relationship of classroom learning to performance in actual practice settings. Studies are needed that extend our understanding of how students think when placed in clinical situations and how they use their knowledge to solve problems and make decisions. An investigation by Hauber et al. (2010) was to determine the relationships among students’ abilities to prioritize actions, associate cognitions, and physiologic outcomes of care in HFS learning in nursing curricula.

Hauber et al. (2010) conducted research at a University in Southeastern United States. A random sample was obtained including 15 volunteer students as well as 280 undergraduate students in a baccalaureate nursing program. Students were all in their third semester at the same level of clinical and laboratory experiences. Mean age of all
students was 23.4. Each student participated in an audio recording of verbal and transcripted report during HFS practice (Hauber et al., 2010).

Ericsson and Smith’s (1991) expert-performance approach was the theoretical framework of the study (Hauber et al., 2010). The framework supported the evaluation of individual performance during simulation experiences. The cognitive load theory facilitated the understanding of effective and efficient skill levels. This theoretical base included components of memory and expert performance. Concepts explored in this work were cognitive architecture, cognitive load, memory, and transference (Hauber et al., 2010).

Knowledge base of sample members was determined by using common knowledge-related measures such as grades, standardized test scores, audio recording of verbal and transcripts of reports in the HFS scenarios. Video recordings of participant statements during HFS practices were evaluated. The use of video during HFS in this work facilitated the educator with feedback for students (Hauber et al., 2010). Physiologic logs were recorded, exported, and loaded into data processing programs (Hauber et al., 2010). Video recordings focused on student participation and their statements during clinical laboratory HFS practice. Physiologic logs were recorded, explored and loading into data processing programs. Knowledge related data was collected that included grades and standardized test scores of participants.

Hauber et al., (2010) used a quasi-experimental design for this study. Participant’s individual cognitions and performance-related variables were measured for level of comprehension. Data was analyzed using the Statistical Program for the Social Sciences (SPSS) descriptive statistics determined the relationship between performance and course
grades (Hauber et al., 2010). Hauber et al. (2010) reported a significant and direct correlation with Adult Health I grade (0.542 to p<0.05). Significant but indirect correlations were recorded with the Fundamentals grade (-0.540 to p<0.05) supporting the author’s effort to explain the knowledge base used, and nursing student’s relationship between HFS laboratory practice and clinical performance (Hauber et al., 2010). Hauber et al. (2010) suggested that the research findings were favorable; yet, the authors supported future exploration in the relationship between Fundamentals and AHI courses utilizing HFS in nursing education.

This study was conducted to explore deliberation of nursing practice to a higher level of performance and competence. By implementing HFS, using repetition and correction in nursing education offers learning without risk to patients. Implication of the findings suggest use of video recording during HFS may facilitate the educator providing valuable feedback for students or novice nurses in a clinical setting. Results do support use of HFS to assist faculty in gathering information for debriefing after practice simulation as a basis for nursing education (Hauber et al., 2010).

The process of education and training of new nurses has undergone a transformation in recent years due largely to rapid changes in technology and the learning styles of the students who grew up immersed in it. As these young adults enter institutions of higher learning, many are demanding to be technologically challenged in ways that traditional nursing programs are not yet equipped to accommodate. There is optimism that will prove as beneficial to the HFS training of nurses as it does to other health professionals (Garrett et al., 2010). Researchers stated, “Students appreciated the opportunity to see what would happen to a patient’s condition based on their decisions
and interventions” (p. 311). The purpose of this study was to examine the use of evidence-based learning approaches in a nursing education simulation center initiated through a practice-academic collaboration (Garrett et al., 2010).

The study took place in at the University of British Columbia, Canadian school of nursing. Approval for this project was granted by the Institutional Ethical Review Board. Eight faculty members trained in HFS manikins were involved in the design and implementation of realistic HFS case studies. A convenience sample of 30 volunteer, undergraduate senior nursing students were presented with clearly structured patient care situations surrounding common respiratory illnesses (Garrett et al., 2010). Student preparation included lecture content, readings, videos, and online simulation exercises.

Student preparation immediately prior to HFS clinical lab included an orientation to the lab setting and simulation manikins. All student knowledge was equal with each student at the senior nursing level. No patient information was disclosed prior to simulation lab. Data collection techniques were faculty observations, videotaping and open discussions post experiences. Students worked in teams of four while caring for a patient in a respiratory distress situation (Garrett et al., 2010).

Garrett et al. (2010) focused on the concept of student learning. The researchers utilized a qualitative approach to address effective learning in nursing education. Garrett et al. (2010) utilized Jefferies framework as structural support for this study. The research team claims that Jefferies framework is frequently used in other studies as a base for creating HFS scenarios. This framework lists “five core concepts: education practices, the teacher, the student, design characteristics, and outcomes” (Garrett et al., 2010, p. 310).
Eight HFS trained faculty applied a design template to facilitate symmetry to HFS development and student responses (Garrett et al., 2010).

With a focus on senior nursing students and the influence of HFS learning, Garrett et al. unexpectedly found that students preferred working alone rather than in collaboration with other students. This student preference was found using reflective debriefing following HFS experiences (Garrett et al., 2010). The value of this negative student perception during debriefing was that faculty could immediately redirect them and explain the value of team work in patient care (Garrett et al., 2010). Debriefing after simulation practice gave students and instructors time to reflect on student clinical performance and to discuss alternative measures. An example would be to identify delegation care interventions to other team members in order to provide quality patient care within a limited time frame (Garrett et al., 2010).

