The Effect of High Fidelity Patient Simulation on Competency and Clinical Reasoning Skills amongst Undergraduate Nursing Students: A Research proposal

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Part 1

Introduction

Background of the Problem

Professional competency is a major concern in the healthcare environment today. The healthcare environment is complex and changing, in attempting to meet the health needs of the community it serves. There is a concern that entry-level nurses are not prepared to provide the quality of care needed in their practice (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010; Frontiero & Glynn, 2012; Keating, 2011). Due to the rise in patient acuity, hospital readmissions, and patient mortality, nurses are expected to provide safe, effective care (Durham & Alden, 2008). Therefore, nursing education programs need to train and graduate nurses who are capable of providing safe patient care. Nursing curricula are presently going through a transformation, where the emphasis is placed on the measurement of student learning outcomes, quality, safe patient care, evidence based practice, and the application of technology (Keating, 2011).

Traditional educational experiences alone may not be sufficient for the new graduate to transition smoothly from theory to practice (Durham & Sherwood, 2008). To prepare our future nurses for practice, human patient simulation (HPS) is being implemented into the curriculum; this learning strategy may be useful for promoting safe patient care, while enhancing student learning outcomes, in a non threatening environment (Brewer, 2011). This pedagogy allows the student to implement their knowledge, and skills in a safe "virtual clinical setting" without
causing potential harm to the patient (Berragan, 2011; Decker, Sportsman, Puetz, & Billings, 2008; Durham & Sherwood, 2008, p. 3).

**Problem Statement**

The challenges affecting nursing education today include less available clinical sites, shortage of nursing faculty, higher patient acuity, and a growing knowledge base (Jeffries, Clochesy, & Hovancsek, 2009). These factors contribute to the need for improved preparation of nursing students through innovative teaching strategies that ensure the intended transfer of learning (Elfrink, Kirkpatrick, Nininger & Schubert, 2010). HPS may help to fill this void, and allows nurse educators to recreate clinical situations where students have the opportunity to develop and refine their assessment skills, critical thinking and problem solving (Adamson, 2012; Laschinger, Medves, Pulling, McGraw, Waytuck, Harrison, M. & Gambeta, 2008). Jeffries, Clochesy & Hovancsek (2009) explain how HPS helps to fulfill clinical needs due to shortages of available clinical sites, and faculty shortages, and may be used to supplement, or replace clinical hours. The need for additional research in this area is apparent (Ross, 2012). Further investigation of the effect of HPS on students' competency skills, and clinical reasoning will be investigated.

**Purpose**

Review of literature suggests the need for future research on ways to assess critical thinking, reasoning, and collaboration among nursing students using simulation (Lewis & Ciak, 2011). Ross (2012) explains that since HPS replicates real clinical environments, the goal is for students to apply what they learned in simulation to the actual patient care setting. Therefore, the purpose of this study is to investigate the use of high fidelity HPS as a teaching-learning strategy to determine if there is a significant relationship between the use of high fidelity HPS and
competing and clinical reasoning skill acquisition among undergraduate nursing students.

Significance

The healthcare environment today challenges nurses with increased use of technology, increased patient acuities, and managing complex patient care issues (Elfrink, Kirkpatrick, Nininger & Schubert, 2012). Preparing novice nurses to perform safe, competent care will lead to improved patient safety, and outcomes. The increasingly complex role of the nurse necessitates acquiring a higher level of critical thinking and clinical judgment (Decker, Sportsman, Puetz & Billings, 2008; Lasater, 2007). The opportunity for nursing students to receive critical thinking experiences in their clinical rotations are challenged by limited clinical placement sites, and shortage of nurse faculty (Elfrink, Kirkpatrick, Nininger, & Schubert, 2010; Lisko, & O'Dell, 2010; Schlairet & Pollock, 2010). Nurse educators are challenged to help students develop higher order thinking skills, and alternative methods to provide students with clinical reasoning skills are required. In an active learning environment students will experience clinical situations and use cognitive, affective, and psychomotor skills. High fidelity simulation and debriefing will offer the students a realistic and challenging experience that will help them develop and practice clinical decision making skills (Jeffries, Clochesy, & Hovancsek, 2009). As students respond to the simulation scenario, they will demonstrate their abilities to prioritize, make decisions, take appropriate action, and function as part of a collaborative team (Jeffries, Clochesy, & Hovancsek, 2009). The outcomes of their actions provide the basis for their reflection during post-simulation debriefing, on the aptness of their response and clinical reasoning that will be of benefit in future practice (Lasater, 2007b).
Part II

