The Evaluation of Teaching the Nursing Process Using Traditional Lecture, Campus Laboratory, Clinical, and the Addition of High Fidelity Human Simulation (HFHS) Unfolding Scenarios

Ruth Erminia Irwin

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THE EVALUATION OF TEACHING THE NURSING PROCESS USING TRADITIONAL LECTURE, CAMPUS LABORATORY, CLINICAL, AND THE ADDITION OF HIGH FIDELITY HUMAN SIMULATION (HFHS) UNFOLDING SCENARIOS

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In partial fulfillment of the requirements for the degree of Doctor of Philosophy

By
Ruth E. Irwin

May 2013
THE EVALUATION OF TEACHING THE NURSING PROCESS USING TRADITIONAL LECTURE, CAMPUS LABORATORY, CLINICAL, AND THE ADDITION OF HIGH FIDELITY HUMAN SIMULATION (HFHS) UNFOLDING SCENARIOS

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ABSTRACT

THE EVALUATION OF TEACHING THE NURSING PROCESS USING TRADITIONAL LECTURE, CAMPUS LABORATORY, CLINICAL, AND THE ADDITION OF HIGH FIDELITY HUMAN SIMULATION (HFHS) UNFOLDING SCENARIOS

By
Ruth E. Irwin
May 2013

Dissertation supervised by Lynn C. Simko, PhD

It is not sufficient to just make changes in a nursing curriculum without a plan to evaluate the impact on program outcomes. This study sought to determine the outcomes of teaching the nursing process to Foundation of Nursing students in an Associate Degree Nursing program using a factorial design study. Four groups of students were taught the nursing process as follows: case study and concept mapping; case study, concept mapping with a pocket reference; case study, two hours HFHS, concept mapping with a pocket reference, or four hours of HFHS, concept mapping with a pocket reference.

The Simulation Design Scale (SDS) measured the perceptions of the simulation groups for design elements. The four hour group mean was significantly lower on both the importance of the objectives and information and importance of fidelity design.
elements (p < .05). This suggests that as time in a simulation increases more attention to these elements is required.

There was not a significant difference between the four study groups on the Nursing Process or the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B examinations individual scores. Two sub-categories on the ATI were significant. Planning was significantly higher for fall 2012 cohort (p = .024) and analysis/diagnosis was almost significant for fall 2011 cohort (p = .054). The results for Factorial Groups was not significant.

The National League for Nursing (NLN) PAX-RN entrance examination had a significant correlation with students passing onto the second semester in a nursing program (p < .001).

The ATI results of students were the same without regard to the Factorial Group assigned in relation to instructor employment status of full time versus part time.
ACKNOWLEDGEMENT

The journey to reaching a lifelong goal can be a long one. The rigors of achieving the Doctorate of Philosophy in Nursing can be challenging. For my journey, there was always someone who offered words of encouragement or inspiration that helped me stay focused on the goal. I extend the warmest and most appreciative thank you to the following people:

Dr. Lynn Simko, our first meeting was the admission interview when I applied to the program. Then you guided me as my academic advisor. Finally, you agreed to be my dissertation committee chair. You kept me focused in this process. You provided validation to the simulation scenarios written for the study. You have been a mentor and were always willing to help me any time I called. Thank you.

Dr. Bonnie Dean, committee member, thank you for leading me to the correct design for my study. You brainstormed with me and bounced ideas until it was clear that the factorial design would give me the most vigorous study.

Dr. Pamela Jeffries, external committee member, thank you for taking a cold call from a PhD student who asked for your time and expertise. You wrote the framework model for simulation in nursing education that I used to develop the simulations. The findings of this research has provided continued support to the framework and contributed to the body of knowledge on simulation in nursing education.

To those of you who were not on my committee, but were there to cheer me on and help with decisions. Dr. Kathleen Malloy, a special thank you. You told me to just do it and now we are done with the PhD. To the nursing learning resource faculty, faculty,
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To my very supportive family thank you. A special thank you to Jeff, my husband, you were there during this journey. You offered encouragement and made it possible for me to continue, especially during difficult life events.
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CHAPTER 1

1.0 INTRODUCTION

1.1 Background

Nurse educators incorporate expensive high-fidelity human simulators (HFHS) into nursing curriculum as a replacement for clinical, a supplement to missing clinical experiences, or for students to practice and demonstrate competency in procedures. HFHS is being promoted as an education technique for students to learn in a safe, controlled environment that is supportive of active learning (Nagle, McHale, Alexander, & French, 2009) and can provide standardized patient experiences. Simulation is identified as a tool to teach critical clinical decision making, to reduce cognitive error, and to improve safety and reliability in care. There is recognition of the need to evaluate transference of skills learned in simulation to the clinical area is a priority (Fox-Robichaud & Nimo, 2007).

In 2005, Jeffries published the Simulation Framework Model. The model is intended to provide a “framework to guide the processes of designing, implementing, and evaluating simulation in nursing” (p. 96) and includes five components for simulation: teacher, student, educational practices, design characteristics of the simulation, and outcomes.

The outcomes of simulation include “learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence” (P. R. Jeffries, 2005, p. 97). Larew, Lessans, Spunt, Foster, and Covington (2006) put forth a design characteristic for the scenario as an algorithm with sequencing for performance and progressively explicit cues to promote success of students during simulation.
There are studies that have evaluated the impact of simulation in learning theory content related to specific diseases. There were no studies reporting the students’ development of critical thinking using the nursing process to guide them to a clinical judgment during a HFHS. This study sought to determine if the introduction of HFHS scenarios that actively engage and teach the nursing process affects the students’ ability to make clinical judgments during a nursing foundations course.

The study was unique in that it was conducted during the first lecture material presented to students during the foundations of nursing course. The content is the nursing process. Students applied the nursing process to a simple, unfolding, clinical scenario using the most basic nursing skills. The Nursing Process Application During Simulation (N-PADS)© pocket reference guided the students in each phase of the nursing process along with the handoff of care report (Appendix A). Additionally, all participants assumed the role of the registered nurse and were randomly assigned to a phase(s) of the nursing process.

1.2 Purpose of the Study

The purpose of this study was to determine the outcomes of teaching and learning critical thinking skills of students taught the nursing process using traditional lecture techniques versus the addition of High Fidelity Human Simulation (HFHS) scenarios in the first course in an associate degree nursing program. The traditional education model of lecture, campus laboratory, and clinical laboratory was compared to the traditional education model enhanced with unfolding HFHS scenarios designed to engage the students in the application of critical thinking using the nursing process.
The simulations required the students to apply the concepts taught regarding the nursing process to a very basic clinical situation thus actively engaging them in applying critical thinking towards a clinical decision. The researcher sought to determine if differences in exam performance occurs between the teaching strategies.

1.3 Research Questions

1.3.1 What is the effect of teaching the nursing process with HFHS scenarios on the development of critical thinking skills compared to the effect of not using a HFHS scenario on the Nursing Process examination?

1.3.2 What is the effect of teaching the nursing process with HFHS scenarios on students’ performance on the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B?

1.3.3 What effect, if any did the teaching with HFHS have on the retention rate of students progressing in the Foundations of Nursing course to the second semester in the nursing program?

1.3.4 Is there a correlation between the National League for Nursing Pre-Entrance RN examination test results and success in completion of the Foundations of Nursing course?

1.3.5 Is there a difference in ATI test performance between students assigned to full-time versus part-time faculty for both clinical portion and campus laboratory portion of the course for both the control and experimental groups?
1.4 Operational Definitions


1.4.2 Clinical Judgment – “refers to a process of observing, interpreting, responding, and reflecting situated within and emerging from the nurse’s knowledge and perspective” (National League for Nursing, 2010; Tanner, 2006).

1.4.3 Clinical scenario – “the plan of an expected and potential course of events for a simulated clinical experience whereby the clinical scenario provides the context for the simulation and can vary in length and complexity, depending on the objectives” (The INASCL Board of Directors, 2011).

1.4.4 Cue – “information provided by instructors during a simulation that helps the student progress through the simulation activity by providing information about the step the student is on or is approaching (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).

1.4.5 Debriefing – “activity that follows a simulation experience led by a facilitator wherein feedback is provided on the simulation participants’ performance while positive aspects of the completed simulation are discussed and reflective thinking encouraged” (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).

1.4.6 Fidelity – “the degree to which either a simulation encounter or simulation equipment approaches reality and believability” (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).
Simulation Innovation Resource Center (NLN-SIRC), 2011; The INASCL Board of Directors, 2011).

1.4.7 *Guided reflection* – “process encouraged by the instructor during debriefing that reinforces the critical aspects of the experience and encourages insightful learning allowing the participant to link theory with practice and research” (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).

1.4.8 *Knowledge* – “the awareness, understanding, and expertise an individual acquires through experience or education” (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).


1.4.10 *Reflective Thinking* – is the process of self evaluation while actively reflecting back on your performance during the simulation scenario.

1.4.11 *Simulation* – “a technique that uses a situation or environment created to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions” (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011).

1.5 Assumptions

The researcher made the following assumptions during this study:
• Students are randomly assigned to clinical and campus laboratory without regard to employment status of faculty assigned to teach.

• Students will have varying life experiences that might influence their performance on tests.

• Students need to engage in active learning strategies from the beginning of their nursing education.

• Experiential learning opportunities lead students through the process of transference of theoretical learning to application.

• HFHS is an augment to traditional classroom and clinical laboratory learning and not a substitute.

• HFHS scenarios must be developed for individual, content specific applications.

• By allotting additional instructional time with an expert faculty member for simulation and learning the nursing process, students’ will improve their skills and develop clinical judgment.

• The Nursing Process examination and the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B examination assess students’ knowledge of the nursing process and ability to make accurate clinical judgments using the nursing process.

• There will be a need for continued research into the learning outcomes and transference of learning to the clinical area.

• The nursing process examination and the ATI examination measure the students’ knowledge of and ability to apply the steps of the nursing process in a testing situation.
1.6 Limitations

The researcher identified the following limitations for this study:

- This study was conducted with a convenience sample from an associate degree nursing program with differing ages of students.
- Control for extraneous variables in educational research is difficult. Both faculty and students present with various life experiences.
- One masters prepared nurse faculty will conduct and be given clear instructions on the case study expectations, but control over implementation will be limited.
- All simulations will be led by the researcher.
- Critical thinking levels vary based on experience.

1.7 Significance of the Study to Nursing

Educators have incorporated expensive HFHS into nursing curriculum as a replacement for clinical, a supplement to missing clinical experiences, or for students to practice and demonstrate competency in procedures. There is a growing need for evidence to discover the learning that may or may not occur in HFHS simulation and to test the simulation model and the scenario design characteristics. This study sought to evaluate the educational practices in simulation and identify support or new evidence for including simulation into nursing program curriculums.

1.8 Summary

Research is needed to determine the impact HFHS scenarios have on student nurses’ learning of the nursing process to develop critical thinking. There is limited research conducted with associate degree nursing programs. This researcher sought to evaluate and test two different methods of teaching the nursing process to determine if
there is a significant difference in the outcomes on the nursing process examination and the ATI RN Fundamentals 2010 Assessment Form B examination.

This study was different from other research conducted with HFHS because the focus was on teaching the steps used in the nursing process in a simulation. Students were guided in the application of the process. The N-PADS© pocket reference helped students recall the steps and complete each phase in a systematic manner. The simulation focused on the steps of the process and not a disease process. The use of heat exhaustion, as the underlying condition in the scenario, focuses on basic knowledge students would learn during the first four weeks in the foundations nursing course. The N-PADS© contains basic vital sign measures for blood pressure ranges, temperature, pulse, respirations, and pulse oximetry for student reference.

It is posited that students need to be shown in order to see. The results of this study provided additional evidence to support the incorporation of HFHS scenario into a nursing curriculum. Especially to teach the nursing process and resulted in an improved comprehension of the process and improved clinical judgments.
Chapter 2

2.0 MANUSCRIPT #1

The Diffusion of Human Patient Simulation into an Associate Degree in Nursing Curriculum

2.1 Abstract

The diffusion of Human Patient Simulation (HPS) within a nursing curriculum is challenging. This article describes an exemplar that presents a three year process guided by the Diffusion of Innovations theory to plan, implement, and evaluate HPS in an associate degree nursing program curriculum.

Without funding for a major renovation or construction of new simulation laboratories, existing campus labs were converted into simulation labs including space dedicated to maternal-child simulation and a remediation simulation lab.

Keywords: simulation, diffusion of innovations, associate degree nursing program, simulation model, remediation

2.2 Introduction

The ability of a nursing program director to find appropriate clinical sites for students continues to be a challenge. In southwestern Pennsylvania, competition for clinical sites is fierce, especially in the specialty courses of acute medical surgical, maternity, pediatrics, and psychiatric nursing. A teaching strategy being deployed as a solution to scare clinical resources is Human Patient Simulators (HPS) and simulation. HPS are being incorporated in both pre-licensure education and hospital in-service education departments to expose learners to patient care scenarios in a controlled environment (McCausland, Curran, & Cataldi, 2004; Nagle et al., 2009). Using HPS and
scenarios, faculty can create a clinical situation for students to apply classroom knowledge in the simulated clinical setting and practice their assessment and procedural skills. Reflecting back on the simulation experience during the debriefing time reinforces learning and helps students to identify areas for improvement. The simulation can be repeated to give students a chance to improve their performance. The HPS are readily available on the market and this nursing program sought funding to purchase the equipment for three sites where the nursing program is taught. HPS are available in four levels of technology; high fidelity, mid fidelity, low fidelity, and no fidelity. This nursing program purchased high, mid, and low fidelity human patient simulators from the Laerdal Medical Corporation (Wapppinger Falls, New York, USA).

