

EFFECT OF SIMULATION ON STUDENT
CLINICAL JUDGMENT AND CLINICAL PRACTICE

A RESEARCH PAPER

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Abstract

RESEARCH SUBJECT: Effect of simulation on student clinical judgment and clinical practice.

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The use of human patient simulation in nursing education will never fully replace real contextual patient care experience. However, it may assist nursing programs which have incorporated this technology into the curriculum to improve learning and development of clinical judgment development (Lasater, 2007a). This will be a partial replication of Dillard's (2009) study. The purpose of this study is to apply the use of Lasater's clinical judgment rubric in the evaluation of students clinical judgment while using simulation; evaluate student learning post simulation; and document student and faculty perceptions of the impact of simulation on clinical practice. Tanner's clinical judgment model will form the theoretical framework for the study. The sample will consist of 50 nursing

students in their junior year. Findings will provide information.

Chapter I

Introduction

With the increasing complexity of the current health care environment, it is more important than ever for nursing programs to prepare students to meet the challenges that face them. Gone are the days of nurses blindly carrying out the orders of a physician without critically thinking and questioning a possible error in that order. Today's complex health care environment requires the nurse to make quick assessments and clinical decisions (National League for Nursing, 2007). The knowledge and skill level required of professional nurses today dwarfs the expectations of nurses a decade ago (Carroll-Johnson, 2009).

The onus is on the school of nursing to prepare the student with the essential knowledge and skill set to enter the profession as a safe manager of care. Difficulty often lies in the transition from nursing student to nursing

professional. New graduates full of hope and excitement are often thrown into impossible situations (Leduc & Kotzer, 2009). Some hospitals accept new graduates into specialty units or high acuity areas without that customary year of medical-surgical experience. In these situations, the new graduate may not possess the proper knowledge, tools, and skills that are required to provide safe and effective care in that specialty area (Rumble, 2009). Internship programs and preceptor programs are available to new graduates in some facilities to help with this transition, but many of these programs fall short. If a new graduate is successful in making the connection between what is learned in the classroom and clinical practice, the transition from student to nurse may be eased.

Some of the literature suggests simulation as a possible answer to bridging this transition to practice gap. High-fidelity simulation provides the opportunity for students to practice in a safe environment without sacrificing realism (Dillard Sideras, Ryan, Hodson Carton, Lasater, & Siktberg, 2009; Bearnson & Wilker, 2005). Because simulation is still relatively new to nursing education, the evaluation tools are limited. The Nursing

Education Simulation Framework (Jeffries, 2005) was developed by a group in conjunction with NLN and Laerdal based on theoretical and empirical literature. The framework can serve to guide the design, implementation, and evaluation of simulation activities including clinical judgment. Simulation outcomes can be measured by students' demonstrated clinical judgments. The proposed study will be a partial replication of the Dillard et al. (2009) study which used the Lasater Clinical Judgment Rubric to evaluate the level of nursing students' clinical judgment. This rubric was based on the Tanner clinical judgment model and designed with simulation evaluation in mind.

Nursing students must also demonstrate proficiency in the clinical setting. Effective evaluation of students in the clinical setting requires enough clinical sites to accommodate all students. There are new schools of nursing opening and more applications being submitted for an already congested area. In Pinellas County, Florida, the site for this proposed study, there are 10 ADN and BSN nursing programs (Florida Board of Nursing, 2009) competing for clinical space in 11 hospitals. That is not counting the practical nursing programs who share the same sites. In

this same area, patient census drops in the spring and summer due to a decrease in the "snowbird" population. The combination of inconsistent census and numerous competing nursing programs creates a challenge for faculty in procuring meaningful clinical experiences for students. Simulation is a possible viable alternative to these live clinical experiences.

Simulation has been recognized by the Florida State Board of Nursing as an alternative to live clinical experiences. Simulation is now included in the Florida Nurse Practice Act and up to 25% of clinical hours can be in patient simulation (Florida State Board of Nursing, 2007). Human patient simulation occurs in a controlled environment using clinical scenarios performed with different levels of simulators. Simulation is designed to be a realistic yet non-threatening learning environment for the student. The students are given time to prepare for a given scenario, and then participate in the scenario followed by a debriefing for reflective learning.

Because simulation is still relatively new to nursing education, more research is needed to validate its effectiveness. Replication of the Dillard et al. (2009)

study would potentially provide empirical support for the results of the original study. Because a larger sample will be used in the replication study, the results may provide a more accurate representation of the target population.

Background and Significance

Simulators have been used in medical student and pre-hospital emergency medicine training since the second half of the 20th century. In the beginning, there were part-task trainers like Laerdal Resusci-Anne. In the 1960s the first generation of high-fidelity simulator, Sim One, was produced for anesthesiology training without much success due to prohibitive cost. In the 1980s the company which is now Medical Education Technologies, Inc. (METI) developed a high-fidelity simulator to be used for anesthesiology training (Bradley, 2006).

The use of patient simulators in nursing was brought about by national mandates for essential healthcare provider competencies. In 1998, the Pew Health Professions Commission called for critical thinking, evidence-based care, the use of interdisciplinary teams, and integration of information technology in the practice of health care professionals (Nehring, 2008). Realizing the need for

incorporating technology into nursing education, those programs that could afford to do so purchased high-fidelity simulators.

There are several types of simulators used in nursing education. The previously mentioned high-fidelity simulators are the most advanced. High-fidelity simulators are computerized simulators which provide realistic physiological and pharmacological indices in real time (Nehring, 2008). Available in adult, pediatric and infant models, this level of simulator provides the most realistic experience. Faculty can implement patient conditions to meet objectives of given courses with the option of creating acute, emergent patient conditions in a safe environment. One company, METI, developed a Program for Nursing Curriculum Integration (PNCI). The PNCI are pre-written, pre-programmed scenarios used specifically for nursing education. In contrast, low-fidelity mannequins provide anatomical representations only (Grady, Kehrer, Trusty, Entin, Entin, & Brunye, 2008). Medium-fidelity simulators may breathe, have heart, lung and bowel sounds, and even pulses, but provide no computerized physiological feedback or responses. Lastly, there are part-task trainers

which are models of a body part or specific system. These focus on specific skills such as heart auscultation, venipuncture, lung auscultation, etc. (Bradley, 2006).

The research supports advantages and disadvantages of patient simulation. Sullivan-Mann, Perron, and Fellner (2009) and Grady et al. (2008) agreed that simulation has a positive effect on improving critical thinking skills. When compared with traditional teaching methods, the realism of high-fidelity simulation enhances the attainment of knowledge, critical thinking and psychomotor skills.

An advantage of simulation is that it has been shown to increase student self-confidence (Bambini, Washburn, & Perkins, 2009; Morrison, Scaracello, Thibeault, & Walker, 2009). High-fidelity simulation can be successful in increasing the self-confidence of students and improving their ability to perform clinical skills. According to the research, these feelings of self-confidence should translate into practice by positively affecting nursing care behaviors.

Some advantages are echoed throughout the literature. The controlled environment offers a realistic yet safe platform for students to practice and hone their skills.

When delivered correctly, the simulation experience is non-threatening to the student and they can practice without the fear of harming a live patient (Dillard et al., 2009; Bearnson & Wilker, 2005).

According to Hicks, Coke, and Li (2009), there are also disadvantages to simulation. As advanced as the equipment may be, the simulator is not a real patient and there are certain physiological responses not possible. Beside the lack of certain physiological responses, the lack of emotional responses from the simulator is a clear disadvantage to holistic patient care. The safe environment of the simulation laboratory may negatively impact the student performance, since there is no consequence for lack of patient safety. This lack of true life may also translate into a lack of emotional stress on the student, since the patient is not really sick.

Initial cost, set-up, and maintenance fees make simulators cost-prohibitive for many nursing programs. The cost to faculty includes enormous time and effort. Faculty need to "buy into" simulation and be willing to take the training in order to be properly prepared. This can be difficult for faculty who may already feel overloaded.

Dillard et al. (2009) recognize one disadvantage as the lack of standardization for simulation use. No matter how simulation impacts the student, if it is not properly incorporated into the curriculum, it will not be effective. Once in the curriculum the simulation can be delivered in the same time and same way by all faculty so that no student is left out. This includes standardization for evaluating student learning in simulation. Bearnson and Wiker (2005) believe more research is needed to identify the best method for incorporating this technology into the nursing curriculum.

Problem

With the increasing number of nursing programs purchasing simulators and building simulation labs, there is still no consensus on how to implement and evaluate student performance with this technology. It is essential that in this evaluation faculty can help the student make the connection from classroom to simulation and from simulation to clinical practice (Dillard et al., 2009).

Purpose

The purpose of this study is to gather perceptions of students in transferring classroom knowledge to simulated clinical practice. A second purpose is to gather student perceptions in transferring what is learned in simulation to the live clinical setting. A third purpose is to provide faculty opportunity to use the Lasater Clinical Judgment Rubric to evaluate student performance in simulation and clinical.