Research Questions

Questions

1. Does the high fidelity HPS experience increase clinical reasoning ability, and competence in undergraduate nursing students?

2. What are the advantages and disadvantages of high fidelity HPS as an instructional strategy, over traditional clinical experience?

3. Are undergraduate nursing students satisfied with using high fidelity HPS as an educational strategy?

Operational Definitions

The method I chose for data collection for my study is dependent on the variables under observation. My research study questions the associative relationship between the two variables; the variables of interest in this study consist of the independent variable which is the high fidelity human patient simulation intervention, and the dependent variable is the acquisition of clinical reasoning skills as determined by the students' test scores.

1. Clinical reasoning described by Tanner, 2005 is the term used to refer to the processes by which nurses make their judgments, and includes both the deliberate process of generating alternatives, weighing them against the evidence, and choosing the most appropriate intervention. The Lasater Clinical Judgment Rubric (LCJR) is an evaluation tool used during the observations to measure students' demonstration of clinical reasoning and competency skills (Adamson, 2012; Lasater, 2007). It can also be used by the students as a self assessment reflective tool, and provides them the framework to describe their perception and progress after the instructional strategy they experienced (Lasater, 2007; Cato, Lasater & Peeples, 2009).
2. **Clinical judgment** is defined as "the ways in which nurses come to understand the problems issues or concerns of patients," and how they respond to this knowledge in concerned and involved ways. Clinical judgment and clinical reasoning are often used interchangeably and the Lasater Clinical Judgment Rubric (LCJR) is an evaluation tool used during the observations to measure students’ demonstration of clinical reasoning and competency skills (Lasater, 2007; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013, p. 149).

3. **Competency** is defined by Decker et al. (2008) as the development of knowledge and psychomotor skills which can be applied in context to a given situation. A tool to measure competency is the Lasater Clinical Judgment Rubric (LCJR).

4. **High fidelity simulation** is defined as a learning strategy that utilizes sophisticated lifelike computerized mannequins which can be preprogrammed within clinical scenarios. The responses to interventions mimic responses an actual patient may have based on the interventions the student chooses (Decker et al., 2008). The scenario is chosen from a set of simulations designed by Laerdal Medical Corporation (2013) Content validity has been established by Laerdal (2013) and is reviewed by faculty for congruence with the course content, and learning objectives. The Lasater Clinical Judgment Rubric (LCJR) is an evaluation tool used during the observation of the simulation intervention to measure students' demonstration of clinical reasoning and competency skills (Adamson, 2012; Lasater, 2007).

**Part III**

**Theoretical Framework**

**Simulation Framework.** The framework for my study includes the variables to determine the relationship between using human patient simulation (HPS) for improving student learning and patient outcomes. The variables that I am most interested in studying are HPS,
competency and clinical reasoning skills. In order to identify an appropriate framework for my study, I took into consideration the fact that patient simulation is a technology using experiential learning (Billings & Halstead, 2009). I also considered what framework would support student learning and patient outcomes. The following frameworks provide an underpinning for this study as they help to predict how the variables affect one another (Wood & Ross-Kerr, 2011).

Although I have chosen three frameworks which are all relevant to a simulation framework, I will model my study primarily after Tanner's Clinical Judgment Model and the Nursing Education Simulation Framework (NESF).