This article will focus on the process used by this associate degree nursing program dean and director to purchase appropriate HPS, educate faculty in the use of HPS, gain faculty acceptance and infuse all levels of fidelity HPS into the curriculum. In addition, the ongoing evolution of this project will be discussed.

2.3 Background of the Frameworks

Nursing education has utilized many tools to simulate nursing care ranging from oranges and hotdogs used for injection practice to no fidelity mannequins for basic psychomotor skill practice. The prototype for Mrs. Chase, a static mannequin, was commissioned in 1910. She was used in the education of nurses through the 1970s (Herrmann, 2008). Techniques and technologies developed in other disciplines, like high fidelity simulators, provided nursing the opportunity to incorporate these innovations into nursing education in a safe, controlled, environment that is supportive of active learning (Nagle et al., 2009).
The 1990s and 2000s had a rapid development of simulators from vendors ranging from the Harvey cardiology simulator, high-fidelity and mid-fidelity models, birthing simulators, to newborn mannequins. These simulators were used to practice and demonstrate competency in procedures, especially those that were high risk, low volume, prior to actual contact with live patients. As the first HPSs were being purchased by nursing programs, nursing administrators were unable to find formal education programs available for faculty to learn the concepts of HPS.

In 2003, The National League for Nursing (NLN) and Laerdal Medical Corporation, a major vendor of HPS equipment, jointly sponsored a project to develop the tools for nursing faculty to utilize when implementing and evaluating HPS into the nursing curriculum (P. R. Jeffries & Rizzolo, 2006). This research project resulted in the development of a simulation model to guide the development of simulation scenarios and research on simulation. Results of this project indicated that simulation allowed students to work in a non-threatening, safe environment and apply classroom knowledge; the debriefing and reflective thinking time led to students reporting increased self-confidence (P. R. Jeffries & Rizzolo, 2006).

The simulation model in Figure 2.1 has been suggested as the best practice for the development of simulation scenarios into nursing curriculums. The model includes five components for simulation: teacher; student; educational practices; design characteristics of the simulation; and outcomes. Following the simulation model should result in anticipated learning outcomes, but will require testing of the model.

The Diffusion of Innovations (DOI) theory was selected to guide the process to incorporate the new HPS technology into the ADN curriculum. The DOI theory is a communication process used to disseminate information on a new technology into an organization (Rogers, 2005). The diffusion of HPS into a nursing curriculum brings uncertainty. Rogers (2005) identified four elements in the DOI: 1) the innovation; 2)
communication channels; 3) time; and 4) the social system. Each of these four elements will be further described in the following section.

Innovation is what is recognized as new to the individual and it can be technology, concepts, or objects. For example, HPS as a technology has both a software and hardware component which can create an uncertainty into the adoption of the technology. Five characteristics of innovations that impact the rate of adoption include: 1) relative advantage – Do I think it is better than what I have now?; 2) compatibility – Is it consistent with existing values, past experience, needs of adopters?; 3) complexity – How easy is it to use and learn?; 4) trialability – Can I use it and decide if it is useable?; and 5) observability – Can I see the result of using the innovation? (Rogers, 2005, pp.15-16).

Communication channels are defined as “the process by which participants create and share information with one another in order to reach a mutual understanding” (Rogers, 2005, p. 18).

Time in the diffusion process begins when the innovation is first recognized, opinions are formed, and the decision is made whether or not to proceed with the adoption of the technology. Time has five steps through which the infusion process progresses: 1)” knowledge – first knowledge of innovation to adoption; 2) persuasion – form a favorable attitude toward innovation; 3) decision – engage in activities to adopt the innovation; 4) implementation – when innovation is put to use; and 5) confirmation – seek to re-enforce the initial decision” (Rogers, 2005, p. 20)

The social system influences the diffusion process. The social system members include all the people in the group or department and the formal and informal social
structure or hierarchy of the group. In the social system there are members who are able to influence others and those who are willing to be the first to facilitate the change or resist the change. The social system is concerned with the consequences that the change will have on them. DOI that are considered desirable and clearly presented will be more palatable. In order to facilitate the DOI, the administrator must be aware of the social system and plan for the impact people might have on the communication of the innovation and be aware that sometimes consequences not anticipated may occur (Rogers, 2005).

There are five categories of adopters found within a social system as described by Rogers (2005): 1) the *innovators*: venturesome; 2) the *early adopters*: respect; 3) the *early majority*: deliberate; 4) the *late majority*: skeptical; and 5) the *laggards*: traditional. Table 2.1 provides a detailed description of each of these adopters.
Table 2.1. Rogers’ (2005) Social System’s Five Categories of Adopters

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<td>Innovators: venturesome</td>
<td>Curious person who is very much interested in new technologies and ideas. Focused on the use of the new technology.</td>
</tr>
<tr>
<td>Early adopters: respect</td>
<td>Opinion leaders grounded in the social system. Cautious when it comes to adoption and will do so after gathering information and analyzing the idea. This is the person who others in the social system come to for discussion and their opinion in regard to the innovation.</td>
</tr>
<tr>
<td>Early majority: deliberate</td>
<td>Not opinion leaders, but adopt innovations right before the rest of a society does. They are in the middle and take their time in decision making.</td>
</tr>
<tr>
<td>Late majority: skeptical</td>
<td>Adoption of the innovation comes when they are ready and feel it is safe to adopt the innovation.</td>
</tr>
<tr>
<td>Laggards: traditional</td>
<td>Last to adopt an innovation. These members of the system need to be sure the innovation is not going to fail and need to evaluate how others have made it work.</td>
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Once the decision is made to proceed with the DOI, it is important to move into the implementation stage of the project. Individuals adopt an innovation at their own pace over time. Rogers (2005) plotted the rate of DOI using the normal distribution curve with *innovators* being the first to adopt the innovation and *laggards* the last to adopt the innovation.

### 2.4 Exemplar of ADN Program Experience

The ADN curriculum is taught at three sites located in three different counties in southwestern Pennsylvania. At the onset of this project, the organizational structure of the ADN program included the dean of health professions, an interim director of nursing programs, one secretary, one clerk, and the faculty members’. The main campus had 11
full time faculty for 220 students and each site had two full time faculty for 40 students. Adjunct faculty for clinical and campus labs were employed as needed.

Full time faculty met throughout the semester and was responsible for the development of the curriculum and all teaching materials. A faculty goal was to ensure all students were taught from the same curriculum, have access to the same support services, and resources to ensure success.

The strategic plan to purchase the HPS and guide the diffusion of this innovation into the curriculum was introduced by the dean of health professions with a target of spring 2007 to purchase HPS. The principles of Rogers’ (2005) DOI processes guided each stage of incorporating HPS into the ADN curriculum. It was a very time consuming process that required the administration and board of director support for faculty development, time allocation to prepare for simulation, the hiring of simulation lab support faculty, rearranging of campus laboratory space, and recruiting faculty curious enough to become champions.

Faculty members were not aware of this technology and the value of HPS as a viable tool for student learning. Fear of the unknown and how this technology works could have resulted in faculty intimidation and avoidance of the technology. All too often the decision to purchase HPS occurs without input from faculty (Hyland & Hawkins, 2009). This was not the case for this ADN program. In 2006, the dean of health professions began the process with gradual introduction of simulation concepts in preparation for the purchase and emphasized the need to incorporate simulation and technology into the curriculum. This approach helped faculty members become knowledgeable and aware of the innovation and how it functioned. Faculty engaged in
informal discussions focused on the capabilities of this technology and made suggestions regarding how to use it within the nursing program. These activities completed the first element in Rodger’s DOI theory process.

Next, job bids were posted in-house for the Nursing Learning Resource Center Simulation Faculty who would be scheduled for 19 hours a week. Two faculty members were budgeted for the main campus and one faculty position for each of the sites. The simulation faculty was charged with the responsibility to become the simulation experts that would assist and guide faculty in the development of scenarios based on course objectives and tutoring of nursing students. Nursing program faculty members were expected to develop the case for the simulation and the Simulation Faculty (SF) would write the software program for it. Together, the faculty and the SF would run the simulation and make modifications as needed.

In the spring 2007, all full time faculty members and the SF attended two initial workshops to develop baseline knowledge in HPS, the first workshop was given by the HPS manufacturer and the other workshop was presented by educators outside the college who used HPS in a respiratory therapy program. Both workshops were hands-on so that faculty could become accustomed to the equipment, what it could do and begin to recognize how it could be incorporated into their fall courses.

To develop an interconnectedness of nursing theory and application to the new technology, the dean arranged for a local university’s nursing faculty to present an all day workshop on evidence based nursing practice. A second, all day workshop on evidence based practice, simulation, and assessment theory was presented by a national speaker.
In the summer of 2007, a permanent Director of Nursing position was filled with responsibility for the nursing programs. The first need was to create space for the HPS through the re-configuration of campus labs and storage spaces. The dean, the director, one full time faculty and the SF worked together to re-configure existing lab and storage space to optimize simulation space. Despite the lack of money to build a new simulation lab, the team was able to use existing equipment to convert the lab space into a Level I lab, a Level II lab, a Maternal-Child lab, and a lab for tutoring and remediation.

Initial HPS equipment that was purchased included: SimMan®, SimBaby®, Nursing Anne, and vital pods for blood pressures, heart rates, and respiratory auscultation. Campus labs at the two off site locations received a SimMan®, Nursing Anne, and vital pods. The NLN Simulation in Nursing scenario package was purchased for each site to provided basic scenarios to assist faculty in the upstart of simulation.

In the fall semester, faculty introduced Level I and Level II students to all the simulation products. Level I students immediately began to use the simulation products in the foundation of nursing course skills lab. The ease of integration was due to the SF support and guidance with the basic vital products. Faculty teaching the skills labs was oriented to the products and had support from SF as needed.

Nurse administrators must remember to include the cost of technical education by the vendor when pricing the expense of the HPS. The dean included the cost of additional education with the purchase of the HPS. During the fall semester five faculty members and the director attended a two day workshop at the manufacturer’s corporate headquarters to learn how to program the software in scenarios for the adult and infant HPS and how to care for the hardware. This greatly enhanced the knowledge readily
available to the faculty going forward. One of the full time faculty returned to school and rapidly identified where HPS would fit into the acute medical-surgical course. This was the first *innovator* according to Rogers (2005). With the help of the SF, this faculty member developed and implemented two simulation scenarios. After the success of these simulations was reported at faculty meetings, the other faculty came to observe the scenario and began to consider how to use simulation in their courses.

The dean and director felt it was necessary to have all full time faculty educated in the use of HPS and the principles used in writing and creating scenarios. Grant money allocated by the dean enabled faculty to attend seminars in December 2007 at The Peter M. Winter Institute for Simulation Education and Research (WISER) facility in Pittsburgh, Pennsylvania. The dean of health professions and director of nursing also attended this conference in order to continue to develop competencies for using HPS and to support staff in this endeavor. Since this initial education occurred, any new full time faculty has had the opportunity to attend this course. The SF also currently offers initial training for simulation programming and tutoring for any faculty member.

It is sometimes difficult to decide what topics should be given priority for simulation. To jump start ideas for simulations, faculty was encouraged to look at the item analysis from exams and consider developing simulations for course content that past students had difficulty mastering. It was felt if they could engage students in an interactive, hands-on care of patients that represent difficult course content, that an improvement in the testing would result. Going forward this will be an area for future study.
The dean, director, and faculty experienced positive feedback on the scenarios and continued to discuss and brainstorm additional uses and revisions for simulation. In spring 2008, an evening/weekend program was started at the main campus which required the hiring of a new faculty member. This person was very versed in simulation and provided the leadership to infuse simulation in the Level I course. Faculty’s reports of success with simulation created more interest and, eventually, simulation became contagious.

Faculty requested the purchase of an infant vital and pediatric vital simulator so that age appropriate simulators could be used. Level II faculty in maternity, pediatrics, chronic medical conditions and manager of care (capstone course) identified and wrote scenarios for their courses. Alternative clinical experiences with simulation scenarios were needed in the pediatric rotation due to the community hospital pediatric unit’s lack of census. Faculty was encouraged to involve the graduate nursing program interns, who they were mentoring, in the development of simulation scenarios. Coordination with the SF was important to ensure success in the writing of simulations.

It was important for faculty to obtain student input regarding the simulation experience. Using a faculty-developed survey tool, data were collected on students’ opinions of simulation and the feedback was positive. Faculty identified a need to develop a survey tool to solicit comments and suggestions for simulations. Work is currently being conducted on this tool.