Research Questions

1. Will student perceptions of their simulation experience reflect transference of didactic knowledge to simulation?
2. Will student perceptions of knowledge gained in their simulation experience reflect transference of that knowledge to the clinical setting?
3. What will faculty deductions reflect when using a clinical judgment rubric to evaluate student performance between simulation and clinical?

Theoretical Framework

Tanner's Clinical Judgment Model will be used as the framework for this study (Tanner 2006). Clinical judgment

is defined by Tanner as an "interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner, 2006, p. 204). The Tanner model portrays the thought process of nurses who are faced with intricate, uncertain, and almost countless variables in their practice. The model identifies four dimensions of clinical judgment including noticing, interpreting, responding, and reflecting (Dillard et al., 2009).

Definition of Terms

Simulation - Conceptual Definition

Simulation "provides a pedagogical link between science and education and the opportunity to evaluate student's clinical judgment abilities" (Dillard et al., 2009, p. 99).

Simulation - Operational Definition

An active simulation and debriefing session lasting about 15 minutes is administered to each student. A 4-point Likert type scale to measure the students' understanding of six selected simulation objectives. This is a self-assessed

understanding of the concepts by the students (Dillard et al., 2009).

Clinical Judgment - Conceptual Definition

Clinical judgment is an "interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner 2006, p. 204).

Clinical Judgment - Operational Definition

Students are expected to notice, interpret, and respond to the patient's respiratory distress; once the patient in the scenario is stabilized, cues for noticing will be given requiring further exploration and patient education (Dillard et al., 2009, p. 101).

Reflection - Conceptual Definition

Reflection is "the turning over of a subject in the mind and giving it serious and consecutive consideration" (Tanner 2006, p. 207)

Reflect - Operational Definition

"Each student will complete a self-assessment focused on the goals and objectives of the simulation experience"

(Dillard et al., 2009, p. 101). Students were assigned to heart failure patients and kept journals with guided written reflections following their care of the patient (Dillard et al., 2009).

Limitations

A major limitation to this study is the fluctuation in availability of patients with heart failure. Another limitation is the inconsistencies that may take place in the scenario delivery from each faculty participating. There may also be inconsistencies in what a student places in their journal and their actual clinical experience. Time limitations may require a reduction in the sample for the journal stage of the study leading to a reduction in the amount of data gathered.

Assumptions

Carefully planned simulations with the proper debriefing are an effective clinical experience. Simulation is effective in facilitating clinical judgment. The combination of the clinical judgment framework with the guided reflective journal provides a practical method for assessing student ability. Most students will perceive simulation as helpful in transference of knowledge from

classroom to simulation and then from simulation to live clinical.

Summary

The gap between what is learned in didactic and what transfers to live clinical remains open. High-fidelity simulation should be used to provide a necessary link between science and education as well as the opportunity to evaluate clinical judgment abilities. The first step of assessing the part simulation plays in acquiring clinical judgment skills is to gather perceptions of simulation effectiveness. In addition, a standardized tool to measure student ability must be implemented and used by all programs in order to evaluate the effectiveness of this teaching strategy across nursing programs. Using an established conceptual framework, this study will provide much needed data and reinforce the need for nursing programs to integrate simulation into their curricula.

Chapter II

Literature Review

Introduction

The increasing amount of knowledge needed to be a safe and effective nurse is forcing nursing programs to increase the amount didactic material with no increase in program hours. With this increase in didactic material the need for evaluating the abilities of students is as important as ever. This evaluation includes the student ability to apply what is learned in theory to clinical practice. High-fidelity simulation is one method of evaluating students' clinical judgment while providing an opportunity for recognizing gaps in their understanding of clinical practice (Dillard et al., 2009). In addition to clinical judgment the student must gain the ability to be a good critical thinker by the end of their clinical education (Weber 2005) and simulation can assist in

accomplishing this while promoting student confidence (Bambini et al., 2009).

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Organization of Literature

The literature review to support this study is divided into five sections: (a) conceptual model, (b) simulation to build and evaluate clinical judgment, (c) simulation to build and evaluate critical thinking, (d) simulation to build and evaluate self confidence, and (e) simulation to enhance knowledge and performance.

Theoretical Framework

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about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner, 2006, p. 204). The Tanner model portrays the thought process of nurses who are faced with intricate, uncertain, and almost countless variables in their practice. The model identifies four dimensions of clinical judgment including noticing, interpreting, responding, and reflecting (Dillard et al., 2009).

The use of simulation to build and evaluate clinical judgment

A study by Lasater (2007a) examined the challenges of development of higher level critical thinking and clinical judgment by students. Lasater explores high fidelity simulation as a possible remedy to this dilemma. The purpose of this study was to examine the effect of high fidelity simulation on the clinical judgment of students using this technology for the first time. Morgan's principles were used to facilitate the focus group using traditional framework for qualitative data analysis.

The setting for this study was a university simulation laboratory. Out of the 48 students participating in a larger study on the same subject, 39 were invited to participate in this focus group and 15 volunteered with a final sample of eight able to attend. As criteria for this study, only students participating in the larger study were eligible. It should be noted that a small cash award and gift card were awarded to the participants (Lasaker, 2007a).

A 90 minute videotaped focus group was held in the simulation laboratory. This was a participant-driven focus group with occasional open-ended questions for prompts. A traditional framework for qualitative data was followed. The data were organized first and then the videotape was watched several times while taking notes. Thirteen themes were identified out of these viewings. The 13 themes were then condensed into five major codes including: (a) simulation strengths and limitations, (b) the paradoxical nature of simulation, (c) desire for feedback, (d) value of connections with other students, and (e) recommendations for better learning. The researcher did not verify her findings with another researcher or take them back to the

students for verification diminishing rigor (Lasater, 2007a).

The Lasater (2007a) study identified strengths and weaknesses of clinical simulation. Strengths acknowledged by the focus group participants included the integration of theory, psychomotor skills and clinical practice during simulation requiring them to think critically. It also reinforced the importance for students to pay attention to detail. Another strength expressed by the participants was the opportunity to use simulation as a method of learning to deal with disease processes and problems they have not experienced in a clinical setting thus expanding their knowledge base. Students stated that even though they felt stupid and anxious in the beginning from not knowing how to respond to the simulation, it was a positive learning experience. The student connection was a positive experience and the group felt they learned from one another interactively during the simulation.

Limitations noted by the group included the use of only a female voice throughout the scenarios. The simulator itself had limitations, such as the inability to change facial expressions; therefore, providing no nonverbal

communication. Neurological assessment was limited due to the lack of reflexes. No inflammatory responses could be simulated reducing the presence of certain physical signs. In addition, a desire for more immediate feedback was expressed by the students.

Due to the ever-evolving acute care setting faced by new graduates, the need for students to develop and faculty to evaluate clinical judgment skills is imperative. The participants of this focus group found that simulation was a safe place to help them develop those skills. Lasater (2007a) concluded that programs using high fidelity simulation should use focus groups at least once a year to gather student perceptions of the simulation experience and assess the effectiveness.

Perhaps one of the most difficult skills to assess in the clinical area is the students' clinical judgment ability. With advances in high fidelity simulation, the need exists for a tool to measure the effect of simulation on clinical judgment. Lasater (2007b) developed and tested such a tool was using a description, observation, revision, and review cycle approach to rubric development. The purposes of this study were: (a) describe students'

responses to simulation scenarios within the framework of Tanner's Clinical Judgment Model, (b) develop a rubric that describes levels of performance in clinical judgment, and (c) pilot test the rubric in scoring students' performance. Tanner's Clinical Judgment Model was the framework for this study.

The setting for this qualitative-quantitative-qualitative design study was a simulation laboratory. A sample of 39 students in their junior year and enrolled in an adult medical-surgical clinical course participated with a smaller sample of 26 observed in the scoring phase and a sample of eight participating in a final focus group.

Tanner's Clinical Judgment Model was used in the first three weeks during which time the model was expanded into 11 further dimensions. This expanded model became a quantitative instrument, the Lasater Clinical Judgment Rubric (2007b). Tanner's model described the major components of clinical judgment and measure: noticing, interpreting, responding, and reflecting. In Lasater's (2007b) rubric, the description of effective noticing was expanded to measure: (a) focused observation, (b) recognizing deviations from expected patterns, and (c)

information seeking. Effective interpreting was expanded to include (a) prioritizing data, and (b) making sense of data. Effective responding further included (a) calm, confident manner, (b) clear communication, (c) well-planned intervention/flexibility, and (d) being skillful. Effective reflection was further described by the dimensions of (a) evaluation/self analysis, and (b) commitment to improvement. Although Lasater's (2007b) rubric was tested, there was not enough data to obtain reliability data.

Lasater's (2007b) rubric was developed for use in measuring clinical judgment in a solitary occurrence. It is designed to provide students with a better understanding of clinical judgment development, evaluate their progress, and assist in identifying and achieving objectives. The rubric allows for the flexibility necessary when dealing with individual backgrounds.

Student performance was scored using the rubric in weeks four and five. With a maximum of 44 points, the scores ranged from 5 to 33 with a mean of 22.98 and a standard deviation of 6.07. There were no statistically significant findings for this group. The focus group yielded five themes: (a) simulation strengths and

limitations, (b) the paradoxical nature of simulation, (c) desire for feedback, (d) value of connections with other students, and (e) recommendations for better learning. The focus group reported that the simulations forced them to critically think. The resounding themes among the group were the desire for more feedback and the positive learning which occurred from student connection.