Students enjoyed the experience of seeing the results of their interventions that were applied during the case HFS situations. Valuable learning took place in a safe environment that fostered student’s self-confidence and clinical competence. Garrett et al. (2010, p. 311) claimed that “students appreciated the opportunity to see what would happen to a patient’s condition based on their decisions and interventions.” The most surprising finding reported in the study results were students preferred working alone rather than in collaboration with other students. The value of this negative student perception was that faculty could immediately redirect them and explain the value of team work regarding patient care. Debriefing after simulation practice gave students and instructors time to reflect on student clinical performance and allowed time to discuss alternative measures such as delegating care interventions to their team members in order
to provide patient care with a limited timeline (Garrett et al., 2010). Student feedback and reflection after HFS practice served the fuel for change in the simulation design and value in education.

A gap between theoretical knowledge and practical application holds professional significance. The question presented is, how do nurse faculty improve entry level nurses’ training to foster a higher degree of self-confidence and self competence? What educational approach will effectively make nursing practice safer in real-life situations? A novel approach to the problem is presented in a study by Blum et al. (2010). The researchers recognized this gap by stating “development of safe nursing practice in entry-level nursing students requires special consideration from nurse faculty” (Blum et al., 2010, p. 1). Nursing education is charged with developing students that are clinically competent and confident. Using a qualitative approach, the purpose of this study provides examination and relationships between HFS and student self-confidence and clinical competence.

Blum et al. (2010) applied a quasi-experimental design exploring health assessment and skills course of entry level nursing students. The sample population was 53 Baccalaureate students enrolled in either a traditional or simulation enhanced laboratory setting in their first clinical rotation. Participants were complete randomization of two groups. A control group practiced skills using a traditional approach to clinical education occurred, while the experimental group practiced skills using a simulation-enhanced approach using Laerdal’s SimMan (Blum et al., 2010). Blum et al. (2010) disclosed the inability to randomize the simulations due to student schedules and prior commitments.
Research approval was granted by the Institutional Review Board of a southeastern university in the USA. Participants were 59 entry level Bachelor of Science nursing students with a response rate of 100% (Blum et al., 2010). Informed consents were obtained from all student participants. Six students were excluded due to incomplete prerequisite didactic work. The junior level of skill was an important element in the inclusion criteria for this study (Blum et al., 2010).

The studies framework was supported by Tanner’s Clinical Judgment Model of clinical judgment development (beginning, developing, accomplished, exemplary). The Model provide theoretical basis for Lasater’s Clinical Judgment Rubric, noticing, interpreting reflecting, and responding, providing quantitative measurement to student self-confidence (Blum et al., 2010). A quantitative component to the research design evaluated the relationship between HFS and student self-confidence and clinical competence (Blum et al., 2010). Measurement consisted of four subscales of Self-Confidence of student responses to a four point Likert-type items ranging from 1 to 4, with 1=calm/confident manner, 2=well-planned interventions/ flexibility, 3= evaluation/self-analysis, and 4= commitment to improvement (Blum et al., 2010).

Clinical competence is quantified through student and faculty responses to four Likert-type items from the four subscales of Lasater’s Clinical Judgment Rubric. The perceived level of clinical confidence and subscales ranging from 1 to 4, with 1=expected patterns, 2=information seeking, 3= prioritizing data, and 4= clear communication (Blum et al., 2010). Expert faculty ratings were used to define and measure student clinical competence. Responses will be used to determine the relationship between a senior nursing student’s participation in HFS as compared to traditional task trainer/student
demonstration and perceived self-confidence and clinical competence in a clinical setting (Blum et al., 2010).

An alpha level of 0.05 was determined to indicate statistical significance. Pearson correlation coefficients were utilized to look at relationships between variables. Blum et al., (2010) revealed overall improvement in student self-confidence and clinical competence across the semester. Blum et al. (2010) reported significantly different values when exploring student self-confidence (p=0.000) with a positive correlation (p=0.001) to HFS practice; and student self-confidence (p=0.000) positive correlation from midterm to final competence (p=0.004).

This study compared traditional methods of clinical education with a more innovative way of learning through HFS. The gap in research was specific to nursing student self-confidence and clinical competence. Results were favorable indicating student self-confidence and clinical competence was significantly improved (Blum et al., 2010). Clear answers were not evident when comparing traditional versus simulation learning environments.

The researchers summarized their work by indentifying a need for further examination of teaching strategies in order to promote the transfer of self-confidence and clinical competence from the nursing laboratory to the patient care clinical settings (Blum et al., 2010). The authors commit to further research that will improve and enhance caring attributes. The value of this study was clearly a contribution to knowledge development in nursing education by presenting innovative ways to measure student self-confidence and clinical competence (Blum et al., 2010). This study validates continued
research utilizing HFS to incorporate new technology in learning that will bring students to a higher level of comprehension and application for quality care of our patients.

Nursing programs that begin to design a component of the curricula involving HFS must consider several factors. As literature materializes, it is apparent that more research is needed to make an evidence-based determination on how best to plan and implement HFS in a nursing program curriculum.