In the fall 2008 and spring 2009 there was an increased infusion of the HPS in the curriculum. Faculty was building on each other’s successes and recognized support and encouragement that they were receiving from nursing leadership for working with the
innovation. Not all simulations resulted in anticipated outcomes, for occasionally, a
student response took the scenario in the opposite direction that was planned by the
faculty and required simulation responses “on the fly”. The phrase “on the fly” was
deefined as the faculty having to manually respond to a student’s response without
previous planning. Faculty accepted this as a learning curve and re-worked the scenario
until it was satisfactory.

While this DOI included *late majority* and *laggards* as mentioned previously by
Rogers (2005), during the summer of 2009, it was evident that these individuals were
beginning to develop simulation in their courses. The director was approached by a
faculty member who had an idea to use the HPS as an orientation for students to the
acute care course, but the needed supplies were not available at the school. The director
and two faculty teaching the acute care course identified the equipment that was needed,
and developed a plan to purchase or seek equipment donations. By the end of summer
the director and faculty were able to obtain all the needed supplies and equipment for the
fall semester. The faculty member completed an observation in the critical care unit to
ensure that the simulation teaching scenario was accurate and mirrored the real life
experience. She then worked with the SF to develop the patient scenario and completed
several trial runs. The simulation was incorporated into the lab portion of the course and
was very successful. The patient was so life-like that the students needed encouragement
to approach the HPS, look at the equipment, touch the equipment, and complete the
assessment. Students provided positive feedback on this experience and felt that this
educational scenario for the acute care course would make the first day of clinical not as
frightening.
In the third year of the DOI, the psychiatric nursing instructor became the last faculty member to embrace HPS. The director of nursing assigned a graduate student to be her intern and requested that a simulation scenario be completed as the graduate’s project. With encouragement and support, a scenario was developed, implemented, and evaluated to be a very good learning experience by students. This faculty later revised the scenario and has used it in subsequent courses.

During the DOI, faculty realized that the HPS could be used for clinical remediation and missed clinical makeup days. In this situation, the clinical faculty member provides the student with an assignment packet that best corresponds to the missed clinical day or topic needing remediation. The student schedules a 30 minute session with the SF to complete the assigned simulation. The student prepares for the simulation experience in the same manner as a clinical preparation by completing the clinical pre-planning documents. This includes gathering data on the patient, looking up the medications, diseases, care of equipment, intravenous therapy, and any other items necessary to give safe care to the patient. When the student reports to the campus lab they receive a shift report from the SF, prioritize care, meet the patient, complete a shift assessment, administer medications, and document the care given. After completing the 30 minute scenario the student gives a shift report to the SF and leaves. The student must complete a concept map and priority nursing diagnosis, describe the care they administered, and evaluate patient outcomes. This information is submitted to the clinical faculty for grading. The SF also gives feedback regarding the student’s performance to the clinical faculty.
2.5 Discussion

2.5.1 Implications for Educators

The process used in the diffusion of innovations for HPS by this ADN program can be used as a guide for other nursing programs who have yet taken the plunge. The process was initially difficult since there were no formal education programs available on this technology. By networking with our vendors for HPS, we were able to secure education for learning the software and hardware. The NLN simulation web site resource provided much information and guidance in the simulation process. The site also listed professionals with whom to network and become a resource on simulation.

HPS is an opportunity for nursing faculty to bridge the gap between lecture content and application to the clinical setting. It provides a safe environment for student practice where the HPS will not be harmed and can come back to life. It permits students to repeat the scenario. Faculty also realized that the HPS could be used for remediation and make-up for missed clinical.

This ADN program was able to adapt existing equipment and space to make a functional simulation lab for students. Faculty continue to look for creative ways to make the experience for students as real-life as possible.

2.5.2 Implications for Administration

Administrators must be willing to become involved in the process and take the risk of learning the innovation along with faculty. Involving faculty can give the much needed input and ideas to make the project successful. Nursing administrators must systematically prepare a plan to implement HPS that includes resources for faculty to prepare and use in the simulations. It is not enough to purchase equipment and tell faculty
they need to use it without the education and support to do so. A school of nursing may not need to build a new campus lab to be successful in the process. Rather, using what is available can be a good start to the change process. It is important to be proactive, identify ways to make HPS work, and draw attention to successes. Make people curious. Sometimes the recognition will result in funding becoming available.

The dean and director keep college administrators and board of director members informed on the HPS program and the progress that is occurring. They focus on what they have and demonstrate what can be accomplished with the HPS equipment using existing space thus continue to have support for the program.

The ADN program has recruited nursing professionals to become members of the Nursing Advisory Board (NAB) that serves to keep the nursing program informed of upcoming changes in the practice sites and input on graduate performance. At the annual advisory meeting an ADN faculty member volunteers to showcase one of their course scenarios. This creates a sharing atmosphere and results in a very interactive meeting. The blending of education and practice through this program results in new ideas and sharing of expertise.

2.5.3 Implications for Practice

Nursing practice continues to look at ways to decrease errors and improve patient outcomes. Hospital-based education departments have been directed to purchase HFS equipment to educate nursing staff. This ADN program will continue to be a resource, support and provide education to our practice colleagues on HPS and solicit input on the performance of ADN graduates.
2.6 Conclusion

Currently, there is a wealth of educational programs and resources on HPS and literature available to support faculty in the implementation of this teaching technique. Using the DOI process as a guide to incorporate HPS in this nursing program created a climate of support and sense of security for a faculty willing to take the challenge in adopting the innovation. It also guided the nursing leadership in steps to ensure success of the project. The use of HPS in this nursing program has given students the opportunity to care for a multitude of patients in clinical situations that they might not necessary have seen in a clinical setting.

Nursing education, nursing practice, and nursing administration are in various stages of infusing HPS into their environments and can provide support to each other. The process, guided by the simulation framework model and DOI theory, helped the nursing administrators successfully infuse the HPS into the curriculum of this associate degree nursing program over a three year period. Key to the success of this project was the planning and willingness to work with existing space and equipment in exchange for the opportunity to purchase HPS. Finally, the nursing leadership provided support and encouragement to all faculty as they progressed in moving simulation forward in the nursing curriculum.
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Chapter 3
3.0 Review of the Literature

3.1 Introduction

This chapter will describe the history of simulation and the integration of simulation into nursing education. A description of the Nursing Education Simulation Theoretical framework that will guide the research and the components of the framework explored in this study is provided. Next, a description of the current research literature on simulation and critical thinking will be presented. Finally, gaps found in the literature will reveal opportunities for future research.

The origin of simulation began in the aircraft industry and started the journey of teaching students in a safe environment the professional practice of their chosen discipline. Simulation moved into the medical specialty of Anesthesia, in the late 1960s, with the use of Sim 1 who had blinking eyes, respirations, heartbeat, and airway management (Rosen, 2008). From this beginning, medicine moved forward with teaching techniques that simulated real life situations students might encounter in a clinical situation. Simulation techniques included role playing, standardized patients, task trainers, software-based simulation, mannequins, and computerized patients (Cooper & Taqueti, 2004; Rosen, 2008).

Nursing education has used many tools to simulate care ranging from oranges and hotdogs, used for injection practice, to no-fidelity mannequins. The 1990s and 2000s had a rapid development of simulators ranging from the Harvey cardiology simulator, birthing simulators, newborn mannequins, mid-fidelity, and high-fidelity models. They are being used by students to practice and demonstrate competency in nursing procedures prior to contact with live patients, especially high risk, low volume procedures.
Nurse educators are incorporating High Fidelity Human Simulators (HFHS) into nursing curriculum as a replacement for clinical, a supplement to missing clinical experiences, or for students to practice and demonstrate competency in procedures. HFHS is being promoted as an educational technique for students to learn in a safe, controlled, environment that is supportive of active learning (Nagle et al., 2009).

Simulation has been identified as a tool to teach clinical judgment and critical thinking skills, to reduce cognitive error, and to improve safety and reliability in care. Recognition of the need to evaluate transference of skills learned in simulation to the clinical area is a priority (Fox-Robichaud & Nimo, 2007). Simulation is an investment in expensive equipment and requires additional educator hours to prepare scenarios. There needs to be exploration of this teaching strategy from the perspective of the student and discovery of what is going on here with simulation.

Scenarios have been written to simulate an entire nursing care experience. A key to simulation is the creation of reality. Students are expected to prepare for and be ready to participate in the scenario. Practice in the simulation laboratory gives students an opportunity to develop skills in an environment free from the distractions of a nursing unit and free from the risk of harm to a real patient. The emphasis in all simulation scenarios is safety.

3.2 Theoretical Framework

In 2005, Jeffries first published the Nursing Education Simulation Framework Model. The Nursing Education Simulation Framework Model was the result of a national research project jointly conducted by the National League for Nursing and the Laerdal Medical Corporation. Jeffries presented this framework as the best practice for simulation
design for nursing. The model is intended to provide a “framework to guide the processes of designing, implementing, and evaluating simulation in nursing”, (p. 97) and includes five components for simulation: teacher, student, educational practices, design characteristics of the simulation, and outcomes. The outcomes of simulation include “learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence” (p. 97). This section will describe the model and the inter-relationship of the components.

Simulation is a technique. To implement simulation into nursing curriculums Nurse Educators must learn the best practices in simulation to be successful. The Teacher component takes the lead in determining the purpose of each simulation and if this is a teaching simulation or an evaluative simulation. This determines if the teacher will function in the role of facilitator or evaluator and guides the teacher in the development of the scenario. The teacher is no longer the focus in the learning process. The teacher is immersed in the topic of the simulation and must be comfortable with himself in this new role. The simulation is student centered and requires the teacher to build in experiential learning techniques. It is difficult to identify all the “what if” responses to a simulation scenario. Because the simulation is student centered, the teacher must be adaptable when the students’ responses to the simulation deviate from the planned scenario (Jeffries, Clochesy, & Hovancsek, 2009).

The Student component guides the developmental level of the simulation. The simulation needs to be written with attention to the students’ age, stage of education and the roles students will perform during the simulation.
The third component is *Educational Practices*, which Jeffries (2005) derived from Chickering and Gamson (1987) “seven principles for good teaching and learning practice”. A successful simulation scenario should include these best practices: (a) they must engage students in active learning, (b) feedback must be given by all participants and observers, (c) faculty/student interaction, (d) opportunities for teamwork are incorporated into the simulation, (e) performance standards are established, (f) diversity among learners must be incorporated into the simulation, and (g) there needs to be adequate time spent on tasks (Chickering & Gamson, 1987; Jeffries, 2005).

The *Simulation Design Characteristics* component guides the process used by faculty in the writing and development of the simulation scenario and incorporates the teacher, student, and educational practices components. Each simulation needs to have defined objectives that clearly state the expected simulation outcomes and adequate information to understand the context of the situation. The objectives will guide the faculty to the correct level of simulator manikin fidelity to provide a realistic re-creation of a clinical situation. The student level in the nursing program and the stated objectives help to determine the complexity of the simulation. There are cues imbedded into the scenarios to aid student success and progression during simulation. These cues become more explicit in an attempt to direct the students’ focus towards details in the patient condition (Jeffries, 2005; Larew et al., 2006).

Faculty must allow adequate time to complete the *debriefing* phase of a simulation scenario. Jeffries et al., (2009) cautions faculty to set the time for the simulation and stay within the period. When a scenario is not progressing as designed, the simulation stops and the debriefing phase starts. This will allow students’ time to reflect
on the scenario and learn what was correct and what needs to improve in the care provided to the patient.

The time allotted for debriefing should be equal to the time spent in the actual simulation (Jeffries et al., 2009). Usually, debriefing occurs immediately following the simulation. The teacher establishes guidelines for the debriefing session to encourage open participation in a non-threatening environment. Participants are guided by the teacher in the process of reflecting back on the experience to self-evaluate performance, evaluate decisions, evaluate communication with team members, evaluate what was unexpected, and connect theory to the experience (National League for Nursing Simulation Innovation Resource Center (NLN-SIRC), 2011). The teacher prepares questions for the debriefing that can lead and focus the discussion on the objectives of the simulation.

Dreifuerst, 2009 posits five attributes of debriefing: reflection on the experience, emotion and emotional release, reception to feedback, integration of simulation into a framework – the nursing process, and assimilation and accommodation. The students’ learning can be enhanced when the teacher prepares for the debriefing and can “offer opportunities to develop critical thinking, clinical decision making, clinical reasoning, and clinical judgment skills” (p. 113).

Debriefing using guided reflection allows students the opportunity to review the simulation scenario and imagine alternatives to their performance. It provides immediate feedback and explicitly reviews the simulation. It is suggested that students participate in a repeat scenario to apply the learning obtained during the debriefing session back to a
simulation to reinforce the corrected learning (S. E. Kardong-Edgren, Starkweather, & Ward, 2008a).

The Simulation Model identifies five Outcomes of simulation. The outcomes of simulation are “learning (knowledge), skill performance, learner satisfaction, critical thinking, and self confidence” (Jeffries et al., 2009).

Students who participate in a simulation scenario should reach these goals. Jeffries (2005) postulates when a simulation scenario is designed according to the Nursing Education Simulation Framework Model students will achieve the outcomes. There is a need for further research to test this model for evidence that designing simulation scenarios using this model will result in the stated outcomes. The design of this study will test the students’ achievement of the outcomes of Learning (Knowledge) and Critical Thinking.