Lasater's (2007b) Clinical Judgment Rubric provided the necessary feedback for measuring clinical judgment development. Students desire for this feedback will assist in the evolution of their clinical judgment abilities. This assessment tool was essential in honing critical thinking to meet the demands of the clinical setting.

In some of the latest research to date, Dillard et al. (2009) identified that what students learn in the classroom does not always transfer to their judgment in the clinical setting. With the use of high fidelity simulation the researcher's goal was to evaluate and facilitate the closure of that connection between the classroom and the clinical setting. The purpose of this study was threefold: (a) create a workshop to examine faculty effectiveness in evaluating students' clinical judgment in a simulation

scenario, (b) evaluate student learning following a single simulation scenario, and (c) analyze student and faculty perceptions on the effectiveness of using simulation to improve clinical practice. Tanner's Clinical Judgment Model was used as a conceptual framework.

Two schools of nursing collaborated to provide classroom setting for a faculty workshop and simulation lab setting for the scenarios and student evaluations. A sample of 68 students in their junior year enrolled in an adult health course participated in the evaluation of simulation learning portion of the study. A subset of students who participated ($n = 25$) was selected for the final stage to reflect on clinical practice. Dillard et al. (2009) did not specify criteria for inclusion or a method for sample selection.

The first phase of the study, the faculty workshop, used a modified questionnaire based on the Cervero model. The 40-item questionnaire used a 5-point Likert scale to measure six subscales: (a) work environment, (b) motivation r/t nursing education change, (c) relation of educational program to change, (d) relation of educational offering to clinical judgment and simulation, (e) instructor

presentation, and (f) faculty self-evaluation on the application of the Clinical Judgment Model and Clinical Judgment Rubric. Implementation of knowledge gained from the faculty workshop would be a function of the 6 subscales. Higher scores would suggest that faculty had an increased probability of implementing the new evaluation techniques. The reported reliability of the faculty self-evaluation instrument was, $r = .94$ (Dillard et al., 2009). The second phase of the study used a 4-point Likert type scale to measure the students' understanding of six selected simulation objectives. This was a self-assessed understanding of the concepts by the students. No reliability was reported on this tool. The final stage of the study used Lasater's Clinical Judgment Rubric. This instrument was used to measure: (a) effective noticing including focused assessment, deviation recognition, and information seeking, (b) effective interpreting including data comprehension and prioritization, (c) effective responding including confidence and composure, communication, interventions and adaptability, and skill, and (d) effective reflecting including self evaluation and

willingness to improve. No reliability was reported on this instrument.

In the reported results of phase one, mean scores suggest that faculty increased their understanding of the clinical judgment model and associated rubric and perceived of themselves as competent to evaluate student clinical judgment. Faculty perceptions of the work environment were positive as measured on a 5-point Likert scale with 5 representing strongly agree/expert. Motivation of faculty was highest ($M = 4.7$) followed by instructor performance ($M = 4.5$) and organizational environment and educational program ($M = 4.3$). Responses to the eight items on educational program and change were lowest ($M = 3.9$).

The second phase of the study measured the students' understanding of the simulation objectives for a heart failure scenario. Based on a 4-point Likert scale, the students scored highest in the understanding of body positioning effect on breathing, ($M = 3.81$, $SD = 0.5$) and scored lowest on the use of lab values ($M = 3.12$, $SD = 0.82$).

The final phase of the study used information taken from student journals regarding clinical decisions made in

the clinical setting. The authors included examples of four student journal results and the manner in which Lasater's Clinical Judgment rubric was applied for evaluation. The student journal entries demonstrated a range of clinical judgment abilities.

Dillard et al. (2009) concluded by recognizing that standardization of curriculum and evaluation for simulation is lacking. The use of clinical simulation can be used as a supplement for allowing the student to focus on critical thinking and clinical judgment. These critical skills are often difficult to focus on as a student due to the overwhelming job of completing tasks.

The use of simulation to build and evaluate critical thinking

There is a relationship between critical thinking and clinical judgment. According to Facione and Facione (2008), "critical thinking is the process we use to make a judgment about what to believe and what to do about the symptoms being presented by the patient". "To arrive at a judgment about what to believe and what to do, a clinician should consider the unique character of the symptoms (evidence) in view of the patient's current health and life circumstances

(context), using the knowledge and skills acquired over the course of their health sciences training and practice (methods, conceptualizations), anticipate the likely effects of a chosen treatment action (consideration of evidence and criteria), and finally monitor the eventual consequences of delivered care (evidence and criteria)" (Facione & Facione, 2008, p. 2). This is the link between critical thinking and clinical judgment offered by Facione and Facione (2008); and because of this relationship, studies on critical thinking and simulation were relevant.

With more and more distance nursing programs, efforts to monitor critical thinking ability have become increasingly challenging. The impact of simulation on distance students' critical thinking ability was tested in a study by Rush et al. (2008). The purpose of this study was to understand the critical thinking of distance RN-to-BSN students who participated in a simulation designed with interactive questions (Rush et al., 2008). The researchers used a conceptual framework of critical thinking by Scheffer and Rubenfeld.

A sample of 33 RN-to-BSN students in their first semester participated in the study. They were distance

students dispersed throughout the southeastern state where the school is located so the physical setting varied. The academic setting was a simulation lab where the simulation scenario took place. There was a blend of students taking the course either online or by way of live television broadcast. The faculty teaching the semester-long health assessment course were not the researchers.

Using a faculty-developed, scripted scenario along with an intermediate fidelity simulator, the scenario was acted out by three faculty members. The CHF/COPD simulation was videotaped and converted for use by the internet students. Instruments used for data collection included written responses and interactive questions guided by the 17 major components of the Scheffer and Rubenfeld framework. The data were coded for this study. Questions to evoke critical thinking were posed at various stages of the simulation. The debriefing topics included the value of simulation, different actions they would have taken, confidence in their assessment, and prioritization. The first component of the Scheffer and Rubenfeld framework measures habits of the mind which include confidence, contextual perspective, creativity, flexibility and open-

mindedness, inquisitiveness and perseverance, intuition, intellectual integrity, and reflection. The second component measures skills and includes analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting, and transforming knowledge.

Habits of the mind are individualized predetermined tendencies of thought. Confidence improved for students who did not work with CHF/COPD patients regularly in their area of practice area of practice while confidence of students who did work with these patients was not affected. All students felt that simulation provided contextual perspective. Creativity was mostly generated by students who found the simulation to be too unrealistic. Flexibility and open-mindedness varied with their different experiences and backgrounds. Inquisitiveness and perseverance were higher across the board with the internet students as opposed to the television students. Intellectual integrity among the students varied with no particular pattern. Reflection was only reported as being expressed by the internet students.

Skills are the learned abilities and thought processes used to complete tasks. A gap in the analysis processes of

the students was reported overall. The students were successful in applying standards throughout the simulation. The discriminating abilities were good in prioritizing but were lacking in categorizing patient data. Information seeking was frustrating overall to the students who see themselves as doers. Logical reasoning was good across the board throughout the simulation. Finally, the students demonstrated skill in both predicting and transforming knowledge.

It was reported by Rush et al. (2008) that these RN-to-BSN students were able to conquer the limitations of geographical proximity to demonstrate all aspects of critical thinking habits and skills of the mind. The ability to create a realistic simulation environment was a difficult challenge. This study showed that this is a challenge worth the effort because with careful planning, human patient simulation is capable of promoting the use of critical thinking skills.

The problem of evaluating critical thinking was addressed in a study by Brown and Chronister (2009). Barriers of effective evaluation include inconsistent patient availability and inability to contour patient

assignment to challenge student level of knowledge. High fidelity human patient simulation can be a possible solution to overcome barriers of effective student evaluation. Skills acquired during patient simulation can assist student nurses in perceiving clinically meaningful patterns and expected outcomes, which builds their clinical competence and their clinical self-confidence (Brown & Chronister, 2009). The purpose of this study was to demonstrate the effect of simulation activities on critical thinking and self-confidence in an electrocardiogram nursing course. A framework was not identified for this study.

The study took place in the classrooms and simulation lab of a university. A convenience sample of 140 baccalaureate nursing students in their senior year and enrolled in a critical care course was selected. The students were randomly divided into treatment and control groups with 70 participants in each group. Students repeating the course were excluded.

A 30-item multiple choice computerized electrocardiogram exam (ECG SimTest) developed by Elsevier was used to measure critical thinking, assessment skills,

and therapeutic nursing interventions. Reliability was reported for the instrument as a mean point biserial correlation coefficient of 0.22 using the Kuder-Richardson formula 20. A five-item questionnaire was developed by the researchers to measure self-confidence with each item rated on a 5-point Likert-type scale. Evidence of reliability was provided (Cronbach's alpha = .899).

During weeks 2-5 of the semester the treatment group received 350 minutes of didactic instruction and 150 minutes of simulation while the control group received 400 minutes of didactic instruction only. Both groups completed the ECG SimTest and the self-confidence tool. Over the next few weeks the control group received 100 minutes of simulation and the self-confidence test was readministered.