**Tanner's Clinical Judgment Model**

In relation to my study on human patient simulation (HPS) as an educational experience, a simulation framework should be used so that the technology can be designed for the learning that is intended (Billings & Halstead, 2009). Tanner's Clinical Judgment model provides a framework that would help students apply abstract concepts through a realistic patient simulation experience, and addresses critical thinking that is acquired through the experiential learning experience which is reinforced during the debriefing process (Cato, Lasater, & Peeples, 2009; Tanner, 2006). During the use of HPS, experiential learning is taking place where the student acquires knowledge through their interactive experience. Billings & Halstead (2009) suggest that the student reflects on this experience, and derives meaning from it as they transfer their new skill to a real life situation. In their article, Cato et al. (2009) describes Tanner’s Clinical Judgment Model as useful in providing a theoretical basis for investigating the relationship between HPS and the development of competence and clinical reasoning. The model supports the assumption that skilled nurses adapt to a given clinical situation by calling upon their self-confidence, critical reasoning and clinical competency (Tanner, 2006). It provides language to
describe how nurses think when they are engaged in complex, clinical situations that require judgment, and points to areas where specific clinical learning activities might help promote skill in clinical judgment (Lasater, 2007a). It can be used as a guide during debriefing where educators can provide feedback and coaching to help students develop insight into their own clinical thinking and reasoning.

This model also includes Benner’s (Titzer, Swenty, & Hoehn, 2012) novice to expert theory to emphasize the integrative role of noticing, interpreting, responding, and reflecting in the development of clinical judgment. Lasater’s (2007a) Clinical Judgment Rubric, grounded by Tanner’s model, quantifies the development of clinical judgment in nursing students. The instrument provides an original approach to evaluating the transfer of nursing knowledge, and competence, and clinical reasoning from the laboratory to the clinical setting among entry-level students.

**Nursing Education Simulation Framework (NESF)**

The Nursing Education Simulation framework (NESF) was developed by a group in conjunction with NLN and Laerdal, and is a comprehensive model that guides the design, implementation, and evaluation of patient simulation, and is also useful for evaluating clinical reasoning and continued competency in nursing (Jeffries, 2005; Smith & Roehrs, 2009). This framework, based on constructivist learning theory, contains five major components with associated variables. The five components are the teacher, student, educational experience, simulation design characteristics, and learning outcomes (Jeffries, 2005; Smith & Roehrs, 2009). The model's design includes providing clear objectives prior to simulation, consideration of the complexity of the simulation, cues given during episode, and debriefing following the scenario. This framework facilitates the application of theory into practice, and may lead to the
identification of best practices for simulation in nursing education (Reese, Jeffries, & Engum, 2010).

**Benner's Novice to Expert Theory**

Benner's novice to expert theory provides a framework that support stages of learning to include novice, advanced beginner, competent, proficient, and expert (Titzer, Swenty, & Hoehn, 2012). Benner distinguished novices from experts by citing clinical judgment capability and clinical competence. Simulation can fit into this framework because as the student progresses in skill, they use critical thinking to decide, and act during the course of the simulation. In the clinical setting nursing students must be able to make clinical judgments to identify patients' needs. This framework helps to describe how this learning experience may facilitate the transfer of the student's acquired knowledge to practice.

**Part IV**

**Literature Review**

**Introduction**

In today's ever-changing healthcare environment, nurses are faced with increasing demands in technology, increased patient acuities, and management of complex diseases (Elfrink, Kirkpatrick, Nininger & Schubert, 2012). Preparing and ensuring the competence of nursing students' will lead to improved patient safety and outcomes. By participating in high fidelity HPS students' may practice in a safe environment without the potential to harm a patient, while learning prioritization, competence, and clinical reasoning skills (Decker, Sportsman, Puetz, & Billings, 2008). The literature review will include concepts that are essential when integrating this form of experiential learning into the curriculum. The purpose of this study is to
compare the effects of two instructional methods on nursing students' clinical reasoning skills and competency.

**Theory to Practice Gap**

The fact that many new graduates are not adequately prepared for their new role as an entry level nurse is well documented in literature (Elfrink et al., 2010; Frontiero & Glynn, 2012). Many of these graduates do not meet the necessary entry level knowledge and professional competencies needed to smoothly transition into practice, and students often feel concerned about their ability to meet the expectations of the patient care setting (Elfrink et al., 2010; Frontiero & Glynn, 2012; Thomas, Bertram, & Allan, 2012). These factors contribute to the need for improved preparation of nursing students through innovative teaching strategies that ensure the intended transfer of learning, and quality of patient care (Billings & Halstead, 2009; Durham & Sherwood, 2008; Elfrink, et al., 2010; Keating, 2011; Thomas, Bertram, & Allan, 2012).