3.3 Review of Pertinent Literature

To move forward in nursing education and curriculum development, nurse educators need to review the literature on the teaching of nursing using HFHS and gain an understanding of its role in the development of psychomotor and clinical judgment skills. Additionally, can the skills learned in a simulation environment be transferred to a real life clinical situation. Literature searches were conducted using the following databases: Pubmed@Duq, PsycINFO, Cochran & OVID SP DSR, Medline (OVID SP), CINAHL, and Ebsco host. The keyword combinations used in the literature search were critical thinking and simulation or developing critical thinking with simulation. Studies published in English, qualitative, quantitative, and mixed method research articles were included in the review.
This section will explore the current research literature on simulation and critical thinking published prior to March 1, 2012. Additionally, reference lists from selected articles were reviewed for any applicable article not uncovered in the original search. Twenty-eight research articles were included in the final review. Each article was reviewed for subject characteristics, design of the study, instrument used for data collection, analysis methods, variables, findings, and implications for practice and future research.

The literature included five qualitative research article, sixteen quantitative research articles, and seven mixed methods research articles. Six additional articles were found and consisted of two systematic reviews, two literature reviews, one integrative review, and one review of six theorists’ attributes of critical thinking. The information found was used in the development of a review of the literature on the state of the science regarding simulation and critical thinking.

3.3.1 Focus of Current Research on Simulation and Critical Thinking

This literature review purposefully cast a wide net over the subjects of simulation and critical thinking by not specifying the type of simulation. It was felt that this approach would identify more published research and give a better perspective of the status of nursing research in simulation. Parameters for what profession and licensure status of subjects being studied were not set to include current research in other disciplines. This enabled the researcher to identify and compare research that was conducted on pharmacy students, active duty and reserve army and air force nurses, new hire experienced and inexperienced registered nurses (RN), accelerated RN to baccalaureate (BSN) students, and pre-licensure nursing students: BSN, associate degree
(ADN), and diploma students. Included is one study from Australia (Shepherd, Kelly, Skene, & White, 2007) and two from the United Kingdom (Daly, 2001; Shepherd, McCunnis, Brown, & Hair, 2010).

A total of 28 studies were included in the review. There were five qualitative studies (Guhde, 2010; Guhde, 2011; Horan, 2009; Kaddoura, 2010; Lasater, 2007), sixteen quantitative studies (Blum, Borglund, & Parcells, 2010; Cormier, Picket-Hauber, & Whyte IV, 2010; Del Bueno, 2005; Fero et al., 2010; Gantt, 2010; Howard, Ross, Mitchell, & Nelson, 2010; Johnson, Flagg, & Dremsa, 2008; S. E. Kardong-Edgren, Starkweather, & Ward, 2008b; Lewis & Ciak, 2011; McKeon, Norris, Cardell, & Britt, 2009; Ravert, 2008; Rhodes, 2005; Seybert, Kobilinsky, & McKaveney, 2008; I. A. Shepherd et al., 2007; Shinnick, Woo, & Evangelista, 2012; Sullivan-Mann, Perron, & Fellner, 2009) and seven mixed methods studies (Bambini, Washburn, & Perkins, 2009; Burns, O'Donnell, & Artman, 2010; Daly, 2001; Dillard et al., 2009; Gilbert, Hutchison, Cusimano, & Regehr, 2000; Jeffries & Rizzolo, 2006; C. K. Shepherd et al., 2010).

Researchers for all studies used convenience sampling from the available participant population. There were 15 researchers who attempted to randomized the convenience sampling to experimental and control groups (Blum et al., 2010; Cormier et al., 2010; Daly, 2001; Fero et al., 2010; Gantt, 2010; Gilbert et al., 2000; Howard et al., 2010; Jeffries & Rizzolo, 2006; Johnson et al., 2008; Lewis & Ciak, 2011; McKeon et al., 2009; Ravert, 2008; C. K. Shepherd et al., 2010; Shepherd et al., 2007; Sullivan-Mann et al., 2009).
3.3.2 Demographics Studied

There were 13 studies that reported gender data for male and female percentage distribution that is similar to Pennsylvania’s pre-licensure student population. There were 87.6% female and 12.4% were male (Blum et al., 2010; Cormier et al., 2010; Daly, 2001; Fero et al., 2010; Howard et al., 2010; Jeffries & Rizzolo, 2006; Kaddoura, 2010; S. E. Kardong-Edgren et al., 2008a; Lasater, 2007; Ravert, 2008; Seybert et al., 2008; Shinnick et al., 2012; Sullivan-Mann et al., 2009). The Pennsylvania (PA) Department of Health, 2010 annual report on nursing programs reports on average there are 87.4% female and 12.6% male students enrolled in PA pre-licensure programs, (p. 23). The National Council of State Boards of Nursing (NCSBN) website indicated that there is no one national data base that houses statistical information on all nursing programs (National Council of State Boards of Nursing, 2012) and therefore these gender averages or pre-licensure program breakdowns could not be compared to national data.

In PA there are 82 pre-licensure RN programs: 36 BSN (44%), 27 ADN (33%), and 19 Diploma (23%) (Pennsylvania State Board of Nursing, 2012). The research reported in this paper included a combination of pre-licensure programs: 15 BSN (Bambini et al., 2009; Blum et al., 2010; Burns et al., 2010; Cormier et al., 2010; Daly, 2001; Dillard et al., 2009; Guhde, 2010; Guhde, 2011; S. E. Kardong-Edgren et al., 2008a; Lasater, 2007; McKeon et al., 2009; Ravert, 2008; Rhodes, 2005; Shepherd et al., 2010; Shinnick et al., 2012), two ADN programs (Horan, 2009; Sullivan-Mann et al., 2009), and one diploma program (Lewis & Ciak, 2011). There was one study that compared BSN and ADN students (Gantt, 2010), one study that compared BSN, accelerated BSN and diploma students (Howard et al., 2010) and two studies that

### 3.3.3 Types of Simulation Studied

Three of the five qualitative studies used high fidelity simulators to actively engage students in application of skills and cognitive knowledge (Horan, 2009; Kaddoura, 2010; Lasater, 2007). Horan, (2009) had student’s self-report thoughts on the scenario and how it helped them in learning critical thinking. Students reported an increase in understanding didactic concepts, feeling more capable in caring for patients, self confidence, and critical thinking. Kaddoura, (2010) identified three themes from data obtained from structured interviews: “just in time cognitive and psychomotor skills, fostering critical thinking and leadership skills through feedback on simulation, and safety in a nonthreatening learning environment” (p. 510). Lasater's, (2007) study substituted one day of hospital clinical with high-fidelity computer controlled simulation during a 15 week course. Each week students either participated in or observed a simulation based on theory content and then participated in a debriefing session to discuss the simulation. The study focused on students’ experiences in the first term of the nursing program using high-fidelity simulation. Based on student demographic data the researcher proposed two focus groups, but there were eight non-traditional students’ who volunteered for the focus group. Findings from the qualitative data analysis included: a) it
required them to critically think about what to do, b) they had the time to reflect on *the little things* that no one points out in clinical, c) increased learning and awareness while feeling anxious and stupid, d) an intense desire for more performance feedback, and e) connecting with their teammates (Lasater, 2007). A strong recommendation from this study was the need for further research to link performance in simulation with skill in clinical practice settings (Lasater, 2007).

There were two studies of Guhde, (2010 & 2011) each with a different focus. The 2010 study by Guhde had students watch three video tapes scenarios of a nurse using a simulator to complete a patient assessment. The students were required to answer questions related to the accuracy of the assessment on a discussion board. Students had an awareness of the importance of early assessment, that patient outcomes are related to assessment, how this will change their approach to patients, and the need to think critically. Guhde's (2011) study compared students’ perceptions of the learning effectiveness of a simple versus complex human patient simulator scenario. The simple scenario was based on one problem and was completed by an individual student. The complex scenario included two clinical problems and was completed by a team of students. After each scenario, students’ completed their perceptions on a Likert scale for the outcomes of thinking, assessment, and learner satisfaction. There was no significant difference on students’ perceptions between the simple versus complex scenarios and both can help them learn. Both studies reported student self-reported positive perceptions of the simulations.

The literature lacked studies that combined similar simulation strategies or duplicated previous studies found in the literature. Simulation assumed many forms in the
research from high-fidelity human simulation (HFHS) (Bambini et al., 2009; Blum et al., 2010; Burns et al., 2010; Cormier et al., 2010; Dillard et al., 2009; Fero et al., 2010; Gantt, 2010; Gilbart et al., 2000; Horan, 2009; Howard et al., 2010; Jeffries & Rizzolo, 2006; Johnson et al., 2008; Kaddoura, 2010; S. E. Kardong-Edgren et al., 2008a; Lasater, 2007; Lewis & Ciak, 2011; McKeon et al., 2009; Ravert, 2008; Rhodes, 2005; Seybert et al., 2008; Shepherd et al., 2010; Shinnick et al., 2012; Sullivan-Mann et al., 2009), low-fidelity human simulation to task-trainers (Jeffries & Rizzolo, 2006; Shepherd et al., 2007), and role play by patient actors (Shepherd et al., 2010). Comparisons in performance also included case studies (Gilbart et al., 2000; Jeffries & Rizzolo, 2006), interactive compact disc (CD) cases (Johnson et al., 2008), interactive case studies (Howard et al., 2010), computer based interactive case studies (McKeon et al., 2009), and video television scenarios (Daly, 2001; Del Bueno, 2005; Fero et al., 2010; Guhde, 2010; Guhde, 2011).

Research was also directed at evaluation of student performance in assessment and skills competencies (Bambini et al., 2009; Gantt, 2010; Seybert et al., 2008; Shepherd et al., 2010), clinical judgment skills (Dillard et al., 2009), student self rating of confidence, and faculty rating of student self confidence (Blum et al., 2010). Further discussion on the researchers’ use of skills performance assessment tools follows.

**3.3.4 Research Using Skills Performance Assessment Tools**

There are many assessment tools to evaluate student performance in simulation and attempts to associate performance in simulation to the development of critical thinking, decision making, and judgment. There are issues in the stage of development of these tools and the concern about faculty interpretations for scoring. Several tools are
already showing promise, but will require further development and application to the nursing student population.

In addition to the Nursing Education Simulation Framework Model developed in Phase I of the multi site, multi method study lead by Jeffries (2006) several instruments were designed to evaluate the simulation framework design components. The design components previously described in this paper include the Design Characteristics, Educational Practices, and Outcomes. The Simulation Design Scale (SDS), is used to evaluate the design characteristics of the simulation. The Student Satisfaction with Learning Scale (SSLS) evaluates the student satisfaction with the simulation design characteristics. The Self-Confidence in Learning Using Simulation Scale measures students perceived performance in the simulation performing skills. The Self-Perceived Judgment Performance Scale (SPJPS) has students self report their performance in the simulation. Cognitive validity was reported for each of these tools after expert’s evaluation along with good reliability as tested using Cronbach’s alpha.

The Educational Practices in Simulation Scale (EPSS) measures the presence of the educational practices in the simulation. The Cognitive Gain or Knowledge was measured using two multiple choice exams used as the pre and post simulation exams. Content validity of both instruments was established by expert faculty (Jeffries & Rizzolo, 2006).

Findings from Jeffries et al., (2006) study gave evidence to support using the Nursing Education Simulation Framework Model to design simulation activity in nursing education. Additionally, students in the HFHS group gave support for the use of debriefing as a way to give feedback to facilitate the decision making/problem solving
They perceived the experience to be an interactive, learning experience. The researchers also concluded the roll assignment during simulation did not affect students learning outcomes. This study contributed a framework model for the development of simulations in nursing, instruments to test the inclusion of best practice for simulation and a guide for future studies.

Lasater (2007) introduced the Lasater Clinical Judgment Rubric (LCJR) as a tool for student self-evaluation and faculty evaluation of student performance. This tool looks at four overlapping components that influence the development of clinical judgment: confidence, aptitude, skill, and experience (Lasater, 2007). These are the focus of observations in performance during simulation. This was a qualitative focus group research project and no elaboration of the LCJR was provided. Results of the focus group were reported in the previous section. Work on the LCJR continues and Dillard (2009) describes the ongoing process of educating faculty in the use of the LCJR tool to assess student performance of clinical judgment during simulation (Dillard et al., 2009). The tool also assesses the students’ self-evaluation of caring for a patient in the clinical setting after the simulation. Lasater and Dillard collaborated with the goal to have evidence of students application of clinical judgment transitioned to the clinical setting.

The LCJR has undergone further development from the original confidence, aptitude, skill and experience by incorporating the four dimensions of clinical judgment specified in the Tanner Clinical Judgment Model (Tanner, 2006). The dimensions along with the corresponding sub-category components are: effective noticing – focused assessment, recognizing deviations from expected patterns, information seeking; effective interpreting – making sense of the data, prioritizing; effective responding – calm
confident manner, clear communication, well-planned intervention/flexibility, and being skillful; and effective reflecting – evaluation/self-analysis and commitment to improvement” Dillard et al., 2009, p. 100). The revised rubric was used to develop a simulation specific, Likert scale, and faculty and student self-evaluation form of the simulation learning objectives that applied key congestive heart failure (CHF) components. Students reported “getting the concepts” from the CHF objectives during the simulation and then faculty were able to determine if the student moved from novice and task completion to clinical decision making (Dillard et al., 2009).