**High Fidelity Simulation in Nursing Curriculum**

Advances in health care delivery are parallel to the cost of technological changes in education. Nursing programs are expected to develop nurses that practice with quality and proficiency at time of graduation. Tuoriniemi and Schott-Baer (2008) offer insight into a decision made by a community college for investments in HFS for their nursing curriculum. One community college shared their experiences purchasing and initiating HFS into their nursing program. The simulator selected by the associate dean of the Health and Human Services Division was multi-featured that offered complex, real-life situations to enhance student learning (Tuoriniemi & Schott-Baer, 2008). The purpose of this study was to explore the process of purchasing and implementation of HFS in a community college nursing program.

There are multiple steps beyond the decision to purchase a simulation manikin. Tuoriniemi and Schott-Baer (2008) attempt to discuss components and implementation of HFS learning into their nursing program, followed by the decision to purchase this technology. The research team describes processes involved in this innovative way of teaching and learning. During this article review a profound statement was noted by Tuoriniemi and Schott-Baer (2008, p. 105) “simulation is a replication of essential
aspects of reality so that the reality can be better understood, controlled and practiced.” Repetition and practice prior to actual direct patient care can provide students mastery in a safe learning environment. Students can learn from their mistakes and practice until they get it right using HFS (Tuoriniemi & Schott-Baer, 2008).

Tuoriniemi and Schott-Baer (2008) discuss the value of utilizing Jeffries’s framework for simulation. This framework has been applied in the writing and development of design characteristics that results in positive student learning outcomes which are cost effective for nursing curricula. According to Tuoriniemi and Schott-Baer (2008), five areas of simulation construct need to be considered when building HFS scenarios into clinical lab time (a) level of student knowledge that parallels learning objectives, (b) realistic patient case studies, (c) variability in simulations that promote critical thinking, (d) appropriate cues facilitated by instructors, and (e) debriefing and student reflex of experiences. The simulation plan included universal learning objectives and pre-sceario pathophysiology questions for student that optimized knowledge retention. All students were provided with pre-work for optimal comprehension of simulation components (Tuoriniemi & Schott-Baer, 2008).

According to Tuoriniemi and Schott-Baer (2008) all faculty were involved in writing a patient care simulation in their area of study with the nursing curriculum. This was a new concept in student learning and a novel teaching strategy for many teachers. Due to the struggle of new technology in education, several instructors attended additional training for HFS and technological support. Finally, all full-time faculty utilized HFS in their student’s clinical training. The simulation experiences were positive
based on Tuoriniemi and Schott-Baer (2008) statement regarding student’s request that adjunct faculty also use HFS in their clinical lab practices.

Results of implementation and the demands of HFS technology into this nursing program have resulted in expansion in faculty adding a part-time coordinator (Tuoriniemi & Schott-Baer, 2008). This work suggests that without dedicated nursing instructors, HFS and the challenges faced are difficult to surpass. This professional discussion (Tuoriniemi & Schott-Baer, 2008) suggests that investment and success of HFS in nursing will prevail in education and suggests that a full-time program coordinator with technical and methodological skills is imperative.

HFS is a new innovative way to approach knowledge transfer to quality patient care. However, this discussion and observation in the development of HFS program in a community college clearly suggests that it is not a simple task. The change in curricula is time consuming, costly and requires faculty that are dedicated to student learning (Tuoriniemi & Schott-Baer, 2008).

Tuoriniemi and Schott-Baer (2008) specifically detailed decision-making steps and the process of instituting HFS in a community college setting. According to the authors, demands of HFS technology required the nursing program to expand-faculty hours and add-a part-time coordinator (Tuoriniemi & Schott-Baer, 2008). The authors suggest that without dedicated nursing instructors, HFS and the associated challenges are difficult to address. However, Tuoriniemi and Schott-Baer (2008) suggest that investment in HFS use in nursing education will continue and a full-time program coordinator with technical and methodological skills is imperative.
Summary

The most common target populations reported in the literature from which samples were drawn were nursing students at various stages of academic preparation toward a career in nursing. Some samples were randomly selected (Blum et al., 2010; Hauber et al., 2010), but most were non-random, convenience samples (Dillard et al., 2009; Fountain & Alfred, 2009; Lasater, 2007; Smith & Roehrs, 2009). All studies included HFS as the independent variable (Blum et al., 2010; Dillard et al., 2009; Fountain & Alfred 2009; Garrett et al., 2010; Hauber et al., 2010; Lasater, 2007; Smith & Roehrs, 2009; Tuoriniemi & Schott-Baer, 2008). One study involved a control group who did not participate in HFS (Blum et al., 2010) Subjects in the control group were taught using traditional methods of demonstration and teach-back (Blum et al., 2010).

Researchers use a variety of graded assessments to describe the effects of HFS on student clinical judgment, self-confidence and clinical competence. Two instruments developed by the National League of Nurses (NLN) used in studies by Fountain and Alfred (2009) and Smith and Roehrs (2009) were (a) Student Satisfaction and Self-confidence in Learning Scale, and (b) Simulation Design Scale. Lasater’s Clinical Judgment Rubric was the most recurrent instrumentation cited in the literature (Blum et al., 2010; Dillard et al., 2009; Lasater, 2007). Lasater offered open-ended questions to students following HFS experience using Morgan’s Principles: Questions to Guide the Focus Group Discussion following HFS experiences to improve student self-reflection. The most frequent type of instrument used in the reviewed studies was Likert-type scales. For example, a Likert-type scale was used to measure students’ perceptions of HFS as a
method for learning (Blum et al., 2010; Dillard et al., 2009; Fountain & Alfred, 2008; Smith & Roehr, 2009).