Literature review indicates that high fidelity simulation is perceived to be a valuable method for learning, and should have a positive effect on nursing students' transition from student to nurse (Dreifuerst, 2009; McCaughey & Taynor, 2010; Thomas et al., 2012). Furthermore, quantitative data collected by McCaughey & Taynor (2010) revealed that the participants believed that their experience with high fidelity simulators also enhanced the safety of their practice.

In addition to proficiency in psychomotor skills, graduate nurses must demonstrate effective clinical reasoning to apply sound clinical judgment in patient situations. Research is beginning to address an association with simulation as a critical component of experiential learning where students may transfer knowledge and strategies obtained during the experience to subsequent clinical situations (Dreifuerst, 2009; Elfrink et al., 2010; Frontiero & Glynn, 2012; Vyas, Ottis, & Caligiuri, 2011).
Simulation as a Learning and Evaluation Strategy

The role of nurse educators today is complex and challenging, and they are expected to produce graduate nurses who are competent in their ability to care for a higher level of acuity in patient care. Utilizing high fidelity HPS as a student centered learning strategy is becoming the accepted standard in nursing education, and have been integrated into nursing programs (Cato et al., 2009; Elfrink et al., 2010; Keating, 2011). Research suggests that this form of experiential learning should coincide with the didactic component of the curriculum, helping to reinforce content learned in lecture (Brewer, 2011; Elfrink et al., 2010). An important concern stressed in literature is the fact that appropriate use of this strategy requires thorough planning, and appropriate training for faculty using this intervention (Decker, Sportsman, Puetz, & Billings, 2008; Elfrink et al., 2010; Smith & Roehrs, 2009). In Brewer's (2011) study she explained that when evaluating students' during HPS there needs to be clear criteria to evaluate performance, and students' need to understand what is expected of them. As an evaluation tool HPS can be very effective while observing the activity, and during the debriefing phase after the simulation. Debriefing occurs immediately following the simulation activity whereby faculty and students reexamine the clinical encounter. Several sources have documented the effectiveness of debriefing as a tool to foster the development of clinical reasoning and judgment through feedback and "reflective learning," facilitating the link between" theory and practice" (Decker et al., 2008, p. 74; Dreifuerst, 2009; Lasater, 2007a; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013, p. 147)

Benefits of Simulation in Nursing Education

Much is documented in the literature regarding the need for nursing education curricular review and reform to prepare graduates for the ever changing healthcare environment.
The increasingly complex role of the nurse necessitates acquiring a higher level of critical thinking and clinical judgment, and is a necessary skill for detecting impeding deterioration in a patient's condition (Decker, Sportsman, Puetz & Billings, 2008; Frontiero & Glynn, 2012; Lasater, 2007a). The opportunity for nursing students to receive critical thinking experiences in their clinical rotations are challenged by limited clinical placement sites, limited exposure to high acuity patients, and shortage of nurse faculty (Decker et al., 2008; Elfrink, Kirkpatrick, Nininger, & Schubert, 2010; Lisko, & O'Dell, 2010; Oldenburg, Maney, & Plonczynski, 2012; Schlairet & Pollock, 2010; Vyas et al., 2011). In addition clinical faculty "may find it difficult to evaluate students' clinical judgment skills" in the clinical setting when they are supervising several students (Cato et al., 2009, p. 105). Studies have suggested that HPS provides the opportunity for students' to "critically think, prioritize, solve problems, gain self confidence, and care for patients in a non-threatening safe environment", without risking harm (Berragan, 2011; Billings & Halstead, 2009, p. 322; Brewer, 2011; Decker et al., 2008; Dreifuerst, 2009; Lewis & Ciak, 2011).