Blum (2010) used the LCJR for both faculty and students to self-evaluate the impact of simulation versus task trainer on self-confidence and competence (Blum et al., 2010). Results indicated there was an increase in self-confidence and competence for both groups as reported by faculty and students.

The Expert-Performance Approach (EPA) was developed to classify nursing students into two groups: high performers and low performers. Students’ were assigned to performance groups based on their verbal reports of observations made during simulation, their actions taken to provide care, and their response to physiologic changes during the simulation task (Cormier et al., 2010).

The Clark Rubric instrument pairs Benner’s five levels of experience with Bloom’s six cognitive domain categories and is used to interpret actions in an objective manner (Gantt, 2010). This too, still in developmental stages, evaluates the student in assessment, history taking, critical thinking, communication, patient teaching, and recognition of necessary diagnostic studies. This tool has shown promise by demonstrating predictability for students needing remediation, but there are concerns
with inter-rater reliability due to bias and subjectivity. The tool was originally developed to evaluate groups. The application to evaluate individuals still needs to be evaluated.

Upon careful review of the literature, this author concluded that more work must be completed in the development of a psychometric tool that is a valid and reliable instrument for faculty to learn to use in the evaluation of an individual students’ performance during simulation learning activities. In the review, there was no mention of a standardized tool used to evaluate traditional hospital clinical and students’ performance that could be used for simulation. The tools show promise in the assessment of simulation and critical thinking during simulation and also transitioning simulation learning to the clinical setting. The Lasater Clinical Judgment Rubric, the Expert-Performance Approach, and the Clark Rubric require additional research to verify findings.

3.3.4 Research Using Standardized Tools to Measure Differences

In the literature, there were many standardized examination tools used to measure students’ ability to think critically, make clinical decisions, and the students’ knowledge level after exposure to various teaching strategies. These tools will be examined in relation to previously identified assessment tools and comparative findings in other studies.

In a 2001 study completed by Daly in the United Kingdom, the Watson-Glaser Critical Thinking Appraisal (WGCTA) was used to assess students’ pre and post videotaped client simulation and “think aloud” technique. The paired t-tests indicated no significant differences in the pre and post score for critical thinking from entry to completion (p = 0.79) (Daly, 2001)
To assess critical thinking and interpersonal skill with focused, un-cued exercises in newly hired experienced and inexperienced RNs, DelBueno (2005) used a series of video television (VTV) simulations. The Performance Based Development System (PBDS) used patient actors who re-created clinical video scenarios that range from simple to complex clinical situations that require the nurse to demonstrate critical thinking in a pencil paper exercise through clinical judgments. The PBDS were developed to measure basic acute medical surgical knowledge for the beginning or novice RN up to the experienced RN working in critical care units. The observational skills, ability to identify independent and collaborative action, act within an acceptable timeframe, and give rationales for their actions is evaluated as either acceptable or not acceptable. The results of this study found that 65-75% of inexperienced RNs did not meet expectation for entry-level clinical judgment ability (Del Bueno, 2005). This does not mean they lack the knowledge as evident by their success on the licensure examination. Del Bueno posits, “Students need consistent experience with both visual simulations and real patients to learn how to focus on and manage patient problems”, (p. 281) and “clinical practice with a preceptor that coaches will develop the clinical judgment skills” (p. 282).

The Clinical Response Verification Tool (CRVT) was developed by a panel of expert nurses on the essential actions that novice graduate nurses should be expected to perform. Students were assigned to three groups: a self-directed learning packet (SDLP) only group, a SDLP plus two scenario based power-point workshops group, or a SDLP plus two scenario based power-point workshops and education sessions using the low-fidelity Vital Anne simulator group. Each student was evaluated with the CRVT during
the completion of a patient assessment on the Vital Anne simulator. The mean test score for nurses in the simulation group was significantly higher than the other two groups (p < 0.001) (Shepherd et al., 2007).

Ravert (2008) used the California Critical Thinking Disposition Inventory (CCTDI) and California Critical Thinking Skills Test (CCTST) to assess participants’ critical thinking pre and post learning experiences. Both the CCTDI and CCTST were developed by P. A. Facione, (2000) after completion of the Delphi consensus study on critical thinking. The CCTDI is a 75-item instrument that has seven disposition scales: open-mindedness, analyticity, cognitive maturity, truth-seeking, systematicity, inquisitiveness, and self-confidence (N. C. Facione, Facione, & Sanchez, 1994). The CCTST is a “test of inductive and deductive reasoning and making correct analyses, inferences, and evaluation”, (P. A. Facione, 2000, p. 73). These tools provide a measurement of the persons’ existing critical thinking skills. There were two experimental groups, a non-Human Patient Simulation (HPS) and regular education with five enrichment sessions and a HPS and regular education with five enrichment sessions. The control group had regular education and no enrichments sessions. There was no statistically significant difference between groups, but limited power to detect the effect due to a small sample size (Ravert, 2008). There was some concern that a more appropriate instrument is needed for nursing education to measure critical thinking and learning skills (Ravert, 2008).

One study focused on the evaluation of three simulation scenarios developed by faculty to use in a foundation of nursing course (Kardong-Edgren et al., 2008b). The Nursing Education Simulation Framework Model components guided the writing of the
scenarios. The tools used to evaluate these simulations were developed and tested for contend validity and reliability during Phase III of the National League for Nursing and Laerdal Medical Multi-Site, Multi-Method Study (Jeffries & Rizzolo, 2006). This current study used the Educational Practices Questionnaire (EPQ), the Simulation Design Scale (SDS), and the Student Satisfaction and Self Confidence in Learning (SSSCL) to evaluate the three scenarios. The SDS identified the need for simulation scenario redesign related to fidelity. The EPQ and SSSCL confirmed appropriate compliance with the components of the Nursing Education Simulation Framework Model and student satisfaction with simulation (Kardong-Edgren et al., 2008b).

The Health Sciences Reasoning Test (HSRT) was developed to measure and assess critical thinking skills of health science students. Sullivan-Mann (2009) used the HSRT to measure differences over time for students in an experimental group having simulation five times versus the control group having simulation two times. There was a significant main effect for time with students answering more questions correct on the post-test for both groups. The ANOVA results indicated the experimental group answered significantly more questions correctly on the post-test versus the pre-test. The control group improved but there was no significant difference in answering more questions correctly on the post-test. There was a significant main effect found for deductive reasoning and analysis and approaching significance on deductive reasoning for both groups (Sullivan-Mann et al., 2009). The researchers concluded that the results showed the expected increase in clinical decision-making. This was the first study with strong quantitative evidence of the outcomes of simulation.
There are two studies that used the Health Education Systems, Inc. (HESI) tool to evaluate mean differences in performance between groups subjected to various treatments. Cormier (2010) used the Expert-Performance Approach (EPA) tool to identify two groups of students based on performance – high and low performers. Each group completed a High Fidelity Human Simulator (HFHS) simulation on the care of a patient with congestive heart failure. The medical-surgical HESI exam was selected and administered because it included content similar to the simulation scenario content. An independent t-test was conducted to compare the means on the HESI knowledge level test between the high and low performing groups and found no significant difference however, the high performers on the EPA had higher test scores (Cormier et al., 2010).

Howard (2010) developed two, 20 item exams from HESI’s test bank of questions based on knowledge content, critical thinking, and application of learned content. Students from BSN, accelerated BSN, and diploma programs were randomly assigned to either the Human Patient Simulation (HPS) group or the Interactive Case Study (ICS) group. Both groups completed the pre and post-HESI tests. The results reported that the mean post-test HESI score for the HPS group was significantly higher than the ICS group (p ≤ 0.05). Of interest, there was not a significant difference in post scores between nursing education program types (Howard et al., 2010).

In Fero’s (2010) cross-over research design study students completed the California Critical Disposition Inventory (CCTDI) and California Critical Thinking Skills Test (CCTST) prior to completion of both VTV and HFHS simulated performance scenarios in an attempt to determine if a relationship existed between critical thinking scores and performance (Fero et al., 2010). Findings for performance in simulation were
similar to DelBueno (2005) with participants not meeting overall expectation on the VTV, with an assessment rating of 75% (Fero et al., 2010). In each simulation most students were unable to identify essential clinical data to report to the physician and 88.9% of the sample did not meet the HFHS expectations (Fero et al., 2010). However, more students initiated nursing interventions in the HFHS scenario (p ≤ 0.001). There was no significant relationship between VTV and CCTDI or CCTST, but there was a positive relationship between HFHS performance and CCTDI scores (Fero et al., 2010).

In a first year, non-clinical nursing course, BSN students, were taught the didactic portion of the nursing process along with communication skills (Burns et al., 2010). One week later students took a pretest on the nursing process content. Students were briefed in the expectations for their participation in the three-hour, complex diagnosis, HFHS simulations using the nursing process. Students not at the bedside during the simulation observed the simulation scenarios at a remote location. Graduate nursing students assisted students in the application of the nursing process during the simulation. Students used pocket cards that outlined the nursing process as a reference. Students were debriefed after each scenario. There were 12 simulation scenarios conducted. The posttest was given one week later, unannounced. Knowledge attainment was significant (p< .001). The researchers concluded that, “HFHS in addition to the course lecture is effective in knowledge acquisition”, (p. e92).

In 2011, Lewis added a simulation lab experience on common pediatrics and obstetrics complications in a growing family course. Lewis evaluated the students’ satisfaction, self-confidence, cognitive learning, and critical thinking. Students took the researcher developed course examination pretest prior to HFHS and then completed the
posttest at the conclusion of the HFHS. A statistically significant increase in knowledge on the paired t-test for the pre and post testing times occurred (p<.005). The Assessment Technology Institute, Inc. (ATI) Nursing Care of Children and Maternal Newborn test results was inconclusive and no conclusions were made in regards to critical thinking and experience in the HFHS. The timeline for administering and completing the ATI was not reported. The National League for Nursing Student Satisfaction and Self Confidence in learning tool reported positive results for satisfaction and self-confidence. An unexpected result from the pretest to the posttest time revealed that students answered a medication question correctly after handling the syringe labeled for the drug and administering the drug during the simulation. The correct answer was only selected on the pretest by 7% of participants and increased to 86% on the posttest (Lewis & Ciak, 2011).

The CCTDI, HSRT, and the Kolb Learning Style Inventory tools were completed by students prior to participation in lecture content on heart failure and simulation in a study conducted by Shinnick (2012). The results of these tests were used in the bivariate analyses. Both the control and experimental simulation groups were determined to be equivalent at the baseline assessment time. This study sought to answer the question if human patient simulation (HPS) is an independent predictor of knowledge gains. The only independent predictor of a good score on the heart failure exam was group membership when a logistic regression was performed (p<.01).

3.4 Summary of Research Gaps

An extensive review of the literature on High Fidelity Human Simulation (HFHS), critical thinking, and developing critical thinking with simulation in nursing education revealed that Nurse educators’ have embraced High Fidelity Human Simulation
as a strategy to teach and assess the skills, knowledge, critical thinking, and decision making of nursing students. There is evidence from students self-reporting that simulation provided them the opportunity to critically think and make decisions when participating in a simulation scenario. The students reported simulation as a safe, non-threatening environment, where faculty and team members support them when feeling anxious, and lacked knowledge on interventions. Finally, students’ reported the development of critical thinking after receipt of feedback on their performance in simulation.

There was evidence provided for the need for more education of nurse educators in the use of HFHS scenarios. This pedagogy requires a new skill set foreign to many educators. The use of the Nursing Education Simulation Framework Model has shown some success when used to guide simulation scenario development. Additionally, there is not one accepted valid and reliable assessment tool to measure individual student performance during a simulation. There is a paucity of research evidence to validate findings. Rubrics are used for scoring student performance, but issues arise in faculty skills in assessing student performance using these assessment tools. Several studies reported problems with faculty scoring based on faculties experience as an educator (Gantt, 2010; Horan, 2009; Sullivan-Mann et al., 2009).

Most studies reviewed used a small convenience sample of participants from various combinations of pre-licensure programs. There were only two studies conducted that researched associate degree nursing students (Horan, 2009; Sullivan-Mann et al., 2009) although associate degree nursing programs annually produce the largest group of graduates (National Council of State Boards of Nursing, Inc., 2012). Several researchers
attempted to randomize groups. Randomization will need to be included in future studies to increase the generalization of research findings along with an increase in sample size.

There are studies that measured the performance of students on standardized critical thinking tools prior to and after simulations. The California Critical Thinking Disposition Inventory, California Critical Thinking Skills Test, Watson Glaser Critical Thinking Assessment, and the Health Sciences Reasoning Test were used to measure students’ existing ability to critically think. The findings of these studies gave conflicting results and concerns on the appropriateness of tools to measure outcomes for nursing students.