Hauber et al. (2010) utilized videography during and after simulation case scenario as methodology to facilitate and enhance student performance evaluation of the experience. Lasater (2007) suggests that debriefing after simulation case scenarios is a key factor in quality learning. Lasater (2007, p. 274) also adds “the depth of debriefing gives students a clear understanding of care standards that are expected during patient care situations that will ultimately meet and exceed quality health care delivery.”

There are many reasons for nursing programs to embrace HFS. HFS offers a more complete evaluation of student ability than what would occur in a patient care clinical setting (Dillard et al., 2009; Lasater, 2007). Blum et al. (2010) stated that HFS is effective in helping students transfer self-confidence and clinical competence to actual clinical experiences. Dillard et al. (2009) found that HFS allows students to exercise clinical judgment in an environment without distractions that can interfere with learning. The literature supports HFS as experiential learning that is effective in increasing students’ ability to synthesize content with practice regardless of learning style. Fountain and Alfred (2009) also found that HFS appeals to both social learners and solitary learners. An additional strength of HFS methodology was the ability to present a simulated patient case scenario to nursing students that might not be available during traditional hospital clinical practice (Beyer, 2009). However, studies that specifically measured factors of personal growth such as self-confidence, or clinical judgment in relation to HFS, stimulated several questions about timing of training, method of delivery and significance.
of results as compared to traditional methodologies demonstration and repeat-back training (Tuoriniemi & Schott-Baer, 2008).

Tuoriniemi and Schott-Baer (2008) stated that redesign of nursing curricula to include HFS is more than simply the purchase of a simulator. More research is needed to provide evidence-on best practice for planning and implementing HFS in a nursing program (Tuoriniemi & Schott-Baer, 2008). The literature does not supply a standardized curricula or method of assessment of students participating in HFS (Dillard et al., 2009). Dillard et al. also stated that HFS pedagogy in nursing curricula requires a faculty development program. Above all, faculty should be mindful that the purpose of HFS is not to replace clinical interaction with a human client.
Chapter III: Methodology

Introduction

Support is found in the literature for use of HFS as an effective way to improve knowledge and skills in a risk-free environment (Lewis & Ciak, 2011). However, little research has examined the relationship between use of HFS and self-confidence and clinical competence (Blum et al., 2010). Furthermore there is a paucity of research that explores differences between HFS and the traditional task trainer/student methodology on development of self-confidence and clinical competence in the laboratory and clinical settings (Hauber et al., 2010). The literature review revealed limitations of traditional clinical practices settings. HFS provides students with the opportunity to apply skills and knowledge to case scenarios that they may not have in the clinical setting. Smith (2009) reports sparse opportunities for students in specialized patient care units that may have rare occurring health crises and limit the number of student participants based on the limited space. In addition no studies have examined change in self-confidence and clinical competence when using HFS as a teaching-learning methodology with preeclampsia. Traditional clinical experiences with obstetrical patients are limited thus demonstrating a need for learning opportunities using HFS case scenarios (Beyer, 2009; Dillard et al., 2009).
Purpose

The purpose of this study is to examine the relationships between use of HFS and caring attributes of self-confidence and clinical competence of senior nursing students. This is a replication of a study conducted by Blum et al. (2010). Once the phenomenon of HFS in learning is understood, nurse faculty can use HFS effectively to help students achieve desired clinical outcomes. Student self-confidence and clinical competence is evaluated after participating in an HFS through self-evaluation and faculty evaluation.

Research Questions

1. Does participation in an HFS improve self-confidence and clinical competence of senior nursing students?

2. Does participation in an HFS increase self-confidence and clinical competence more than traditional task trainer/student demonstration methodology?

Population, Sample, Setting

The population will be senior nursing students enrolled in a senior level nursing course: Developing Family and Child in a traditional Bachelor of Science in Nursing. The convenience sample will include a potential of eighty volunteer participants completing the Student Self-Confidence and Clinical Competence Likert scales. The setting will be a Midwestern university with an undergraduate baccalaureate nursing student enrollment of 500.

Protection of Human Subjects

The study will be submitted for approval to the Institutional Review Board of Ball State University. A description of the study will be given to each participant in a cover
letter. Students will be invited to participate in the project through a letter of intention. They will be randomly assigned to control and study groups and after data is collected they will be given the opportunity to experience the other methodology. Participation will be voluntary with the opportunity to withdraw at any point. Participation or non-participation will have no effect on course grade. Informed consent forms will be signed by students who agree to participate in the study. Consent will include permission to be video-taped during the simulation experience. All data will be anonymous and will not contain any names or personal identifying information. Confidentiality will be maintained. Each participant will be assigned a code number for data management. The code list will be kept in a locked file accessible only to the researcher. The code list will be destroyed by shredding when data analysis is complete. No risks have been identified with participation in the study. Benefits include providing better understanding of the impact of HFS on student self-confidence and clinical competence. Understanding the outcomes of HFS versus traditional task-trainer/student demonstration methodology will help nursing faculty better prepare senior nursing students for a wide variety of clinical settings and with the transition to practice.