**Theoretical Position**

Throughout literature various theories have explained or predict outcomes in patient simulation, as a learning strategy, and it is evident that most studies use some form of theoretical framework to underpin their research (Billings & Halstead, 2009; Elfrink et al., 2010; Mariani et al., 2013). Literature on studies relating to the use of HPS have used various frameworks to guide their studies, including the Nursing Education Simulation Framework (NESF), Tanner's Clinical Judgment Model, Benner's Novice to Expert, and Kolb's adult learning theory.

NESF is useful as a guide in planning and carrying out the scenario and evaluating simulation activities (Billings & Halstead, 2009; Smith & Roehrs, 2009). Literature has
identified positive student outcomes when using this framework with HPS including knowledge, nursing interventions, skill performance, self confidence and satisfaction, and critical thinking, and reasoning (Frontiero & Glynn, 2012; Guhde, 2011; Jeffries, 2005; Jeffries, Clochesy, & Hovancsek, 2009; Smith & Roehrs, 2009). The phases of the Tanner Model are discussed by (Cato et al., 2009; Lasater, 2007; Mariani et al., 2013) as providing a framework for students' to organize their thoughts while managing patient situations.

Kolb's theory of experiential learning provides a theoretical foundation for the use of HPS as a strategy to help students' apply abstract concepts in realistic patient care scenarios (Adamson, 2012; Lisko & O’Dell, 2010; White, Brannan, Long, & Kruszka, 2013). This framework has been addressed as a process where knowledge is created by a transforming experience; the use of simulation allows students to experience the application of theory in an interactive and safe environment (Jeffries, Clochesy, & Hovancsek, 2009).

Benner's novice to expert theory has been used as a framework in studies to best develop students' knowledge and competency as they progress through the four phases of the model (Mariani et al., 2013; White, Brannan, Long, & Kruszka, 2013). Literature review reveals that Benner's model distinguishes the novice from the expert by observing the students 'clinical judgment capability and clinical competence; this can be further evaluated in the clinical setting. In their simulation study, Titzer, Swenty, & Hoehn (2012) explain that the HPS experience can be effective because it requires action and decisions from the learner, and this "gives the students' the opportunity to begin the transition from novice to expert" (p. 327).

**Data Collection Methods used in HPS**

Researchers recognize the need for greater objectivity in measuring competence, using
structured multi-faceted measures of several factors (Lasater, 2007) instead of only using simple observation of students’ implementation of the nursing process. Although literature has presented a positive reflection of HPS as a valuable teaching-learning strategy, there are few tools that specifically measure clinical reasoning during a simulation experience. The Lasater Clinical Judgment Rubric (LCJR) is a useful tool for simulation instructors to measure the students’ demonstration of clinical reasoning during the activity, and offers students the language needed to describe their progress (Cato et al., 2009; Lasater, 2007; Mariani et al., 2013). In the study by (Mariani et al., 2013) the LCJR was used to measure students' clinical judgment skills at the end of the simulation, prior to debriefing and described the instrument as being reliable and consistent. The Simulation Design Scale provides educators with feedback that can be useful for improving simulation design and implementation (Billings & Halstead, 2009; Smith & Roehrs, 2009). The Student Satisfaction and Self Confidence in Learning tool was used with positive results in studies by Adamson (2012), Cato et al. (2009), Lewis & Ciak (2011), and Smith & Roehrs (2009). Pre and post tests were frequently used in studies to measure gain in knowledge after the intervention (Adamson, 2012; Cato et al., 2009; Lewis & Ciak, 2011)

**Part V**

**Methodology**

**Study Design**

My proposed study will consist of a mixed method, two group, and quasi-experimental design. The simulation protocol used in this study is based on Jeffries' (2005) established simulation framework and guided by five simulation design characteristics: designing appropriate objectives, ensuring fidelity, creating appropriately complex simulations, providing consistent cues, and facilitating debriefing.
Assignment. The two clinical groups will participate in the study during their weekly assigned time for clinical, and are assigned to either the intervention or comparison group. The intervention group will receive practice via a patient simulation scenario using high fidelity manikins, while the comparison group will not receive any additional practice outside of their clinical and pre/post conference. The groups all receive traditional lecture with relevant medical-surgical content and discussion, and skill practice in the lab.