There were studies that used researcher developed, content specific, examinations in a pre and posttest format to measure the outcome of learning (knowledge) increases after HFHS. There is conflicting evidence of students scoring higher on the posttest. The area of learning (knowledge) needs continued exploration on both the immediate effect HFHS has on it and the long term effect.

Nursing students’ enroll in a pre-licensure nursing program to learn the profession of nursing. It is posited that nurse educators teach nursing so students achieve the recognized educational outcomes of human flourishing, nursing judgment, professional identity, and spirit of inquiry (National League for Nursing, 2010). Nursing judgment further defined as “encompasses the three processes of critical thinking, clinical judgment, and integration of best evidence into practice” (p. 67). Critical thinking “means identifying, evaluating, and using evidence to guide decision making by means of logic and reasoning”, (p. 67). Nurse educators teach the nursing process to students to enable them to learn to make nursing judgment. There were no studies that examined the
attainment of knowledge of the nursing process using HFHS in an associate degree
nursing program during progression through a foundations course. Additionally, there
were no studies where the students’ all assumed the role of the registered nurse in
completion of a phase of the nursing process during a simulation.

There is a continued need for evidence to discover the learning that may or may
not occur in HFHS simulation from the students’ perspective to provide guidance in
decisions related to teaching nursing with HFHS. There is support that HFHS scenarios
are engaging and provide experience to students. There is a need for supporting evidence
that the inclusion of HFHS in beginning clinical nursing courses has an effect on the
critical thinking and clinical judgment of nursing students in the first clinical course.

3.5 Summary

Over a very short time, nurse educators have embraced High Fidelity Human
Simulation (HFHS) scenarios as a teaching strategy for skills training, a replacement for
clinical, a supplement to missing clinical experiences, or to demonstrate competency in
procedures prior to contact with live patients. Research to identify best practices for the
continued incorporation of simulation into nursing curriculums must continue.

There is beginning evidence in the literature that supports using HFHS and
outcomes of simulation achieved. The need exists, for evidence of transferability of
HFHS learning to the clinical setting. Evidence is needed to support that students are
graduating with beginning, entry level skills with priority in noticing changes in patient
condition, acting on these changes, communicating with other members of the health care
team, and evaluation of the results of nursing interventions – clinical judgment.
CHAPTER 4

4.0 Research Methodology

4.1 Introduction

There is a growing need for evidence in order to discover the learning that may or may not occur in High Fidelity Human Simulator (HFHS) simulation and to test the simulation model framework and the scenario design characteristics. This study sought to determine the outcomes of teaching and learning critical thinking skills of students taught the nursing process using traditional lecture techniques versus the addition of HFHS scenarios. The goal was to identify empirical support for including simulation into nursing program curriculums.

4.2 Design of the Study

This study involved a quantitative, quasi-experimental, factorial 2 x 2 design using a pre-test and post-test to evaluate the effect that an unfolding High Fidelity Human Simulator (HFHS) scenario has in the students' learning of clinical decision making and critical thinking skills that will be measured at two points in time. The factorial design is selected because the researcher is interested in examining variations that may occur based on educational practice and to examine interaction effects. The 2 x 2 Factorial Design of this study is illustrated in Figure 4.1.

The major independent variables are *time in instruction* and the *setting*. The subdivisions of factors is further defined as follows: time is defined as seven hours of instruction: three hours of lecture and four hours in campus laboratory; setting is defined as either lecture and lab, lecture, lab, and case study, or lecture, lab, and HFHS scenarios. The dependent variables are the nursing process knowledge gained and nursing judgment
abilities as measured by the two instruments. The quasi-experimental design is a realistic method to use when full experimental design is not achievable (Polit & Beck, 2008).

**Figure 4.1.** Experimental 2 x 2 Factorial Design of the Study with Major Independent Variables of Time in Instruction and the Setting

<table>
<thead>
<tr>
<th>Setting Factor A</th>
<th>Time In Instruction Factor B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture/Campus Lab</td>
<td>Group 1 3 hours of lecture and 4 hours of lab</td>
</tr>
<tr>
<td>Lecture/Campus Lab/High Fidelity Human Simulation (HFHS)</td>
<td>Group 3 3 hours of lecture and 2 hours of lab and 2 hours of HFHS</td>
</tr>
</tbody>
</table>

**4.2.1 Description of the Nursing Process: Application During Simulation (NPADS)**

All students in the fall 2012 cohort were supplied with a pocket reference guide developed by this researcher titled, “Nursing Process: Application During Simulation (NPADS)”. The NPADS© pocket reference, Appendix A, includes seven steps that the beginning student needs to complete in the nursing process. It was developed as a quick reference for the steps of the nursing process to help students learn the process without worry of missing a step.

The *Introduction* guides the student in the basics of entering a patient’s room, including asking the patient how they would like to be addressed. The *Assessing* step
guides the student in obtaining subjective and objective data. Since the scenario is introduced in week four, students have limited nursing knowledge. Therefore, a quick reference range for adult vital signs is provided in this section (American Heart Association, 2011; Berman & Snyder, 2012). This enables the student to compare the normal ranges to their patient’s vital signs.

The *Diagnosing* step reminds students to consider actual versus potential nursing diagnosis along with wellness nursing diagnosis. The components of a three step diagnosis are included. The *Planning* step includes inclusion of the patient in prioritizing the diagnosis and the student making decisions on the goals of the nursing interventions. The *Implementing* and *Evaluating* steps give reminders to help the student focus on the continued process. The last step is the communication process, with attention given to including data on the situation, background, assessment, recommendations, and read-back of orders/diagnostic reports (*SBAR-R*) for the hand off of the patient’s care to another healthcare provider.

### 4.2.2 Description of the Unfolding High Fidelity Human Simulation Scenario

The experimental groups had the addition of the unfolding HFHS scenarios that explicitly teach application of the nursing process. The researcher attended a two-day workshop provided by Laerdal Corporation on writing and implementing computerized simulation scenarios and several simulation workshops at The Peter M. Winter Institute for Simulation Education and Research (WISER) facility in Pittsburgh, Pennsylvania.

The simulation is designed as an unfolding scenario to guide beginning nursing students in the application of the nursing process in a clinical situation. The Simulation Design Template and the Nursing Education Simulation Framework Model guided the
development of these simulations (Jeffries, 2007). The scenarios were reviewed and enacted by the researcher and NLRC faculty. The timing for each phase, vocals, and content accuracy were determined to have content validity and realism. The students were given a study packet for the scenarios that outline psychomotor skills, cognitive activities, learning objectives, and a summary of the patient diagnosis prior to the simulations.

The unfolding HFHS scenario had beginning nursing students apply the concepts of the nursing process to the care of a patient presenting in an emergency department. The nursing process is the underlying process that nurses use to make nursing judgments (National League for Nursing, 2010). Explicit patient cues are built into the scenarios. Students were required to apply the nursing process to assess, diagnose, plan, implement, and evaluate the patient. This simulation required all participating students to assume the role of the registered nurse while performing the assigned step(s) of the nursing process.

This simulation was developed to expose students to a patient situation they might encounter in this rural, farm community. The local farms employ migrant workers, especially those from Mexico with English as a second language. A professional fluent in both English and Spanish recorded the vocals for the simulation. The vocals include words and phrases in Spanish, English, and a combination of both accents to expose students to a local population. They were required to use listening skills and etiquette to understand the patient’s responses. Additionally, cultural considerations for the patient responses to health care questioning, respect, introduction of self, and vocals given in response to the assessment questions asked by the students were incorporated (Zoucha & Zamarripa, 2008).
The first scenario introduces the students to Mr. Quinones-Perez. The patient is a migrant farm worker who presents with symptoms of heat exhaustion. This required the students to do a focused examination. The students completed the introduction and assessment phase and concluded with a priority nursing diagnosis. After 20 minutes, students moved to a classroom to debrief and began developing a concept map for this patient.

The second scenario time frame is one hour after the initial assessment and required students to conduct a thorough history and physical exam. Application of communication skills required the students to complete a “hand off report” using the reporting procedure of Situation, Background, Assessment, Recommendations, and Read-back of orders/diagnostic reports (SBAR-R). Group #3 concluded the simulation at this point and completed the debriefing process and the concept map.

Group #4 continued the HFHS over the next two hours. The students had the opportunity to apply the nursing process as the simulation scenario continued for Mr. Quinones-Perez. The learning obtained during the debriefing and guided reflection was applied in the next two scenarios to continue the practice of the registered nurse role. The next unfolding scenario was the admission to the nursing unit where additional complications were revealed by the patient. The last scenario was the beginning of the discharge planning process. Students completed a debriefing at the end of each phase of the scenario. The simulation concluded with a review of the simulation and further development of a concept map. The unfolding simulation is included (Appendix B).

The unfolding HFHS simulation was evaluated during the design/development phase. Three simulation faculty used the 20 – item Simulation Design Scale (SDS) to
measure the simulation design components; objectives and information, support, problem solving, feedback, guided reflection, and fidelity (realism). The designers of the SDS reported an overall content validity for Cronbach’s alpha of 0.94 (Jeffries, 2007).

Results of the SDS scored by the simulation faculty for the unfolding HFHS simulation indicate overall agreement for all components of 4.88 mean. The fidelity (realism) component had a 5.0 agreement and the remaining components: objectives and information, support, problem solving, and feedback/guided reflection each had a 4.75 agreement. Therefore, there was evidence of strong support for the presence of the design elements in the unfolding HFHS scenarios.

Additionally, seven students enrolled in the part time evening program of study agreed to participate in a trial run through the first two scenarios. This resulted in the completion of the entire nursing process using the N-PADS©. Students used the SDS to evaluate the simulation scenarios. The presence of the simulation design elements score was 4.71 and the importance of the simulation design elements was 4.56. The students gave evidence of the simulation having strong presence and importance of the design elements.

4.2.3 Description of the Unfolding Case Study

The unfolding HFHS scenario described previously was adapted into a paper – pencil case study. Students assigned to Group #2 completed the unfolding case study (Appendix C) in a time frame similar to the HFHS groups. A masters prepared nurse educator led the students in the unfolding case study.
4.2.4 Description of the Nursing Process Campus Laboratory

The Nursing Process Campus Laboratory packet was developed for fall 2011 and fall of 2012 Foundations of Nursing course. Activities include objectives for the laboratory experience and learning activities designed to achieve the objectives. Students learned the process of developing a concept map for Ineffective Airway Clearance, practice the role of patient/nurse using the process of data collection and concept mapping. The last activity had students watching a DVD on a basic interview and analyzing what they observed versus what they learned in lecture (Appendix D).

4.3 Setting

The setting for this research study was in a rural, public, community college located in southwestern Pennsylvania. The nursing program is taught in three different counties, each site approximately one hour away from the main campus. All locations are equipped with HFHS laboratories staffed with master prepared nurse educators. All nursing courses are offered at each site and students can complete nursing courses at the assigned location. The Foundations of Nursing course is taught in the fall at all three locations. The nursing process lecture content was taught during the first week of the semester. The nursing process campus laboratory is taught during week four.

To reduce variation in presentation of lecture content and potential extraneous variables, the study was conducted on the main campus. The same faculty member taught the nursing process content in fall 2011 and again in fall 2012. This site has the largest enrollment in the nursing foundations course, admitting approximately 120 students each fall.
The HFHS scenario was conducted in the Nursing Learning Resource Center (NLRC) simulation laboratory room that is equipped with the Laerdal SimMan®, cardiac display monitor, hospital bed, overhead table, and wall mount oxygen and suction unit. The simulation laboratory room was staged to replicate an emergency room patient care area. The room is equipped with three ceiling mounted cameras, microphones, and the Laerdal Advanced Video System (AVS) to record and project the simulation to a remote classroom location. The simulation lab room was large enough for all students to participate and watch the scenario in the lab room. The simulation scenario groups were digitally recorded, but not broadcasted to another room.

The researcher was at the bedside as the instructor for all simulations. This is a teaching simulation and the researcher’s role is a facilitator. Students were guided in the application of the nursing process during a basic scenario using the Nursing Process Application During Simulation (NPADS©) pocket reference. There are vocal cues from the patient built into the scenario. The researcher offered cues to the students as needed.

The NLRC faculty were hidden from students’ view by a one way mirrored screen. The NLRC faculty operated the simulation scenario settings as outlined in the researcher guidelines.

Campus laboratory group size ranges between eight and ten students. Students assigned to the HFHS groups rotated between observer and participant. All students were present at the bedside during the simulation. Students who were observing documented the assessment findings as they observe the simulation. All students participated in the debriefing process and concept mapping as outlined in the scenario.
Students assigned to the case study groups were taught in a nursing laboratory, classroom style with the same masters prepared faculty guiding the case study. Students used the NPADS© pocket reference as a guide and create a concept map.

After all students took the ATI examination, students not participating in the HFHS scenarios from Group 2 were given the opportunity to engage in the simulation scenarios. Students from Group 3 were given the opportunity to complete the last two HFHS scenarios. There were two students’ who replied to the notice, but elected not to participate.