**Procedures**

After receiving permission from the Institutional Review Board of the university, a meeting will be scheduled with the Dean of the college and faculty to discuss details of the study. Nursing faculty will be invited to the meeting through faculty email.

Two faculty experienced in obstetrical nursing and HFS will be assigned to this project. Senior nursing students choose to participate and sign informed consent. The steps in the process include:
1. All participating students complete didactic content in obstetrical nursing.

2. Faculty and student review of mechanisms and functionality of computerized human patient simulator and HFS.

3. Students utilize the HFS case scenario named Polly Preeclampsia or the traditional task-trainer/student methodology as randomly assigned.

4. After HFS practice or traditional practice, students complete the Student Self-Confidence and Clinical Competence Likert scales.

5. After HFS practice or traditional practice, faculty evaluates student performance by completing the Clinical Competence Likert scale.

6. They will place completed scales in a brown envelop left in the main nursing office marked only with the researcher’s name.

7. After data is collected students have the opportunity to experience the case scenario using the methodology they did not use during the study.

Methods and Measurement

It is presupposed that self-confidence and clinical competence are integral components for development of clinical judgment and provision of high quality, safe patient care. Student self-confidence and clinical competence will be measured using the Lasater’s Clinical Judgment Rubric (Blum et al., 2010) Self-confidence and clinical competence is measured by student responses to four Likert-type items from four subscales based on Tanner’s model (noticing, interpreting reflecting, and responding). Student’s quantitative reflective score of perceived level of clinical confidence ranging from 1 to 4, with 1=calm/confident manner, 2=well-planned interventions/ flexibility, 3=evaluation/self-analysis, and 4= commitment to improvement (Blum et al., 2010).
Clinical competence is measured through student and faculty responses to four Likert-type items providing a quantitative reflective score of perceived level of clinical confidence ranging from 1 to 4, with 1=expected patterns, 2=information seeking, 3=prioritizing data, and 4=clear communication (Blum et al., 2010).

Students will complete the self-confidence and clinical competence scale; faculty with complete the student clinical competence scale. The Likert scales will be completed independent of each other with a student proctoring the completion of the student scales to assure no faculty will see the data. Data will be analyzed using SPSS. An alpha level of 0.05 was determined to indicate statistical significance. Descriptive statistics will be completed on all variables including demographic characteristics. Measures of central tendency and variability will be calculated. Pearson correlation coefficients will be utilized to look at relationships between variables. Independent samples T-tests will be completed to look for differences between groups prior to the study. Independent samples T-tests also will be used to examine for differences between the two groups (HFS, traditional) on self-confidence and clinical competence and between faculty responses and those of students in each group.

Previous studies have provided evidence of inter-rater reliability (alpha = 0.87) and internal consistency (Cronbach’s alpha ranging from 0.886 – 0.931) (Gubrud-Howe, 2008). Content validity was assured by 3 nursing faculty (Blum et al). More recently Blum found internal consistency using Cronbach’s alpha for the self-confidence items to be 0.810 and for clinical competence 0.884. The self-confidence scale consisted of items measuring four dimensions: 1=calm/confident manner, 2=well-planned interventions/flexibility, 3=evaluation/self-analysis, and 4=commitment to improvement.
Clinical competence was measured using four items ranging from 1 to 4 each with a distinct focus: 1=recognizing deviations from expected patterns, 2=information seeking, 3=prioritizing data, and 4=clear communication (Blum et al., 2010).

**Research Design**

This study is a quasi-experimental, quantitative study to take place in the context of a senior level obstetrics course. The use of HFS versus traditional methodology of task-trainer/student demonstration is designed to build on prior levels of self-confidence and clinical competence to better prepare students for the clinical setting. Laboratory section enrollment (HFS, traditional) will approach random assignment, limited by prior student commitments. Demographic information will be gathered to examine for significant differences between groups prior to beginning the study. Appendix A contains steps involved in development and content of the HFS case scenario Polly Preeclampsia. Figure 1 contains an excerpt from the HFS case scenario Polly Preeclampsia.

**Roles for Polly Preeclampsia HFS case scenario.** Students are informed of the various roles and responsibilities prior to the HFS scenario. Participants are expected to perform assigned roles as if the clinical situation was real. Roles will be determined by random selection of index cards, one for each role. Individual roles are defined as

- primary nurse working with secondary nurse to provide care;
- secondary nurse assisting primary nurse;
- two clinical instructors acting as facilitators of case scenario;
- one student acting as nervous father of baby and husband of Polly Preeclampsia;
- one student acting as mother of Polly Preeclampsia;
Alternating groups of four students as observers;

one clinical instructor conducting interviews with students during debriefing process.

**Verbal report before simulation.** Time allowed for report will be five minutes. This will include time for students to ask any questions about Polly’s condition prior to the start of HFS practice. Each group of students will be given a scheduled start time for HFS and their role prior to entering the HFS laboratory. Student roles will be assigned through a random draw of index cards each of which contains a description of an individual role as well as specific prompts during HFS practice. After student roles are defined, a verbal patient report is given to the primary nurse. Between group rotations, students will wait in the adjoining room practicing psychomotor skills required for the simulation. Students will be informed of specific patient information prior to start of HFS practice.