Setting. The simulated clinical experience intervention uses high-fidelity HPS in a skills laboratory setting that was designed to look like a realistic hospital room setting. The scenario was chosen from a set of simulations designed by Laerdal Medical Corporation (2013) and consisted of a post-operative cholecystectomy hemorrhage. Content validity has been established by Laerdal (2013) and reviewed by faculty for congruence with the course content, and learning objectives. Through this experiential learning activity students interacted with each other while working through the patient's crisis. This simulation scenario was selected to facilitate collaboration and promote critical thinking and clinical reasoning in a safe learning environment. Students will be briefed on the patient's status before the session, including pertinent medical and surgical history, laboratory values, medications, and physical assessment data. The session is videotaped, to reexamine the simulation experience during the debriefing phase.

Population

Sample. My sample decision will take into consideration the population that is most relevant and accessible at the time of my study. The study's sample will be taken from the two nursing clinical groups that are presently in their medical-surgical rotation. These groups are determined at the time of student course registration, based on the student's choice of time, and availability of clinical openings, and are representative of the target population.
The convenience sample of twenty students is selected at the time of the study using second semester junior nursing students in a four year baccalaureate nursing program. The students are pre-assigned into two clinical groups, and are presently in their four week medical surgical clinical rotation. This design is used to determine the differences in level of competency and clinical reasoning skill acquisition between the group experiencing the simulation experience and the group only attending a traditional clinical experience. Due to the fact that the groups are small, random assignment may result in an unequal distribution of important subject variables (Wood & Ross-Kerr). Although randomization is not used, the smaller sample of nursing students is representative of the target population. Demographic and situational variables that may intervene in the study, including difference in education level, age, gender, and GPA are taken into consideration. Although they are not being measured, "these variables would be controlled" by separating the two clinical groups equally with consideration given to these variables (Wood & Ross- Kerr, 2011, p. 101). Using strata in sampling will help to ensure that the two groups are represented equally or proportionately within the sample. (Wood & Ross-Kerr, 2011).

**Ethical considerations**

Approval for the study was received from the university's institutional review board. Participation in this research is completely voluntary, and students will be informed of the details and intent of the research study, and allowed to withdraw from the study at anytime without penalty (Wood & Ross-Kerr, 2011). A fully informed consent (Appendix A, p.25) is given and signed by the participants. There are no risks attributed to this study, including no monetary gain. In addition, any recorded data will be kept strictly confidential; simulation recordings will be locked up, and data collected from surveys or tests will be coded to keep anonymity.
Data Collection Methods and Tools

The variables in my study will be measured to ascertain if the group who experienced enhanced instruction with the high fidelity human patient simulation acquired improved clinical reasoning skills. Using multiple forms of measurement in a quasi experimental design helps to strengthen this type of design (National Center for Technology Innovation, 2013). For a thorough measurement of clinical reasoning skill acquisition I will use a mixed method, at three different time intervals to ascertain if the knowledge was retained.

The quantitative approaches will consist of a pre/post test with test questions taken from Health Education Systems, Inc. (HESI). This test is based on relevant course content and specifically related to the simulation scenario, and chosen to test clinical reasoning in both groups (Elsevier, 2012). The pre-test will measure the students' knowledge before the intervention, and the post-test will measure changes in knowledge in the cognitive domain. In addition, the 11 item Lasater Clinical Judgment Rubric (LCJR), using a 4 point Likert ordinal scale with 1 representing beginning clinical judgment and 4 representing exemplary clinical judgment, will be used as an instructor's evaluation tool during the observations to measure students' demonstration of clinical judgment, competency skills, and communication, and will be helpful to provide feedback during the debriefing (Adamson, 2012; Lasater, 2007). The LCJR will also be used by the students as a self assessment reflective tool with a 4 point Likert ordinal scale, and provides them the framework to describe their confidence in applying clinical reasoning to patient care and progress after the instructional strategy they experienced (Lasater, 2007; Cato, Lasater & Peeples, 2009). This tool describes the major components of clinical reasoning needed to respond to patient care situations including noticing, interpreting,
responding, and reflecting (Lasater, 2007). This measurement will be administered to the students at the end of the clinical rotation to see if the knowledge gained was retained.