The researchers reported no statistically significant differences between the treatment and control group for critical thinking, assessment and communication. There were significant differences between groups for confidence in ECG rhythm recognition and benefit of instructions with the control group indicating higher self-confidence post-simulation. The data from the tests and both groups were combined and a correlation analysis showed a significant

positive correlation between questions 4 and 5 and the ECG SimTest scores. This indicated a connection between higher critical thinking scores and higher perceived self-confidence scores. Further testing demonstrated no significant differences in ECG SimTest scores between students with telemetry experience and those who did not; but there was a significant difference between these two groups on questions 2, 4 and 5 of the self-confidence tool. Paired *t* testing showed statistically significant differences ($p < .05$) in the control group when comparing scores pre and post simulation demonstrating an increase in self-confidence. Posttest self-confidence scores were compared between first and second semester seniors. As expected, the second semester students demonstrated significantly higher self-confidence ($p < .05$).

Critical thinking scores specifically related to ECG concepts were not positively affected by simulation in this study. Critical thinking was affected by levels of experience as demonstrated by higher scores among second semester seniors and students with previous workplace exposure to telemetry. Simulation had a positive effect on the self-confidence of the students and, according to Brown

and Chronister (2009), this may translate to the clinical setting. The researchers reported that more confident students tended to score higher on the critical thinking measurement tool indicating some positive effect of simulation on critical thinking. Brown and Chronister (2009) concluded that nursing students with increased self-confidence tend to be better critical thinkers.

The development of different methods to evaluate students' critical thinking skills is essential for nursing program graduates to be successful and safe practitioners. Sullivan-Mann et al. (2009) completed a quantitative study to ascertain if simulation is an effective tool for developing these skills. The purpose of this study was to investigate the effect of using simulation as a teaching strategy on the critical thinking abilities of nursing students, particularly those in an associate degree nursing program. The Roy Adaptation Model was used as the conceptual framework for this study.

The setting for this study was the simulation lab of a Midwestern US college equipped with a high-fidelity simulator. An original sample of 56 Nursing II students was selected for the study with a final sample of 53

participants divided into experimental and control groups. Both groups participated in two simulation scenarios throughout the semester with the experimental groups receiving three additional simulation scenarios. The only criterion for inclusion was to be enrolled into the medical-surgical portion of the Nursing II course.

The instrument used in the study was the Health Science Reasoning Test (HSRT), a computer-based instrument which measures the critical thinking skills of health science students. The HSRT contains a pretest and posttest to measure five critical thinking skills including interpretation, analysis, evaluation, explanation, and influence. Data included HSRT composite scores and five subscale scores for inductive and deductive reasoning, analysis, inference, and evaluation for all participants for the control and experimental groups (Sullivan-Mann et al., 2009). The researchers reported selection of this tool for its established reliability and validity.

The researchers reported findings for the five critical thinking skills along with the subscales for both the control and experimental groups. Pretest and posttest scores as well as composite scores were compared using

ANOVA. The students in both the experimental and control groups answered more questions correctly on the posttest ($F_{1,51.0} = 8.78, p < .01$). The experimental group experienced three additional simulation scenarios and answered significantly more questions correctly on the posttest than on the pretest ($F_{1,26.0} = 6.74, p < .05$). There was no significant difference in the pre and post test scores of the control group.

Sullivan-Mann et al. (2009) demonstrated that simulation does have a positive effect on the critical thinking of students as evidenced by significant differences between pre and post test scores for the experimental group. The authors concluded that the three additional simulation scenarios made a significant impact on student critical thinking skills. The researchers recommended that nurse educators strive to incorporate human patient simulation into the nursing curricula as an active learning strategy.

The use of simulation to build and evaluate self confidence

In nursing education the use of human patient simulation to facilitate the connection between what is learned in theory and clinical practice is important.

Morrison et al. (2009) argue that the same degree of importance attached to the role of simulation in critical thinking development among distance RN-to-BSN students is appropriate for distance practical nursing students. As noted in the Bambini et al. (2009) study, clinical simulation experience can be effective in increasing students' self-efficacy in their ability to perform clinical skills. The purpose of this study was to examine the impact of human patient simulation on student self-confidence. A conceptual framework by Jeffries was mentioned in the literature review but there was no discussion about how this framework was applied to the study. The study took place on a college campus. Students rotated through four stations: a classroom, 3 simulation labs, and a computer lab. A convenience sample of 33 first-year distance practical nursing students was selected which was then separated into smaller, randomly assigned groups.

An experimental pre and post test was developed by the researchers to collect both quantitative and qualitative data. In addition, an evaluation survey was administered after the simulations. The pretest and posttest contained 25 identical questions measuring student knowledge in

nursing care of the mother and newborn during the antepartum, delivery, and postpartum phases. The tool was checked for content validity and validity was confirmed by three experts. Reliability was not reported. The simulation experience evaluation contained 27 Likert-type-scale questions and 6 open-ended questions. Addressed in this survey were categories of lab design, educational practices, and student self-confidence.

According to Morrison et al., quantitative data demonstrated an increase in student knowledge regarding nursing care of the maternal-infant and surgical patients ($M = -2.48$, $SD = 1.95$). These data indicated a statistically significant increase in student knowledge post-simulation, ($t(32) = -7.303$, $p < .05$).

The data showed that 92.3% of the students agreed or strongly agreed that the simulation scenarios provided them with a chance to practice with disease processes they had not yet encountered in the clinical setting. One hundred percent of the students agreed or strongly agreed that the simulation offered them the opportunity to practice skills and apply knowledge in a safe environment. One hundred percent of the students agreed or strongly agreed that the

simulations increased their confidence to practice in the true clinical setting.

Morrison et al. (2009) stated that both methodology and the instruments used for evaluation were limitations in this study. They also called for more research using a validated instrument such as the Educational Practice Scale for Simulation and Simulation Design Scale. The results of this study did indicate an increase in the students' knowledge and confidence which would hopefully translate to better critical thinking and clinical decision making.

Although simulation has been confirmed to have a positive effect on student learning, a study by Smith and Roehrs (2009) suggested that little is known about why. The purpose of this study was to examine the effects of simulation on student satisfaction and self-confidence and to identify other factors that correlate with student satisfaction and self-confidence. The Nursing Education Simulation Framework was used as the theoretical framework for this study.

The study setting was the simulation lab of a university. A convenience sample of 68 BSN students in their junior year and enrolled in a medical/surgical course

was selected to participate. The students had to be in the first medical/surgical course following fundamentals.

An instrument designed by the researchers was used for the collection of demographic characteristics data which the researchers then used to run correlations between demographics, student satisfaction, and self-confidence. The 13-item Student Satisfaction and Self-Confidence in Learning Scale was used to measure student satisfaction and self-confidence using a 5-point Likert scale. Reliability was reported with a Cronbach's alpha of 0.94 for the satisfaction subscale and 0.87 for the self-confidence subscale. The 20-item Simulation Design Scale (SDS) was used to measure the 5 subscales of objectives, support, problem-solving, feedback, and fidelity using a 5-point Likert scale. Reliability was reported as a Cronbach's alpha of 0.92 for the SDS. Both the Student Satisfaction and Self-Confidence in Learning scale and the SDS were developed by the National League for Nursing (2007).

The students were satisfied with the simulation experience overall according to the scores ($M = 4.5$, $SD = 0.5$). Scores showed most students experienced increased self-confidence after the simulation experience ($M = 4.2$,

$SD = 0.4$). A Mann-Whitney was conducted to determine any differences between students with experience with respiratory distress and students without experience. Scores were statistically insignificant. The scores for the SDS demonstrated positive responses from the majority of the students from the lowest mean score of Objectives ($M = 4.4$, $SD = 0.5$) to the highest mean score, Guided Reflection ($M = 4.8$, $SD = 0.4$).

No strong correlations were found to exist between the simulation design characteristics and the outcomes of satisfaction and self-confidence. Both outcomes had the highest correlation to Objectives, ($r_s = 0.614$) for satisfaction and ($r_s = 0.573$) for self confidence. Although they were the highest, they only demonstrated moderate correlation. The lowest correlation to satisfaction was Guided Reflection ($r_s = 0.452$) and the lowest correlation to self-confidence was Fidelity ($r_s = 0.430$). Objectives and problem solving appeared to be significant factors in predicting the outcomes of satisfaction and self-confidence. Further testing and analysis illustrated that no single variable had any significant correlation between that variable and the outcomes. There was significant

correlation between the outcomes and combinations of variables.

Smith and Roehrs (2009) concluded that a combination of variables are correlated with student satisfaction and self-confidence in high fidelity simulation. The authors identified a need for further research regarding the outcomes of high-fidelity simulation

Bambini et al. (2009) hypothesized that self-efficacy is a major factor affecting a student's performance in the clinical setting. The use of patient simulation may increase this self perception; and therefore, increase clinical judgment. The purpose of this study was to evaluate simulated clinical experiences as a teaching/learning method to increase the self-efficacy of nursing students during their initial clinical course in a prelicensure program. Bandura's self-efficacy framework was used as the framework for this study.