4.4 Sample

Results of a literature search revealed a lack of research studies on associate degree nursing programs (ADN) as to the effect HFHS has on the development of clinical judgment skills. In the United States, 57 percent of the graduate nurses, in 2011, who took the National Council Licensure Examination (NCLEX) RN examination were graduates of ADN programs (National Council of State Boards of Nursing, 2011). Therefore, a convenience sample of first year, first semester ADN students enrolled in the Foundations of Nursing Care course in the fall 2011 and 2012 academic years were selected for this study. All students have completed the same orientation to the NLRC and SimMan® during week one of the program.

The two distinct cohorts of ADN students are defined by the year admitted into the program of studies. The admission criteria to the nursing program is consistent between the cohorts admitted to Fall 2011 and Fall 2012 groups. Students’ scores from the National League for Nursing (NLN) Pre – Admission Examination (PAX) - RN, grade point average (GPA) for co-requisite courses completed, and additional points
given for a “C” or better in all co-requisite courses completed are scored. The scores of
the applicants are ranked from high to low. Applicants are offered a seat in descending
order.

The class admitted in the Fall 2011 is Group #1 and designated as the control
group. Group #1 was taught the nursing process theory during a three hour lecture and a
four hour campus lab. The campus lab packet included practice conducting an assessment
interview, case study for care and developing a concept map. The aggregate data from the
nursing process examination scores and the ATI fundamental examination scores
provided the control groups’ data.

Students admitted in the Fall 2012 were randomly assigned in the factorial design
to Group #2, #3, or #4. This was completed after campus laboratory group assignments
were made during orientation in the semester students are accepted into the nursing
program. The orientation was held in a large auditorium with students from all three sites
in attendance. The researcher instructed students to self select a seat based on site
assigned for instruction. The study site had 15 rows set up with eight to ten seats
available. This self selection results in students being assigned to a campus laboratory
and a clinical laboratory group. The 15 groups were assigned to one of the three
experimental groups. All groups had the same nursing process theory in a three hour
lecture. The campus laboratory duration and teaching pedagogy was conducted as
described in the factorial design.

Additional inclusion criteria for final analysis required students to complete both
the nursing process examination and the ATI assessment, and cohort 2012 members
completing the experimental teaching as assigned. Students returning in fall 2012 with a
history of withdrawing or failing the Foundations of Nursing Care course were not included in the study. Demographic data was collected from a Data Sheet done by all students when entering the nursing program.

4.4.1 Power Analysis

G*Power 3.1.3 software was used to conduct a power analysis test for the Analysis of Variance (ANOVA): Fixed effects, special, main effects and interactions to predict the necessary sample size needed for the study (Faul, Erdfelder, Buchner, & Lang, 2009). To compute the required sample size the following parameters were used: a medium effect size of 0.25, alpha of 0.05, power of 0.80, numerator degree of freedom (df) = 3, and a total of four groups. A total sample size of 179 participants were needed for this study, each group requiring at least 45 participants.

It is difficult to predict the number of student who will elect to participate in the entire research study. Although the G*Power 3.1.3 software power analysis identified a sample size of 45 participants in each group (Faul et al., 2009) it was determined that all qualified candidates would be recruited for the study. The sample size will be evaluated post data collection to calculate actual power.

4.5 Data Collection Instruments

4.5.1 NLN Pre – Admission Examination (PAX) - RN

The NLN PAX-RN, is a proprietary examination and is one measure used by the research site for admission decisions to the nursing program. The NLN clearly delineates that this examination be one of several criteria faculty use for decisions on entry into pre-licensure nursing programs. Test results are reported as an overall composite score, with the mean of 100 and a standard deviation of 20. Three examinations are used to measure
candidates’ knowledge in verbal ability, mathematical skills, and knowledge of basic science. Each test has a test blueprint developed to reflect the knowledge students need upon entry into a registered nurse program to be successful (National League for Nursing, 2011).

The NLN PAX-RN results were used to compare the cohorts from Fall 2011 to Fall 2012. The NLN reports each test form as equated to a standard reference form so scores of applicants from differing test years can be compared (National League for Nursing, 2011).

The psychometric quality of the test is reported for reliability and validity. The test – retest evidence revealed a stability coefficient of 0.864. The Kuder-Richerson (KR-20) internal consistency for each examination was reported: verbal ability (0.82), mathematics (0.81), and science (0.75) (National League for Nursing, 2011).

Validity studies were reported based on the correlation between the NLN PAX-RN score and student completion rates of the first year of the nursing program and completion of the nursing program. The reported results of “the correlation between PAX-RN composite scores and completion of the first year of the program was 0.36 (n=2200), and the correlation between PAX-RN composite scores and completion of the entire nursing program was 0.35 (n=1448) thus results are significant” (National League for Nursing, 2011, p. 12).

4.5.2 Nursing Process Examination

The Nursing Process Examination was developed to measure the lecture and campus laboratory objectives for the theory content for the nursing process. The Foundation course has 30 objectives for the lecture content. There is at least one question
for every objective. The first examination students took was a 50-point multiple-choice examination. The first 25 questions test the nursing process content and the second 25 questions test the hygiene and data collection content. Passing the examination requires a 77% or better on the examination. One alternative question format was a select all that apply.

It is important for nurse educators to ensure that the examinations created to measure the objectives have a satisfactory level of content validity (Polit & Beck, 2008). One method of determining content validity is to subject the examination to the scrutiny of content experts (Polit & Beck, 2008; Waltz, Strickland, & Lenz, 2010). A five-member panel of experts conducted an independent analysis of the Nursing Process examination for content validity. The experts are four, full-time nursing faculty, one who developed the examination, and one director, who have all taught the nursing process content for at least three years in an associate degree nursing program.

The Nursing Process examination was converted to a four-point scale of relevance: not relevant = 1, somewhat relevant = 2, quite relevant = 3, and highly relevant = 4 (Waltz et al., 2010). The instructions asked the experts to compare the course objectives for the nursing process content to each examination question and score each question for relevance in measuring the objectives. The content validity was conducted to ensure that each examination question was an evaluation of a course objective. The correct answer to each question was bolded.

Using the experts rating of quite relevant = 3 and highly relevant = 4 the scale-level percentage of content validity (S-CVI) for individual items agreement ranged from 0.9 to 1.0. The S-CVI average for the 25-item examination is 0.988. This S-CVI is
excellent and exceeds the suggested value of 0.90 for excellent content validity given by Polit & Beck, (2008).

The experts evaluated each question for Bloom’s taxonomy of the cognitive domain. The lowest percent of agreement recorded by the experts was 40% on six items. The percent of agreement for the remaining items was 60% on nine items, 80% on eight items, and 100% on two items. The results demonstrate a degree of congruency between the test developer and the content experts using Bloom’s taxonomy of the cognitive domain (Waltz et al., 2010). The findings presented demonstrate a normal distribution of the examination questions with the application type question at the mean. This distribution of test questions is reflective of the recommended test plan of the 2010 National Council of State Boards of Nursing (NCSBN) RN® Test Plan (National Council of State Boards of Nursing, 2010). The National Council Licensure Examination for Registered Nurses (NCLEX-RN® Examination) used Bloom’s taxonomy for the cognitive domain with the “majority of the test items written at the application or higher levels of cognitive ability, which requires more complex thought processing” (National Council of State Boards of Nursing, 2010, p. 2).

Reliability for the nursing process 25-point examination was calculated using the reliability coefficient (KR20) with a value of 0.19. This is considered a low level; however this would be expected since the test was constructed with each item to stand on its own merit (Waltz et al., 2010). The group of subjects are first semester nursing students, and “alpha will be lower when the group is homogeneous” (Waltz et al., 2010, p. 150)
The item analysis included a point-biserial correlation for each test item. The point-biserial correlation is calculated to determine the relationship between two variables (Gravetter & Wallnau, 2007). The variables of comparison are the correct responses for each item by students in the upper 27% and students in the lower 27% based on correct responses on the examination. The correlation is measuring the strength of the relationship between the students’ performance on the examination by the students ranking on the examination. It is also a reference to nurse educators to evaluate the test item for discrepancies. The correlations for this examination ranged from -0.03 to 0.52. A correlation near 1.00 or -1.00 indicates a strong relationship (Gravetter & Wallnau, 2007). The point-biserial for this examination was low on all items except two. One could conclude that whether a student is in the upper or lower 27% in correct responses for the test as a hole had a very low correlation on how the student would perform on the test item. This could be attributed to the groups homogeneous.

Fall 2011 first semester nursing students, N = 113, took the examination. The nursing process test scores ranged from 17 – 25 with the mean score of 21.49, median score of 21.66, and standard deviation of 1.77. The distribution of test scores resulted in a negatively skewed distribution. The nursing process examination was developed specifically for the nursing process content. It is anticipated that the nursing students would perform well on the examination. Therefore, the skewed distribution was anticipated.

From this evaluation of the Nursing Process examination, it measures what it was intended to measure. The test is a multiple-choice format and is easy to administer within the 50-minute time limit. The students fill in the answer on a scan card. The faculty use a
scantron reader to score the examination. This is a well developed examination that will be a good measure of the students’ cognitive domain on the nursing process and critical thinking. This evidence provides support to the inclusion of this examination as a measurement for this proposed study (Appendix E).

4.5.3 Assessment Technology Institutes RN Fundamentals 2010 Assessment Form B

The Assessment Technology Institutes (ATI) RN Fundamentals 2010 Assessment Form B is a proprietary examination used to measures students’ knowledge in basic care of the patient. Table 4.2 provides the mean raw score, alpha (a reliability coefficient) and the mean point bi-serial for the RN Content Mastery Series (CMS) 2010 Fundamentals assessment. There is only preliminary data on the RN CMS 2010 Fundamentals assessment given that it was only released live a few months ago (T. Juve, personal communication, January 18, 2012).

Table 4.2. Psychometrics RN 2010 Form B Examination

<table>
<thead>
<tr>
<th></th>
<th>Fundamentals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RN CMS 2010</strong></td>
<td></td>
</tr>
<tr>
<td>Scored Items</td>
<td>60</td>
</tr>
<tr>
<td>Mean Raw Score</td>
<td>42.85</td>
</tr>
<tr>
<td>Alpha</td>
<td>0.652</td>
</tr>
<tr>
<td>Mean Point Biserial</td>
<td>0.292</td>
</tr>
</tbody>
</table>

The ATI examination was developed based on the 2010 revision to the NCLEX-RN test plan (T. Juve, personal communication, July 19, 2011). The ATI RN
Fundamentals 2010 Assessment Form B reports test results for the individuals’ performance based upon ATI Proficiency Levels. There are four levels of proficiency: a level 3 proficiency level identifies scores of 80% or greater, a level 2 proficiency level range between 68.3% - 78.3%, level 1 proficiency level ranges between 58.3% - 66.7%, and below level 1 is less than 58.3%. A level 1 proficiency is considered the minimal score for the content area. The adjusted group score is the mean for the group’s performance on the exam.

The ATI exam also reports individual and group scores on the 60 test items written to evaluate students on the nursing process. Areas of importance for this research include student performance on both the foundational thinking in nursing content (32 items), clinical judgment/critical thinking in nursing (28 items), and eight items that evaluate priority setting. The nursing process is evaluated with test items as follows: assessment (7 items), analysis/diagnosis (8 items), planning (10 items), implementation/therapeutic nursing intervention (23 items), and evaluation (12 items). A detailed listing of the content for the ATI examination is provided in Appendix F.

**4.5.4 Demographic Data Sheet**

The Student Data Sheet provided the demographic data for this study. The data included for this research project are age, gender, ethnic group, full time versus part time enrollment, previous non-nursing degree and major, previous health related education, and military background. All information will be reported as aggregate data with no identifiers reported (Appendix G).
4.5.4 Simulation Design Scale (Student Version)

The simulation must be evaluated at three phases (Jeffries, 2007). The two phases, the design/development phase and the evaluation phase were discussed previously. The remaining evaluation occurs after the implementation. The Simulation Design Scale (SDS), Student Version was used to measure the students’ perception of the simulation design. The SDS measures the components of the simulation design elements and importance of each item to the student. The components are the objectives and information, support, problem solving, feedback/guided reflection, and fidelity (realism) (Appendix H) (Jeffries, 2007).

4.6 Procedure for Data Collection

The instruments for data collection are the Nursing Process examination, the ATI RN Fundamentals 2010 Assessment Form B, the Simulation Design Scale (Student Version), the NLN Pre – Admission Examination (PAX) – RN, and a demographic form. Both the NLN PAX-RN and demographic data form are completed upon acceptance to the program. Data was retrieved after IRB approval.

The times for measurement are set in the curriculum to assess lecture content during the 15-week semester. The Nursing Process examination was given in week four after all lectures and labs completed on this topic. The Nursing Process Examination will test all groups for knowledge and critical thinking in relation to using the nursing process in practice. The ATI assessment was given in week 11 after the majority of fundamentals content is taught. This assessment evaluates students’ content mastery in fundamental nursing concepts using the nursing process.

The intervention occurred during week four, before the Nursing Process examination was administered. The simulation intervention required the students to
engage in the application of the nursing process to a patient situation while guided in thinking by the researcher. Students not assigned to the simulation intervention completed a case study designed with the same patient situation. All students received a copy of the pocket reference “Nursing Process: Application During Simulation” (NPADS©). Students completed the SDS, student version, immediately after completing the HFHS scenarios.