Polly is a 27-year-old primigravida who was admitted last evening to the birthing center for cervidil insertion. Physician orders are in place for morning Pitocin induction of labor due to the development of preeclampsia in pregnancy. Polly is accompanied by her husband who is nervous about her elevated blood pressures. The patient has 2+ pitting pedal edema, DTRs are 2+, negative for clonus. Physician orders are on the chart. During report it was noted that intravenous Pitocin has started. The primary nurse is informed of the need to insert and anchor the urinary foley catheter. The range of the fetal heart rate is 120 to 140 beats per minute. Frequent acceleration episodes of fetal heart rate are measuring 15 by 15 beats; accelerations, no decelerations noted; there is moderate variability. Amniotic fluid membranes are intact. Polly reports feeling
uterine contractions, but rates them as mild. The fetal monitor is showing uterine contractions every 5 to 8 minutes lasting about 30-45 seconds. Polly denies need for pain medication.

Polly’s blood pressure is increasing, 186/122. All other vital signs are unremarkable, oxygen saturation is 98% on room air. The crash cart and eclamptic tray are sitting beside the patient’s labor room. The primary nurse is notified of need to reduce stimulation in the room and to hold a discussion with family members about leaving an order to reduce extraneous noise. Following report, the primary nurse will be presented with Polly’s chart containing admission orders along with Pitocin induction orders.

**Start of HFS practice.** Polly Preeclampsia is preprogrammed for vital signs and fetal heart tones. Father of baby and husband is prompted to state “are all of these IV’s necessary? Can she have something to drink?” Variable scenario cues are provided by facilitator if needed.

**7 minutes into HFS.** Father of baby/ husband is prompted to state “are my wife’s ankles supposed to be so swollen?” Variable scenario cues are continued by facilitator if needed.

**10 minutes into HFS.** Polly’s vital signs change, blood pressure is now 190/132, pulse rate 100, respiratory rate 28. She complains of a sudden onset of shortness of breath. Oxygen saturation is dropping to 88% on room air. FHT baseline is declining; lungs now have crackles. Facilitator presents new laboratory values to the primary nurse. Husband is prompted to state “what is happening? Is something wrong with my baby? Why is my wife having trouble breathing?”
**15 minutes and Transfer of patient care.** Patient care is directed toward preparation for emergency delivery, with an immediate cesarean section. (Gilbert, 2011; Schubert et al., 2011).

**Intended Method for Data Analysis**

Data will be analyzed using SPSS. An alpha level of 0.05 was determined to indicate statistical significance. Descriptive statistics will be completed on all variables including demographic characteristics. Measures of central tendency and variability will be calculated. Pearson correlation coefficients will be utilized to look at relationships between variables. Independent samples T-tests will be completed to look for differences between groups prior to the study. Independent samples T-tests also will be used to examine for differences between the two groups (HFS, traditional) on self-confidence and clinical competence and between faculty responses and those of students in each group.

**Summary**

The purpose of this study is to determine the impact of HFS methodology on student self-confidence and clinical competence. This project will provide information about the use of HFS in senior nursing curricula for application of knowledge and skills to an obstetrical case scenario. Participants will include 80 senior level nursing students enrolled in a Midwestern university Bachelor of Science in Nursing program. Data will be collected over one semester during a course called Developing Family and Child.

The Student Self-Confidence and Clinical Competence Likert scales will be used to quantify student perceptions of self-confidence and clinical competence. Items from the four subscales are used to evaluate self-confidence and clinical competence following use of HFS or traditional methodology. Pearson correlation coefficients will reveal
strength and direction of relationships between variables. Results will provide information on the influence of HFS as compared to traditional methodology on caring attributes of self-confidence and clinical competence of senior nursing students.

HFS clinical lab practice allows students to organize knowledge into effective quality patient care. This method of teaching and student learning is an important aspect of critical thinking development in novice nursing. The bottom line advantage to HFS technology is the ability for students to learn and feel safe practicing critical thinking and calculated skills. HFS experiences can be repeated until mastered before real patient care delivery occurs.


Dillard, N., Sideras, S., Ryan, M., Carlton, K., & Siktberg, L. (2009). A collaborative project to apply and evaluate the clinical judgment model through simulation. *Nursing Education Perspectives, 30*(2), 99-104.


Appendix A

Executing HFS Case Scenario Polly Preeclampsia.

Clearly defined terminology can enhance understanding and consistency of simulation practice. The HFS case scenario used for this project will be a patient with preeclampsia. The HFS case scenario was applying Standards of Best Practice: Simulation (INASCL Board of Directors, 2011) Standards I through VI with inclusion of critical elements as supported by evidence-based practices. The HFS case scenario is focused on increasing student self-confidence and clinical competence and transference to the clinical setting.