The setting was simulation lab using low, medium and high fidelity simulators. A sample of 112 first semester baccalaureate nursing students was selected for the study. A subsample of 20 students completed the follow-up survey. The sample of 112 was a convenience sample; therefore, the

only criterion was that they were preparing for their first clinical rotation.

A pre-test, post-test, and follow-up survey was developed to evaluate simulation as a method of instruction. Respondents rated their experiences using a 10-point Likert-type scale. Open-ended questions were included on the posttest and follow-up. The purpose of the surveys was to measure the self-efficacy level of students prior to and immediately after an eight station post-partum exam simulation experience. The follow-up was completed after the first day of the students' clinical experience. Content validity was determined by faculty with expertise in obstetric nursing and/or education but there was no reliability reported.

Quantitative findings reported by Bambini et al. (2009) showed a significant increase ($p < 0.01$) in student confidence with post-partum exam post-simulation (pretest $M = 28.6607$, $SD = 7.7187$; posttest $M = 42.1429$, $SD = 7.4542$). A significant increase in overall skills confidence was reported using the Wilcoxon Matched Pairs Rank test ($-M$ Ranks = 5, $+M$ Ranks = 55.46, test statistic = 2992.5, $p < .001$).

The qualitative data demonstrated that student confidence increased in how to conduct themselves in the clinical setting and, more specifically, during fundus assessment. The three topics identified from the qualitative comments included: (a) *communication* - the importance of both verbal and non-verbal with patients and families, (b) *confidence* - the increase of student self-confidence with patient interactions and psychomotor skills, and (c) *clinical judgment* - the importance of prioritizing, identifying abnormal findings, and knowing how and when to intercede.

The researchers concluded that although self-efficacy is important, simulation experiences should be focused on evaluating the patient care skills of students. The end result is to provide an atmosphere in simulation that will allow students to build confidence in their clinical skills, and hone their clinical judgment making for a safe well-rounded clinician. It is the authors' belief that simulation should be integrated into curricular design to help achieve this goal.

The use of simulation to enhance knowledge and performance.

Students and faculty of nursing programs often miss scheduled clinical days for reasons beyond the control of the faculty. Reasons such as low census, site visits, and weather conditions do not excuse students from the minimum clinical time required by every state board. Missed clinical time reduces the valuable time students need to build their critical thinking and clinical judgment skills. A study by Bearnson and Wiker (2005) reported on the use of human patient simulation when faced with the dilemma of missed clinical days during the 2002 Winter Olympics. The purpose of this study was to explore the benefits and limitations of using a human patient simulator as a substitute for one day of actual clinical experience. There was no framework identified for this study.

The setting for this study was a university simulation lab equipped with human patient simulators. The sample size for this study was undisclosed and described only as "two groups of students" (Bearnson & Wiker, 2005, p.442). The only criterion for inclusion was that the students were first-year baccalaureate nursing students.

The researchers created the instrument for this study. The instrument was a survey using a 4-point Likert-type scale containing four positive statements about the session and three open-ended questions. This instrument measured the students' perceptions of the learning experience using the simulators. Reliability of the instrument was not reported.

The students' responses were positive overall on the Likert-type statements. Mean scores reported on the four items were as follows: (a) increased knowledge of medication side effects (3.13), (b) increased knowledge of differences in patient responses (3.31), (c) increased ability to administer medications safely (3.06), and (d) increased confidence in medication administration skills (3.00).

In the open-ended questions the students indicated an increase in confidence post-simulation. They made positive comments on the importance of a thorough assessment, abnormal finding recognition, and the use of critical thinking. Students agreed that the use of a human patient simulator was a valuable experience and should be used in as an adjunct to clinical.

Based on the overall positive responses to the simulation experience, Bearnson and Wiker (2005) concluded that the use of simulation was a useful learning strategy. Simulation was a fairly new strategy at the time of the study. The authors identified the need to further explore ways of incorporating this technology into the curricula.

According to Grady et al. (2008), not all simulation will produce the same results and in this study the researchers addressed training students using different levels of simulator fidelity. The purpose of this study was to identify differences in student perceptions and student attitudes when using high-fidelity and low-fidelity simulation with a secondary purpose of examining the acceptance of simulation by student gender. No framework was identified for this study.

The setting for the study was a university simulation lab. A sample of 52 first-year nursing students was selected to participate in this study with a final sample of 39 students completing all requirements. The final sample included 27 women and 12 men. The two nursing procedures used for this study were nasogastric tube insertion and urinary catheter insertion. A 21-item

observer-based performance assessment instrument was developed for the nasogastric insertion. A 15-item observer-based performance assessment instrument was developed for the urinary catheter insertion. Both instruments measured student performance of the nursing procedures. Reliability for the observer-based nasogastric instrument was reported as a coefficient alpha of 0.93 and the reliability for the observer-based urinary catheter instrument was reported as a coefficient alpha of 0.84 indicating high reliability for both instruments. An eight-item post-training self-report questionnaire was developed to measure student attitudes about the simulator-based training they received using a 5-point Likert-type scale. A nine-item post-evaluation self-report questionnaire was developed to measure student assessment of their performance, confidence, and opinions about the training using a six 5-point Likert-type scale items, one yes/no/uncertain-type item, and two open-ended questions. Reliability for the post-training instrument was reported as a coefficient alpha of 0.88 indicating high reliability.

First the effect of fidelity on training was reported. Results reported for the observer-based instruments used

for both procedures and both genders showed a significantly higher performance level. This higher performance level was observed when using high-fidelity simulators compared to the low-fidelity simulators, ($F[1,37] = 2.83, p < 0.05$), indicating enhanced training effectiveness with high-fidelity. Results reported for the self-report questionnaire showed more positive student attitudes to using high-fidelity simulators compared to using low fidelity, ($F[1,37] = 3.22, p < 0.05$), indicating the advantages of high-fidelity reactivity and realism.

There was no overall difference in performance of procedures between the genders. There was a marginal significance in difference between the genders' interaction to simulator fidelity, ($F[1,37] = 1.83, p < 0.10$), indicating male students benefited more from high-fidelity than female students. Male students demonstrated more positive overall attitudes toward high fidelity compared to female students, ($F[1,37] = 5.01, p < 0.05$), indicating men were more receptive to novel technology than women.

Grady et al. (2008) concluded that simulation technology has positive impact on student learning. When compared with traditional teaching methods, the realism of

high-fidelity simulation enhances the attainment and retention of knowledge, instills critical thinking and psychomotor skills, and increases student self-confidence. The researchers agree that more research is necessary into the influence of simulation across a variety of applications.

A study by Hicks et al. (2009) addressed the lack of research on the effectiveness of preparing students with necessary knowledge and critical thinking skills using simulation versus live clinical. The purposes of this study were to: (a) examine the differences between traditional clinical experience and simulation as teaching methods in pre-licensure nursing education, (b) analyze how simulation training may impact knowledge, clinical performance and confidence levels of undergraduate students and compare this with traditional clinical experience, and (c) contribute to the body of knowledge on the uses and limitations of simulation in pre-licensure nursing education for both regulators and educators. No framework was identified for this study.

The setting for this study was a university college of nursing simulation lab and a hospital critical care unit. A

sample of 58 senior baccalaureate nursing students divided into two cohorts of 23 (for 2006) and 25 (for 2007) was selected. Each cohort was divided via random selection and placed in one of three practicum groups; simulation only, simulation and live clinical combined, and live clinical only. Criterion for inclusion was for the students to be enrolled in a required critical care course in their senior year (Hicks et al., 2009).

To assess knowledge acquisition and retention, 50-item pre and post intervention examinations were given prior to and after the simulation/clinical experience depending on the group. Reliability on the exams was reported with Cronbach alphas ranging from 0.6 to 0.7. Clinical performance was measured with one of three tools created for the three different scenarios which included chest pain, shortness of breath, and loss of consciousness. These evaluation tools contained 28, 29 or 30 items depending on the scenario. Student performance was videotaped and then evaluated by faculty using these tools. Reliability for was reported as Cronbach alphas of 0.72 for chest pain, 0.78 for shortness of breath, and 0.78 for loss of consciousness indicating adequate reliability. Self confidence was

measured pre and post intervention using a 4-point 12-item Likert-type scale. Reliability was reported as a Cronbach alpha of 0.93 for the pretest and 0.96 for the posttest indicating high internal consistency reliability. A 23-item questionnaire was given to live clinical and combination groups to evaluate their clinical experience. A 14-item questionnaire was given to the simulation and combination groups to evaluate whether they perceived the simulation experience to be beneficial to learning. Reliability was not reported for these tools (Hicks et al., 2009).

Data from the two cohorts was combined and analyzed as one group. Knowledge retention was highest in the live clinical group (88.5%) and lowest in the simulation only group (82.9%). There was no significant multivariate difference in knowledge change between the groups. However, there were statistically significant differences between groups at the 95% confidence level in the area of clinical performance with the live clinical and combo groups outperforming the simulation group. The live clinical and combo groups demonstrated higher levels in recognition of chest pain symptoms, chest pain assessment, assessment of

shortness of breath, shortness of breath intervention and the overall shortness of breath items (Hicks et al., 2009).