Observation during the HPS will be utilized during the scenario, and used as a qualitative method of measurement. Wood & Ross-Kerr (2011) explain that this is a useful way to collect data due to the fact that you may "observe behavior as it occurs" (p. 173). This collection method, using a rubric or checklist will ensure reliability and validity because the simulation observation will be planned and recorded (Wood & Ross-Kerr, 2011). In addition, Wood & Ross-Kerr (2011) state that it may be used along with other methods, and "will assist in interpreting results obtained by other means of data collection" (p. 174).

Data analysis

**Pre and Post Test.** The pre/post tests will be measured using a paired t-test to show improved learning pre to post simulation. A frequency table using statistical regression analysis may be used to visualize comparisons between the pre/post test data (Wood & Ross-Kerr, 2011; Elfrink, Kirkpatrick, Nininger & Schubert, 2010; National Center for Technology Innovation, 2013). Investigators have found that using HESI exams to assess student knowledge provides validity and reliability which guarantees the exams are reflective of the ability to deliver the highest quality of critical thinking test items (Elsevier, 2012).

**LCJR Measurement.** The LCJR measurement has been examined and validated for face and content validity, construct validity, and criterion-related validity (Adamson, 2012; Lasater, 2007; Mariani et al., 2013). LCJR difference scores may be analyzed with a t-test to examine differences between the means of the two groups (Lasater, 2007; Wood & Ross-Kerr, 2011, p. 264). The LCJR scores of the students' in both groups may be compared and analyzed again at the end of the semester, using a repeated measures analysis of variance (RM-ANOVA) to assess
differences between the groups over time (Lasater, 2007; Mariani et al., 2013). The inclusion of well established teaching and evaluation tools that measured competency and clinical reasoning skills enhanced the accuracy and strength of this study.

**Conclusion**

High fidelity simulation has become more popular in recent years owing to the advances in technology. The present healthcare environment is complex, and nurse educators are challenged to implement instructional strategies that promote students' clinical reasoning and competency. High fidelity simulation can be used as an experiential learning and evaluation strategy in a safe realistic setting. This study would offer new insight on students' clinical reasoning acquisition during high fidelity simulation. Further research would indicate if this experiential learning strategy is effective at enhancing clinical reasoning skills when used as an adjunct to traditional clinical, or if it may be used as a partial replacement. Future studies with larger student samples of from various geographic locations will continue to expand the body of knowledge on the clinical decision making process of student nurses.
References


Appendix A

Consent Form

Dear Student,

My name is Anne Marie Holler; I am a graduate student in the Department of Nursing Education at the State University of New York Institute of Technology. You are invited to participate in a research project entitled: the effect on high fidelity human patient simulation and its effect on competency and clinical reasoning amongst undergraduate nursing students. This study has been approved by the University’s Institutional Review Board.

If you decide to participate, you will be asked to participate in group simulation scenarios and complete a survey about the simulation experience. The experience will take place during your assigned times of your medical surgical clinical rotation. The session will be audio and video taped so that I can accurately reflect on what is discussed. The tapes will only be reviewed by members of the research team who will transcribe and analyze them. You do not have to answer any questions that you do not wish to.

Participation is confidential, and study information will be kept in a secure location at the State University of New York Institute of Technology. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Participation in this research is completely voluntary and you may refuse to participate without consequence. I will be happy to answer any questions you have about the study, and you may contact me at 716-998-8888. If you have any questions about your rights as a research participant, you may contact the Office of Research Compliance at the State University of New
York Institute of Technology at 315-998-8888. Thank you for your consideration, your participation is greatly appreciated.

[Your signature below indicates that you have read the above information, are at least 18 years of age and agree to participate in the research study.]

____________________________________
Printed Name

________________________  ___________________
Signature Date