Simulation Standard I: Terminology

Defining terminology provides clear understanding and consistency during HFS practice (Meakim et al., 2011). Preeclampsia is defined as development of hypertension and proteinuria in a previously normotensive patient after the second trimester or in the early postpartum period. In the presence of trophoblastic disease, it can develop before 20 weeks of gestation. This condition predisposes the woman to potentially lethal complications, including disseminated intravascular coagulation (DIC), acute renal failure, hepatic failure, adult respiratory distress syndrome, and cerebral hemorrhage. Preeclampsia contributes significantly to intrauterine fetal death and perinatal mortality. Causes of perinatal death related to preeclampsia are uteroplacental insufficiency, and abruptio placenta, preterm birth and low birth weight (Gilbert, 2011; Meakim et al., 2011).
Simulation Standard II: Professional Integrity of Participant

Professional integrity related to confidentiality and collaboration during HFS will support the experience and project (Meccariello et al., 2011). Cognitive activities required prior to simulation are: lecture notes, didactic readings, orientation to simulator, review of expectations of scenario, review of expectations of assigned roles, and expected time frame. Student preparation for simulation lab will include didactic content covering hypertensive disorders in pregnancy that is part of a senior level nursing course: Developing Family and Child. The required student reading assignment in the course text is a chapter on Hypertensive Disorders (Gilbert, 2011; Meccariello et al., 2011). Required student psychomotor skills prior to simulation are: vital signs (VS), fetal heart monitoring (FHM), perinatal assessment, urinary foley catheter insertion, intravenous (IV) therapy, intake and output monitoring (I&O), and postpartum assessment.

Simulation Standard III: Participant Objectives

“The simulation experience should focus on student educational objectives and experience level” (Gore et al., 2011, p. s10). The objective of this obstetrical simulation experience is to develop clinical judgment in order to deliver high quality and safe nursing care for the high risk mother and fetus. The learning outcomes will be the transfer and application of knowledge and skills into a clinical setting. This experience should produce a higher level of comprehension, analysis, synthesis, and evaluation. The learning outcomes and goal of this project is that students will demonstrate competent psychomotor skills and appropriate evidence-based clinical judgment in care of the patient with preeclampsia (Gilbert, 2011; Gore et al., 2011).
Simulation Standard IV: Facilitation Methods

Many types of HFS are recognized and used for simulation to replicate real-life experiences. The experience level of students was considered when developing this HFS learning experience case scenario for senior nursing students (Schubert et al., 2011).

Students will arrive in the simulation lab and be given report on the simulation patient. Information provided includes the following: Polly Preeclampsia a 27-year-old Caucasian female, primigravida, 37 weeks gestation who was admitted to the birthing unit the previous night for cervidil insertion. Her current weight is 80 kg, height is five feet six inches and she has no known allergies. Polly’s pregnancy has been uneventful until current diagnosis of preeclampsia. The patient has no significant past medical history and denies drug or alcohol use. Induction of labor will begin this morning due to preeclampsia. Polly was in her physician’s office yesterday with a blood pressure of 170/112 mmHg; pulse rate 80; respirations 12; proteinuria 30 mg/dl; 24 hour urine pending; generalized edema of face and abdomen with 3+ pitting pedal edema. Deep tendon reflexes (DTR) are 2+, negative clonus. Fetal heart tones are 120 to140 beats per minute with good variability; reactive and no decelerations noted. Cervix was thick and closed at cervidil application this morning at 2cm, 50% effaced, and posterior. She is accompanied by her support person, her husband. He is anxious about her elevated blood pressure.

Time and location of simulation. Expected simulation run time is 30 to 40 minutes. Debriefing after simulation will be planned for 40 to 45 minutes. Completion of the Student Self-Confidence and Clinical Competence Likert scales will occur immediately after simulation. Faculty and students will have access to a videotape of the
performance during simulation (Howard, 2010). Videotaping will begin after each student receives report about Polly Preeclampsia. Videography will give faculty and students the opportunity to reinforce learning from HFS (Lasater, 2007). Location of simulation practice and debriefing will be held in the School of Nursing’s clinical simulation lab.

**Equipment available in simulation lab.** The most important piece of equipment needed for the success of this project is the HFS manikin, Polly Preeclampsia. Other equipment needed and available to students will be

- fetal monitor located in the labor and delivery unit of simulation lab;
- labor and delivery style patient bed;
- IV start kits with IV tubing and primary line fluids 1000 ml Lactated Ringers;
- two secondary IV lines including Magnesium 40 grams in 1000 ml Lactated Ringers and Pitocin 10 units in 1000 ml Lactated Ringers;
- two IV infusion pumps;
- urinary foley catheter;
- variety of oxygen delivery equipment: nasal cannula, mask;
- patient identification wristband;
- crash cart with airway management, suction and emergency medications;
- IV pressure infusion bag;
- Medications available will be post-operative antibiotics, eclamptic tray containing medication including Hemabate 0.25mg vial.
**Diagnostics available during simulation.** Prior to simulation, or during event, student will have the following laboratory values for assessment:

- urine protein;
- complete blood count (CBC) to include hemoglobin and hematocrit;
- serum creatinine;
- platelet count;
- fibrinogen levels;
- liver enzymes;
- glucose;
- type and screen, type and cross for blood;
- prothrombin time (PT), partial thromboplastin time (PTT);
- blood urea nitrogen (BUN).