The researchers reported that there were no overall statistically significant differences in the group performance but noted that the combination and clinical groups rated higher than the simulation-only groups. Self-confidence in the simulation only and combination groups significantly increased after clinical/simulation experiences in the area of patients with acute changes in condition ($p < 0.05$). There was no significant change in self-confidence reported for the clinical only group. Most of the students in the clinical and combination groups either agreed or strongly agreed that their clinical experience was beneficial. Most of the students in the simulation and combination groups either agreed or strongly agreed that their simulation experience was beneficial (Hicks et al., 2009).

Due to the lack of statistical differences between the groups of students, Hicks et al. (2009) concluded that the effects of simulation on the clinical performance of nursing students remain inconclusive. Even though the evaluation showed significant increase in self-confidence

and perceived abilities by the students, the researchers point out that this perception is not enough in determining higher level problem solving, decision making, and psychomotor skills.

Summary

With the increasing use of patient simulators in nursing education, evaluation of nursing students' learning using simulation as a tool has become necessary. The literature review provided evidence that simulation is, in most of the conclusions, an effective venue for assessment clinical judgment and other interrelated characteristics to support this learning.

The first Lasater (2007a) study examined the effect of simulation on students' clinical judgment. Lasater concluded that simulation provided a safe environment to assess this judgment. The second Lasater (2007b) study addressed the development and testing of a clinical judgment rubric. She concluded the rubric provided the necessary feedback to measure clinical judgment. The Dillard et al. (2009) study examined the effectiveness of simulation on clinical judgment. They concluded simulation is an effective method of providing a safe environment for

students to focus on development of clinical judgment and critical thinking skills. In this study the researchers also recognized the lack of standardization of curriculum and evaluation regarding simulation.

This group of studies demonstrated clinical judgment can be assessed with simulation providing a safe, non-threatening environment. They also demonstrated how a clinical judgment rubric can be effective in assessment of clinical judgment skills during patient simulation.

The study by Rush et al. (2008) examined impact of simulation on distance students' critical thinking ability. They concluded that human patient simulation is capable of promoting the use of critical thinking skills. Brown and Chronister (2009) examined the effect of simulation activities on critical thinking and self-confidence of nursing students. They concluded simulation had a positive effect on the self-confidence of the students and nursing students with increased self-confidence tend to be better critical thinkers. Sullivan-Mann et al. (2009) investigated the effect of using simulation as a teaching strategy on the critical thinking abilities of nursing students. They

concluded simulation does have a positive effect on the critical thinking of students.

This group of studies demonstrated simulation can be an effective tool in assessment and development of critical thinking skills. Although critical thinking and clinical judgment differ in definition, the link is close and supports the relevance to this proposal.

Morrison et al. (2009) examined the impact of human patient simulation on student self-confidence. They concluded students' knowledge and confidence was increased using simulation. Smith and Roehrs (2009) examined the effects of simulation on student satisfaction and self-confidence and identified other factors that correlate with student satisfaction and self-confidence. They concluded a combination of variables come into play when correlating student satisfaction and self-confidence as two outcomes of high fidelity simulation. Bambini et al. (2009) evaluated simulated clinical experiences as a teaching/learning method to increase the self-efficacy. They concluded that although self-efficacy is important, simulation experiences should be focused on evaluating the patient care skills of students.

This group of studies demonstrated the use of patient simulation in building student self-confidence. There is a theme throughout the literature suggesting a student with higher self confidence is apt to perform better in the clinical setting. Brown and Chronister (2009) went as far to suggest a student with higher self-confidence will be a better critical thinker.

Bearnson and Wiker (2005) reported on the use of human patient simulation in increasing student knowledge, ability, and confidence. They concluded the use of simulation was a useful learning strategy. Grady et al. (2008) assess for differences in student perceptions and student attitudes when using high-fidelity and low-fidelity simulation. They concluded that simulation technology had positive impact on student learning. Hicks et al. (2009) examined effectiveness of high-fidelity simulation compared to traditional clinical, with real patients. They concluded that the effects of simulation on the clinical performance of nursing students remain inconclusive.

The last group of studies demonstrated the positive impact of patient simulation on student learning. With the exception of the Hicks et al. (2009) study, which produced

inconclusive results, patient simulation was an effective strategy for student learning.

All of this literature is relevant to this new proposed study. The use of simulation to evaluate clinical judgment, critical thinking, self-confidence, and enhance knowledge; and performance is linked to the conceptual model. Tanner's model included evaluating the individual ability to notice, interpret, respond, and reflect. The Lasater Clinical Judgment Rubric was expanded from the Tanner model to include dimensions for evaluation of clinical judgment as well as the other three focus areas addressed in this proposal.

Chapter III

Methodology

Assessment of a nursing students' ability to apply the didactic material learned in the classroom to the clinical setting and patient care is essential. Literature has shown that there are numerous barriers to overcome in the live clinical setting in order to accomplish this assessment. Human patient simulation has been identified as a possible solution to this problem. This is a partial replication of Dillard et al's. (2009) study. The purpose of this study is to gather perceptions of students in transferring classroom knowledge to simulated clinical practice. A second purpose is to gather student perceptions in transferring what is learned in simulation to the live clinical setting. A third purpose is to provide faculty opportunity to use the Lasater Clinical Judgment Rubric to evaluate student performance in simulation and clinical. The information in this chapter will include the population, sample,

procedure, measurement, methodology and design used to guide this study.

Research Questions

1. What will student perceptions reflect regarding the transference of didactic knowledge to simulation?
2. What will student perceptions reflect regarding transference of knowledge from simulation to the live clinical setting?
3. What will faculty deductions reflect when using a clinical judgment rubric to evaluate student performance in simulation and clinical?

Population, Sample and Setting

The population will include students matriculated in a southeastern state college associate degree nursing program with 670 enrolled students. The anticipated convenience sample will include all 168 third semester students who are in the level 3 medical-surgical course. The inclusion criteria for this sample will be students' enrollment in the required course who can meet the information needs of the study replication. Meeting the information needs includes participating in and completing all portions of the study including simulation, surveys, live clinical, and

reflection journal. Exclusion criteria are students who are repeating the third level and have had previous exposure to the selected scenarios. Also, participating in this study will be 14 master's prepared and above nursing faculty with 12-43 years of nursing/teaching experience.

This state college associate degree nursing program was selected based on the target population of entry level nursing students. In addition, this program has been using simulation since 1998 and now has a state of the art "mock hospital" with 6 high fidelity simulators and 7 medium fidelity simulators.

This study proposal will be submitted to the Ball State University Institutional Review Board and the Director of Institutional Research & Effectiveness of the college where the research will take place for approval prior to implementation.

Protection of Human Subjects

Strict adherence to all codes of ethics shall be paramount for this study. A risk/benefit analysis will be completed to ensure the research will provide a beneficial gain to nursing education versus any possible negative impact on the participants. Participant contribution to

this project include the increased ability to assess clinical judgment of nursing students using simulators and increased awareness of the students' need for additional assistance in developing the connection between theory and clinical. An additional benefit is the potential opportunity to use study data in strengthening the nursing program.

Procedure

After receiving IRB approval a letter of introduction will be sent to the Provost of the Health Education Center as well as the Dean of the College of Nursing explaining the purpose of the study. A meeting with the nursing Dean and Program Directors will be scheduled to discuss the details of the study, criteria for inclusion, anticipated sample, and instruments to be used. A meeting with the Director of Institutional Research & Effectiveness and the Provost will be arranged to discuss the details of the study, procedure details, and to obtain their approval.

The researcher will obtain a list of the students enrolled in the medical surgical course and arrange a briefing with the students and faculty. The researcher will invite the students and faculty to participate in the

study. The researcher will provide the potential participants with full disclosure of the study. If the participants agree to move forward, a written consent will be obtained.

The researcher will gather data from experiences of the faculty and students in a clinical simulation using human patient simulation including debriefing. Each student simulation session will be video-recorded. Each student will be evaluated by the faculty using the Lasater Clinical Judgment Rubric on how well they recognize, interpret, and respond to a patient in a heart failure exacerbation. Faculty will self-evaluate their use of the rubric. Post simulation students will self-evaluate on the understanding of simulation scenario objectives and on their clinical judgment skills in the clinical setting.

Instrumentation, reliability, and validity

One deviation from the original study is the exclusion of the faculty workshop. Instead an information session will be held on a faculty development day on the use of the Lasater Clinical Judgment Rubric. Because of this exclusion only portions of the modified Ryan, Campbell and Brigham questionnaire will be used. The last 7 questions on faculty

self-evaluation on the application of the Clinical Judgment Model and Clinical Judgment Rubric will be used.

Reliability of the original six subscale questionnaire was $r = .94$. Content validity will be evaluated by a panel of experts.

Student performance will be evaluated using the Lasater Clinical Judgment Rubric. This instrument is used to measure effective noticing, effective interpreting, effective responding, and effective reflecting. According to Dillard et al. (2009), the construct validity of the rubric was sustained by the faculty's ability to discern levels of student performance in simulation. Since validity varies in different samples and situations it should be examined in a study situation (Burns & Grove, 2005).

A six item questionnaire will be given to the students for self-evaluation of the simulation learning experience. The questionnaire will address the objectives of the simulation and measured using a 4-point Likert-type scale. Finally, the students will keep a journal reflecting their clinical decision making on all heart failure patients in the clinical setting. A t-test will be completed between

the participating students and the students who choose not to participate.

Design

The design of this study is evaluative, descriptive, and non-experimental. Evaluative research is used for determining the effect or outcomes of a program, treatment, practice or policy (Lobiondo-Wood & Haber, 2002). This study will be evaluating the usefulness of a rubric, the ability of the faculty to use the rubric effectively, and the perceived effectiveness of human patient simulation. Due to the lack of randomization, manipulation, or control this study meets the criteria for a non-experimental study.

Methods of Data Analysis

Descriptive statistics will be used for analyzing data from the faculty self-evaluation and student self-evaluation questionnaires. The reduction of data to manageable proportions using descriptive statistics will provide a clear summary of the data (Lobiondo-Wood & Haber, 2002). Reflection of student decision making and faculty conclusions using the rubric will be compiled and summarized.

Summary

Evaluating clinical judgment of nursing students is essential to ensure that programs produce safe, critically thinking professionals. With dwindling availability and the hectic environment of the clinical sites, the use of human patient simulators has increased in the evaluative process. Faculty will have an opportunity to practice performance evaluation using a clinical judgment rubric. Students and faculty will record their perceptions of assimilating human patient simulation into the learning process as an effective tool in building clinical judgment. The transference of that judgment into the live setting is imperative to providing quality care.

References

- Bambini, D., Washburn, J., & Perkins, R. (2009). Outcomes of clinical simulation for novice nursing students: Communication, confidence, clinical judgment. *Nursing Education Perspectives, 10*(2), 79-82. Retrieved from Academic Search Premier.
- Bearnson, C. S., & Wiker, K. M. (2005). Human patient simulators: A new face in baccalaureate nursing education at Brigham Young University. *Journal of Nursing Education, 44*(9), 421-425. Retrieved from Medline.
- Bradley, P. (2006). The history of simulation in medical education and possible future directions. *Medical Education, 40*, 254-262. Retrieved from Medline.
- Brown, D., & Chronister, C. (2009). The effect of simulation learning on critical thinking and self-confidence when incorporated into an electrocardiogram nursing course. *Clinical Simulation in Nursing, 5*(1), e45-e52. Retrieved from Mosby's Nursing Consult.
- Burns, N., & Grove, S. (Eds.). (2005). *The practice of nursing research: Conduct, critique, and utilization* (5th ed.). St. Louis: Elsevier.

- Carroll-Johnson, R. M. (2009). A day without a nurse. *Oncology Nursing Forum*, 36(3), 259. Retrieved from Medline.
- Dillard, N., Sideras, S., Ryan, M., Hodson Carlton, K., Lasater, K., & Siktberg, L. (2009). A collaborative project to apply and evaluate the clinical judgment model through simulation. *Nursing Education Perspectives*, 30(2), 99-104. Retrieved from Academic Search Premier.
- Facione, N. C., & Facione, P. A. (2008). Critical thinking and clinical judgment. In *Critical thinking and clinical reasoning in health sciences: A teaching anthology* (pp. 1-13). Millbrae, CA: The California Academic Press.
- Florida Board of Nursing. (2009). *Registered and practical nursing education programs*. Retrieved December 3, 2009, from Florida Department of Health Web site: http://www.doh.state.fl.us/mqa/nursing/nur_edu_info.html

Florida State Board of Nursing. (2007). *Nurse practice act.*

Retrieved December 3, 2009, from Florida Department of Health Web site:

http://www.doh.state.fl.us/mqa/nursing/info_PracticeAct.pdf

Grady, J. L., Kehrer, R. G., Trusty, C. E., Entin, E. B., Entin, E. E., & Brunye, T. T. (2008). Learning nursing procedures: the influence of simulator fidelity and student gender on teaching effectiveness. *Journal of Nursing Education, 47*(9), 403-408. Retrieved from Medline.

Hicks, F. D., Coke, L., & Li, S. (2009). *The effect of high fidelity simulation on nursing students' knowledge and performance: A pilot study.* Retrieved September 17, 2009, from National Council of State Boards of Nursing Web site:

https://www.ncsbn.org/09_SimulationStudy_Vol40_web_with_cover.pdf

Jeffries, P. R. (2005). A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nursing Education Perspectives, 26*(2), 96-103. Retrieved from Medline.

- Lasater, K. (2007a). High-fidelity simulation and the development of clinical judgment: Students' experience. *Journal of Nursing Education, 46*(6), 269-276. Retrieved from Medline.
- Lasater, K. (2007b). Clinical judgment development: Using simulation to create an assessment rubric. *Journal of Nursing education, 46*(11), 496-503. Retrieved from Medline.
- Leduc, K., & Kotzer, A. M. (2009). Bridging the gap: A comparison of the professional nursing values of students, new graduates, and seasoned professionals. *Nursing Education Perspectives, 30*(5), 279-284. Retrieved from Mosby's Nursing Consult.
- Lobiondo-Wood, G., & Haber, J. (Eds.). (2002). *Nursing research: Methods, critical appraisal, and utilization* (5th ed.). St. Louis: Mosby.
- Morrison, B., Scarcello, M., Thibeault, L., & Walker, D. (2009). The use of a simulated nursing practice lab in a distance practical nursing program. *Clinical Simulation in Nursing, 5*(2), e67-e71. Retrieved from Mosby's Clinical Consult.

- National League for Nursing. (2007, March 5). *NLN publishes first comprehensive guide to simulations in nursing education*. Retrieved December 3, 2009, from http://www.nln.org/newsreleases/simulation_030507.htm
- Nehring, W. M. (2008). U.S. boards of nursing and the use of high-fidelity patient simulators in nursing. *Journal of Professional Nursing, 24*(2), 109-117. Retrieved from Academic Premier.
- Rumble, M. (2009). Nursing internship program: Assisting new nurses in the transition from student to oncology nurse. *Oncology Nursing Forum, 36*(3), 59. Retrieved from Medline.
- Rush, K. L., Dyches, C. E., Waldrop, S., & Davis, A. (2008). Critical thinking among RN-to-BSN distance students participating in human patient simulation. *Journal of Nursing Education, 47*(11), 501-507. Retrieved from Medline.
- Smith, S. J., & Roehrs, C. J. (2009). High fidelity simulation: Factors correlated with nursing student satisfaction and self-confidence. *Nursing Education Perspectives, 30*(2), 74-78. Retrieved from Academic Search Premier.

- Sullivan-Mann, J., Perron, C. A., & Fellner, A. N. (2009).
The effects of simulation on nursing students'
critical thinking scores. *Newborn and Infant Nursing
Reviews, 9*(2), 111-116. Retrieved from CINAHL.
- Tanner, C. A. (2006). Thinking like a nurse: A research-
based model of clinical judgment in nursing. *Journal
of Nursing Education, 45*(6), 204-211.
- Weber, S. (2005). Promoting critical thinking in students.
*Journal of the American Academy of Nurse
Practitioners, 17*(6), 205-206.

Literature Review Table

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
Lasater (2007a)	One of the most difficult skills to assess in the clinical area is the students' clinical judgment abilities.	Describe students' responses to simulation scenarios within the framework of Tanner's Clinical Judgment Model, develop a rubric that describes levels of performance in clinical judgment, and pilot test rubric in scoring students' performance .	Tanner's Clinical Judgment Model	39 junior students enrolled in an adult-medical-surgical clinical course A smaller sample of 26 observed in the scoring A sample of eight participating in a final focus group	Non-experimental Methodological	Lasater Clinical Judgment Rubric	Lasater's Clinical Judgment Rubric provided the necessary feedback for measuring clinical judgment development. Validity of the findings may have been affected by continuing evolution of the rubric during the scoring.