**Documentation tools available.** Recognized by Tanner’s Model of Clinical Judgment, students will be expected to document the key elements of noticing, interpreting, responding and reflecting, (Blum et al., 2010) in an attempt to reflect the thinking processes of student nurses-making clinical judgments during a HFS case scenario. The documentation tools available will be

- physician orders for admission, standing preeclampsia orders, post-operative;
- nursing documentation flow sheet for preeclampsia;
- medication administration record;
- VS and fetal heart tone (FHT) graphic record;
- shift assessment narrative notes;
code record, anesthesia, consent forms, recovery record, transfer orders.

Simulation Standard V: The Debriefing Process

According to Mayville (2011) debriefing after simulation can facilitate knowledge and skill acquisition as well as enhance clinical judgment. Debriefing is an essential step in student learning processes. Debriefing gives each student an opportunity to reflect on self-confidence and clinical competence after participation in HFS case scenario (Decker et al., 2011). The following questions are a guideline for faculty interviews with students post HFS experience.

1. How did you feel during and after the simulation experience?
2. Give examples of how you met the objectives for the HFS case scenario.
3. Describe the objectives you were able to achieve?
4. Which health care team member was most helpful?
5. Which health care team member was least helpful?
6. Did your pre-class knowledge level prepare you to meet the objectives?
7. Did your pre-class psychomotor skill level prepare you to meet the objectives?
8. Were you confident with your ability to work through the situation?
9. Looking back, would you have handled any aspects of the simulation differently?
10. What did the group do well?
11. What did the group need to improve on?
12. What did the team identify as the primary nursing diagnosis?
13. What were the key assessments?
14. Were there any key interventions identified?

15. Is there anything else you would like to discuss or share?

Polly Preeclampsia scenario specific discussion questions

1. Discuss IV fluids, Magnesium IV drip and the rationale behind this intervention.

2. Discuss lack of oral intake order and when to call the physician.

3. Discuss intrauterine resuscitation and what went well.

4. What did you omit or forget or not notice or not respond to during the scenario?

5. The Pitocin was stopped at time of patient deterioration. Discuss the rationale for why this was appropriate.

6. Were the documentation tools helpful?

7. Were the admission labs appropriate for a pregnant patient with preeclampsia?

8. What was significant about the new labs?

9. Were the physician orders complete?

10. What resources, orders, or patient information would you have liked to have had?

11. What complications do you anticipate with decreasing FHT’s?

12. What do you do for Intrauterine Resuscitation and why?

13. What are important points to remember when preparing someone for surgery?

(Decker et al., 2011; Gilbert, 2011; Mayville, 2011).
**Simulation Standard VI: Evaluation of Expected Outcomes**

Sando et al. (2011, p. s18) state, “simulation is an acceptable method of evaluating knowledge, attitude and skills.” Evaluation of expected participant outcomes may include student self-confidence and clinical competence (Sando et al., 2011). The evaluation of expected outcomes will be quantitatively instrumented through application of Student Self-Confidence and Clinical Competence Likert scales. At the end of individual student interviews, faculty will write a brief note regarding their perspective of student’s demonstration of clinical self-confidence and clinical competence after HFS practice.

**Student Self-Confidence and Clinical Competence Likert scale.** Lasater’s Clinical Judgment Rubric (Blum et al., 2010), based on Tanner’s model, utilizes Likert-type scales to quantify student’s perceptions of self-confidence and clinical competence. Items from the four subscales (noticing, interpreting, reflecting, responding) are used to evaluate transfer of knowledge, confidence, and competence from the simulation lab to the clinical setting. Self-confidence is measured by student responses to four Likert-type items of perceived level of clinical confidence ranging from 1 to 4, with 1=clam/confident manner, 2=well planned interventions/flexibility, 3=evaluation/self-analysis, and 4=commitment to improvement (Blum et al., 2010). Clinical competence is measured through student and faculty responses for four Likert-type items of perceived level of clinical confidence ranging from 1 to 4, with 1=expected patterns, 2=information seeking, 3=prioritizing date, and 4=clear communication (Blum et al., 2010). Responses will be used to determine the relationship between a senior nursing student’s participation.
in HFS as compared to traditional task trainer/student demonstration and perceived self-confidence and clinical competence in a clinical setting (Blum et al., 2010).

Faculty and students will complete four Likert-type items to identify level of clinical competence. Using the Likert-type scale the following questions related to HFS and self-confidence and clinical competence with 1=expected patterns, 2=information seeking, 3=prioritizing date, and 4=clear communication.

1. Student functioned well as the primary nurse.
2. Student was proficient during the first assessment of Polly Preeclampsia.
3. Student answered questions from relatives appropriately.
4. Student prioritized Polly’s patient care measures appropriately.
5. Student recognized care interventions needed with changes in patient’s condition.
6. Student recognized changes in Polly’s VS.
7. Student recognized changes in FHT.
8. Student prepared correct dosing and drip rate of IV therapies.
9. Student reported significant patient information to the doctor.
10. I recognized signs and symptoms of Polly and preeclampsia.

Summary

The Student Self-Confidence and Clinical Competence Likert scales will be used to measure student self-confidence and clinical competence post HFS practice. Faculty will debrief student groups after the HFS case scenario using predetermined questions. Debriefing data will be collected in an interview. Students will complete the Student Self-
Confidence and Clinical Competence scales. Faculty complete the Student Clinical Competence scales on each student based on their own perceptions.