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Lasater (2007b)	Development of higher level critical thinking and clinical judgment by students is challenge.	Examine the effect of high fidelity simulation on the clinical judgment of students using this technology for the first time.	Tanner's Clinical Judgment Model	Eight out of 48 students participating in a larger study on the same subject were selected.	Non-experimental Exploratory focus group	Retrospective analysis of videotaped focus group using five major codes, including simulation strengths and limitations, the paradoxical nature of simulation, desire for feedback, value of connections with other students, and recommendations for better learning	Programs using high fidelity simulation should use focus groups at least once a year to gather Students' perceptions of the simulation experience and assess the effectiveness.
Dillard, Sideras, Ryan, Hodson, Carlton, Lasater, & Siktberg	What students learn in the classroom does not always	Create a workshop to examine faculty effectiveness in evaluating	Tanner's Clinical Judgment Model	A sample of 68 junior students enrolled in an adult health course.	Non-experimental Evaluative	Faculty self-evaluation questionnaire on application of the	Standardization of curriculum and evaluation for simulation

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
(2009)	transfer to their judgment in the clinical setting.	students' clinical judgment and students' learning following a single simulation scenario; analyze students' and faculties' perceptions on the effectiveness of using simulation to improve clinical practice		A subset of 25 students participated in the final stage to reflect on clinical practice		Clinical Judgment Model and Clinical Judgment Rubric. Likert type scale to measure the self-assessed students' understanding of six selected simulation objectives. Lasater's Clinical Judgment Rubric	is lacking. The use of clinical simulation can be used as a supplement for allowing the student to focus on critical thinking and clinical judgment.
Rush, Dyches, Waldrop, & Davis (2008)	With more and more distance nursing programs, the need for monitoring critical thinking ability has	Understand the critical thinking of distance RN-to-BSN students who participated in a simulation	Concept-ual framework of critical thinking by Scheffer and Rubenfeld	33 distance RN-to-BSN students in first semester	Non-experimental Exploratory	Written responses and interactive questions guided by the 17 major components of the Scheffer	Students were able to conquer the limitations of geographical proximity to

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	become an increasing challenge.	designed with interactive questions				and Rubenfeld framework.	demonstrate all aspects of critical thinking habits and skills of the mind.
Brown & Chronister (2009)	Evaluation of critical thinking, clinical judgment and overcoming barriers of effective student evaluation such as inconsistent patient	Demonstrate the effect of simulation activities on critical thinking and self-confidence in an electrocardiogram nursing course	No framework identified for this study	140 baccalaureate nursing students in senior year and enrolled in a critical care course group.	Quasi-experimental Comparative correlational	30-item multiple choice computerized electrocardiogram exam (ECG SimTest) developed by Elsevier was used to measure critical thinking, assessment skills, and therapeutic	Higher critical thinking scores on the ECG SimTest correspond to higher perceived self-confidence scores. The control group scored higher in all confidence measures and the ECG SimTest scores, with a

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	availability and inability to contour patient assignment to challenge student's level of knowledge			Students were randomly divided into treatment and control groups with 70 participants in each.		nursing Interventions.	positive correlation between self-confidence and ECG SimTest scores Increased confidence translates into higher critical thinking scores.
Sullivan-Mann, Perron, & Fellner (2009)	Developing different methods of evaluating critical thinking skills is essential to nursing programs.	Investigate effect of using simulation as a teaching strategy on critical thinking abilities of nursing students particularly in associate degree nursing	Roy Adaptation Model	53 Nursing II students divided, experimental and control groups	Quasi-experimental 2x2 Mixed model	Health Science Reasoning Test, including pretest and posttest.	Simulation does have a positive effect on critical thinking of students as evidenced by significant difference between pre and post test

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
		programs.					<p>scores for the experimental group.</p> <p>The three additional simulation scenarios made a Significant impact on student scores demonstrating increased knowledge and critical thinking skills.</p>
Morrison, Scarcello, Thibeault, & Walker (2009)	In nursing education, connection between what is learned in theory to clinical practice is important in the	Examine the impact of human patient simulation on student self-confidence.	Concept-ual framework by Jeffries	33 first-year distance practical nursing students separated into smaller randomly assigned	Quasi-experimental Within subject design	A researcher developed pretest and posttest contained 25 identical questions measuring students'	More research should be conducted using a validated instrument , such as Educational Practice Scale for

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	development of critical thinking and self-confidence. The need for methods to facilitate this development is a challenge.			groups		knowledge in nursing care of the mother and newborn during the antepartum, delivery, and postpartum phases.	Simulation and Simulation Design Scale instruments. Results indicated a significant increase in the students' knowledge and confidence.
Smith & Roehrs (2009)	Although simulation has been confirmed to have a positive effect on student learning, little is known about why.	Examine effects of simulation on students' satisfaction and self-confidence and identify other factors that correlate	The Nursing Education Simulation Framework	68 BSN students in their junior year and enrolled in a medical/surgical course	Non-experimental Descriptive correlational	A researcher developed 13-item Student Satisfaction and Self-Confidence in Learning Scale was used to measure student satisfaction and self-	A combination of variables come into play when correlating student satisfaction and self-confidence as two outcomes of high

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		with students' satisfac- tion and self- confidence				confidence. The Simulation Design Scale (SDS)	fidelity simulation . There was a moderate correlatio n between both student satisfacti on and self- confidence and objectives . The lowest correlatio n to satisfacti on was guided refection. The lowest correlatio n to self- confidence was fidelity. Further research

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							is needed regarding the outcomes of high-fidelity simulation addressed in this study as well as other outcomes, such as learning, performance, and critical thinking to test relationships of this simulation framework.
Bambini, Washburn, & Perkins (2009)	A major factor which affects a student's performance in the clinical	Evaluate simulated clinical experiences as a teaching/learning method to increase	Bandura's Self-Efficacy Framework	112 first semester baccalaureate nursing students A subsample of 20 students	Quasi-experimental Repeated measure	Pretest, posttest, and follow-up survey	Although self-efficacy is important, simulation experiences should be focused

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	setting is self-efficacy, a challenge to increase.	self-efficacy of nursing students during initial clinical course in a prelicensure program		completed the follow-up survey			<p>on evaluating the patient care skills of students.</p> <p>Students more confident in performing tasks</p> <p>Students were more confident in providing care to post partum patients</p> <p>Feelings of self-efficacy should translate into practice by affecting nursing care</p>

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
							behaviors.
Bearnson & Wiker (2005)	Students and faculty of nursing programs often miss scheduled clinical days for reasons beyond the control of the faculty.	Explore the benefits and limitations of using a human patient simulator as a substitute for one day of actual clinical experience.	No framework was identified for this study.	The sample size was undisclosed and described only as "two groups of students" The students were first-year baccalaureate nursing students.	Non-experimental Exploratory, descriptive	Researcher developed survey using a 4-point Likert-type scale with four positive statements about the session and three open-ended questions. Measured students' perceptions of the learning experience using the simulators.	With overall positive responses to the simulation experience, the use of simulation was a useful learning strategy. Further research was needed to explore ways to incorporate this technology into the curricula.
Grady, Kehrer, Trusty, Entin, & Brunye (2008)	It is important to know if all levels of simulation fidelity are equally	Assess for differences in student perceptions and student attitudes when using high-	No framework was identified for this study.	39 first-year nursing students	Quasi-experimental	A 21-item observer-based performance assessment instrument was developed	Simulation technology has positive impact on student learning.

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
	effective.	fidelity and low-fidelity simulation with a secondary purpose of examining the acceptance of simulation by student gender.				<p>for the nasogastric insertion.</p> <p>A 15-item observer-based performance assessment instrument was developed for the urinary catheter insertion.</p> <p>An eight-item post-training self-report questionnaire was developed to measure student attitudes about the simulator-based training they received using a 5-point</p>	<p>When compared with traditional teaching methods, the realism of high-fidelity simulation enhances the attainment and retention of knowledge, instill critical thinking and psychomotor skills, and increases student self-confidence .</p> <p>More research is necessary</p>

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						<p>Likert-type scale</p> <p>A nine-item post-evaluation self-report questionnaire was developed to measure student assessment of their performance, confidence, and opinions about the training using a six 5-point Likert-type scale items, one yes/no/uncertain-type item, and two open ended questions.</p>	<p>into the influence of simulation across a variety of applications.</p>

Source	Problem	Purpose / Research Questions	Framework or Concepts	Sample	Design	Instruments	Results
Hicks, Coke, & Li (2009)	There is a lack of research on the effectiveness of high-fidelity simulation compared to traditional clinical, with real patients, in preparing students with the knowledge and critical thinking skills required	Examine the differences between traditional clinical experience and simulation as teaching methods in pre-licensure nursing education. Analyze how simulation training may impact knowledge, clinical	No framework was identified for this study.	58 senior baccalaureate nursing students enrolled in a required critical care course. They were then divided into two cohorts of 23 (for 2006) and 25 (for 2007). Each cohort was	Quasi-experimental Randomized controlled design with repeated measures of pre and post treatment design	50-item pre and post intervention examination to assess knowledge acquisition and retention. Clinical performance was measured with one of three tools created for the three different scenarios and contained 28,	No overall statistically significant differences in the group performance. Due to the lack of statistical differences the effects of simulation on the clinical performance of nursing students remain inconclusive.
	to be a safe nurse.	performance and confidence levels of undergraduate		divided via random selection and placed in one of three		29 or 30 items depending on the Scenario. Self	Even though the evaluation showed

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		<p>students and compare with traditional clinical experience.</p> <p>Contribute to the body of knowledge on the uses and limitations of simulation in pre-licensure nursing education for both regulators and educators.</p>		<p>practicum groups; simulation only, simulation and live clinical combined, live clinical only.</p>		<p>confidence was measured pre and post intervention using a 4-point 12-item Likert-type scale.</p> <p>23-item questionnaire was given to live clinical and combination groups to evaluate their clinical experience.</p> <p>14-item questionnaire was given to the simulation and combination</p>	<p>significant increase in self-confidence and perceived abilities by the students, the researcher's point out that this perception is not enough in determining higher level problem solving, decision making, and psychomotor skills.</p>

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						groups to evaluate whether they perceived the simulation experience to be beneficial to learning.	