4.7 Procedure for Protection of Human Subjects

The researcher gained Institutional Review Board (IRB) approval from Duquesne University. The Westmoreland County Community College selected for the study does not have an IRB, therefore permission to conduct the research was given from the college President.

There was clear communication to the participants that participation in the education components of the course are required as part of the nursing course, but that consent to participate in the research is voluntary. Students can agree to participate, not participate, or withdraw at any time. This decision will not impact their grade for the course or their progression through the program. Course instructors will not have access to the analysis of this data and will not have knowledge of who did or did not participate.

A written script was read to the potential participants. They were asked to participate in this research project that investigated the effects of teaching the nursing process using a HFHS unfolding scenario or a case study. The normal components of the NSG 111 Foundations of Nursing Care course include a nursing process examination and the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B. The addition of a HFHS unfolding simulation scenario, which is video-taped, or case
study was added to some of the campus labs for this course. All campus labs were completed during a four hour time frame.

Students were asked to allow the researcher to access the information provided upon admission to the program, specifically, the National League for Nursing (NLN) Pre-Entrance RN examination and a demographic survey. There are no known risks greater than those encountered in everyday life. There are also no direct benefits for student participation other than the knowledge that the results of this study may contribute to the body of knowledge on HFHS and thus help other nursing students in the future.

This study required a consent form from participants and therefore an expedited IRB review was requested. All students were screened prior to consent for assurance of >18-years of age. A copy of the signed consent was provided for all participants. The consent was stored in a locked file in the researcher’s home office (Appendix I). A total of 110 students from Fall 2011 and 110 students from Fall 2012 consented to participate.

4.8 Procedure for Data Analysis

Descriptive statistics were examined. The Two-Factor Analysis of Variance (ANOVA) will be performed and other analysis as indicated using the most current version of the Statistical Package for the Social Sciences (SPSS) software.
CHAPTER 5

5.0 SIMULATION DESIGN SCALE MANUSCRIPT #2


5.1 Abstract

Background: Writing simulation scenarios is more than converting a case study. It is a process based on the best practices in simulation design. Educators need to evaluate simulations for the presence of the simulation design elements to ensure that the simulation is presenting what the educator intended. The simulation was taught in a two hour and a four hour laboratory to evaluate if there was a difference in the Presence and Importance of the Simulation Design Elements scoring in relation to the time in the simulation.

Method: The NLN/Jeffries Simulation Framework was used to guide the development of an unfolding High Fidelity Human Simulator (HFHS) scenario to teach the nursing process. The Simulation Design Scale (SDS) was used to evaluate the simulation scenario for the presence and importance of the simulation design elements.

Results/Conclusions: Results of the Independent \( t(\text{test}) \) on the overall SDS for the groups for the Presence of the Simulation Design Elements was not significant \( (p = .103) \), but for the Importance of the Simulation Design Elements results were significant \( (p = .03) \). Further analysis of the Groups’ results for the Importance of the Design Elements indicated significant results on the Independent \( t(\text{test}) \) for the elements of Objectives and Information \( (p = .002) \) and Importance of Fidelity \( (p = .017) \). These results suggest that as the time planned to be in the simulation increases more attention needs...
directed toward the evolution of the element of *Objectives and Information* and the maintenance of the level of *Fidelity* would be a factor when writing simulation scenarios. Further study of these findings is recommended.

### 5.2 Introduction

This article will explore the development of an unfolding high fidelity human simulation (HFHS) scenario guided by the Nursing Education Simulation Theoretical Framework Model. Nurse educators have used role playing, standardized patients, task trainers, software-based simulation, static mannequins, and computerized patients to teach nursing students (Cooper & Taqueti, 2004; Rosen, 2008). As HFHS scenarios are introduced into nursing curriculums, nurse educators need to evaluate not only the outcomes of simulation, but the presence of the simulation design characteristics in the simulation scenarios (Jeffries, 2007).

Writing simulations is not a simple process. Simulation scenarios are written to create a nursing care experience whereby students can practice in a safe, controlled environment. It requires the educator to be creative and focus on the objective of the scenario. The scenario presented was taught in the fourth week of a foundation of nursing course to guide students in the application of the steps of the nursing process in an emergency room setting. The scenario required minimal knowledge of nursing practice and disease process. The scenario incorporated a cultural aspect depicting a Mexican, migrant worker.

### 5.3 Review of the Literature

A literature search was conducted as to the state of knowledge on simulation and critical thinking published prior to March 1, 2012. Keyword combinations used were
critical thinking and simulation or developing critical thinking with simulation to search the databases: Pubmed @Duq, PsycINFO, Cochran & OVID SP DSR, Medline (OVID SP), CINAHL, and Ebsco host. Studies published in English, qualitative, quantitative, and mixed method research articles were included in the review. Twenty-eight research articles were reviewed. Only five of these studies included Associate Degree Nursing (ADN) students. Of importance to this article is the lack of research conducted on Associate Degree Nursing (ADN) students. Two studies were conducted with ADN students (Horan, 2009; Sullivan-Mann et al., 2009), one study that compared Bachelor (BSN) and ADN students (Gantt, 2010), and two studies that compared BSN, ADN, and Diploma students (Fero et al., 2010; Jeffries & Rizzolo, 2006)

Nursing students’ enroll in a pre-licensure nursing program to learn the profession of nursing. It is posited that nurse educators teach nursing so students achieve the recognized educational outcomes of human flourishing, nursing judgment, professional identity, and spirit of inquiry (National League for Nursing, 2010). Nursing judgment further defined as “encompasses the three processes of critical thinking, clinical judgment, and integration of best evidence into practice” (p. 67). Critical thinking “means identifying, evaluating, and using evidence to guide decision making by means of logic and reasoning”, (p. 67). Nurse educators teach the nursing process to students to enable them to learn to make nursing judgment. There were no studies that examined the attainment of knowledge of the nursing process using HFHS in an associate degree nursing program during progression through a foundations course. Additionally, there were no studies where the students’ all assumed the role of the registered nurse in completion of a phase of the nursing process during a simulation.
There is support that HFHS scenarios are engaging and provide experience to students. There is a need for supporting evidence that the inclusion of HFHS in beginning clinical nursing courses has an effect on the critical thinking and clinical judgment of nursing students.

Simulation scenarios are written and students participate in them. There is a need to evaluate the scenario to determine validity. It is posit that simulations written using the Nursing Education Simulation Framework Model will satisfy the criteria of “best practices” in simulation design. There is a need for educators to evaluate all simulations to determine if the design characteristics of simulation are present. In the following sections, evidence will be presented on the writing and evaluation of a simulation scenario using the Simulation Design Scale.

5.4 Theoretical Foundation of the Nursing Education Simulation Framework Model

Jeffries, (2005) presented the Nursing Education Simulation Framework Model as the best practice for simulation design for nursing. The model includes five conceptual components for simulation: teacher, student, educational practices, design characteristics of the simulation, and outcomes.

The design characteristics include: objectives and information; fidelity (reality); problem solving; participant support and cues; and reflective thinking (debriefing). Outcomes are further defined as “learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence” (p.97). This model guided the development and implementation of the High Fidelity Human Simulation (HFHS) unfolding simulation scenario.
In 2012, a panel of researchers, who were to analyze The Nursing Education Simulation Framework Models’ five constructs, presented their findings at the International Nursing Simulation Learning Resource Center Conference. The recommendations included changing the conceptual component of teacher to facilitator and student to participant (Jeffries, 2012). Additionally, the model was re-named The NLN/Jeffries Simulation Framework.

5.5 Exemplar

5.5.1 The Nursing-Process Application During Simulation (N-PADS©)

A recommendation of the work of Burns et al., (2010) was that nursing programs develop tools for assisting students in the simulation experience. The nursing process is the first lecture content taught in the study site. Students need shown how to apply lecture content on the nursing process in a clinical situation. Simulation is a tool to guide students in this application. The Nursing Process Application During Simulation (N-PADS©) (Irwin, 2011) was designed for students as a handy pocket reference that could accompany them to the simulation and clinical. It was postulated that the N-PADS© and the cues would help students organize their approach to the patient and was developed based on the foundations textbook used by the nursing program (Berman & Snyder, 2012).

The first step is the Introduction. It reminds students to remember to knock on the door before entering the room and to make introductions. The second step is the Assessing. Students are cued to collect subjective and objective data and make a comparison. Since this is taught early in the foundations course students have a limited knowledge of nursing. A quick reference range for adults on vital signs is included.
(American Heart Association, 2011; Berman & Snyder, 2012). The Diagnosing step includes cues to evaluate the assessment data and compare the data to normal. The parts of a three step nursing diagnosis are included. The next three sections include cues for the Planning, Implementing, and Evaluation steps of the nursing process. The last section guides them in the communication process that should be followed every time there is a change in care provider. The communication includes the situation, background, assessment, recommendations, with the addition of Read-back of orders/diagnostic reports (SBAR-R).

5.5.2 The Simulation

Using the Simulation Design Template and the NLN/Jeffries Simulation Framework (Jeffries, 2012) an unfolding high fidelity human simulation scenario was written to teach beginning nursing students the application of the nursing process in a clinical situation. Objectives were written for beginning students with limited knowledge of nursing. They included: conduct a health history and head to toe assessment of the patient, compare subjective data with objective data, interpret assessment data, prioritize the assessment findings, develop a three part nursing diagnosis, identify what actions need implemented, evaluate outcome of the nursing actions, compose a SBAR-R communication for the next shift, and construct a concept map.

Students were assigned readings, received learning packets, attended the lectures on the nursing process and assessing health, attended the hygiene, assessment and data collection campus laboratory prior to simulation. They were instructed to become familiar with the material and to be prepared for the nursing process campus laboratory. Students were not aware of the Factorial Design campus laboratory they were assigned.
There were three laboratory options: two hour campus laboratory with two hour case study; two hour campus laboratory and two hours simulation; or four hours simulation laboratory. All three options were developed with the same patient information.

The setting was in an emergency department of a community hospital. The triage nurse completed the basic assessment of a brief history of present illness, vital signs, and began documentation. The triage nurse put on the patient identification bracelet and brought the patient back to the treatment room, connected him to the heart monitor, and applied oxygen by nasal cannula at 4 Liters.

The Simulator monitor displayed the following vital signs: BP 90/56, T 102° F, P 116, and R 20. The researcher guided students on the interpretation of the vital signs using the reference list on vital signs included in the N-PADS©.

The patient was diagnosed with heat exhaustion resulting from working in excessive heat and not drinking enough fluids. It is mid September and the temperature is over 90 degrees. The signs and symptoms of heat exhaustion can include paleness, dizziness, nausea, vomiting, fainting, moderate temperature elevation (101° F to 102° F). Other causes can be dehydration, alcohol use, and over dressing. The priority was reversal of symptoms.

This simulation exposed students to a patient situation they might encounter in this rural, farm community. The local farms employ migrant workers, especially those from Mexico with English as a second language. A professional fluent in both English and Spanish recorded the vocals for the simulation. Students’ were required to use listening skills and etiquette to understand the patient’s responses. Cultural considerations
were included that anticipated response to the assessment questions students might ask (Zoucha & Zamarripa, 2008).

The simulation included opportunities for patient teaching. The students would be able to teach the patient to recognize the early signs and symptoms of heat exhaustion, and preventative measures (Center for Disease Control, 2011).

All participants were to assume the role of the registered nurse in the simulation. The N-PADS© tabs were used to assign roles to each participant, including the role of observers. The observers were to take notes as a reference for the debriefing sessions and development of the mind maps.

5.6 Method

5.6.1 Design and Sample

Students were randomly assigned to campus laboratory groups. The unfolding simulation scenarios were conducted during the week of the Labor Day holiday. Students assigned to the Monday campus laboratory self-selected an alternative campus laboratory to attend that week. Students were not aware of the laboratory teaching strategies.

This study was concerned with evaluating the simulation design characteristics of the unfolding simulation scenario used to teach the nursing process. The researcher taught all simulation scenarios. Completion of two hours of simulation resulted in one full cycle of the nursing process practice and development of a concept map. The two groups are referred to as Group #1 with two hours of simulation along with two hours of campus laboratory (n = 35) and Group #2 with four hours of simulation (n= 46). The last two hours of simulation by Group #2 gave this group "do over" to apply learning on the nursing process obtained in the debriefing sessions.
Demographic characteristics of both groups were completed. Gender was the same for both groups with 80% female and 20% male. The majority of participants were under 30 years of age. Race for each group was white, non-Hispanic with Group #1 reporting 97% and Group #2 reporting 84%. Of interest was the self-reported previous health related education. In Group #1, eight out of the 35 participants (31%) reported previous health related education with 23% trained as certified nurse aides, nurse aides, or residential assistants. In Group #2, 13 out of the 45 participants (42%) reported previous health related education with 29% trained as certified nurse aides, nurse aides, or residential assistants.

Institutional Review Board approval was received from the Duquesne University and the college president at the research location. Students were read a script to inform them of the study and their right to participate, not participate, or to withdraw consent at any time. Additionally, their decision would not impact their grade for the course. All students elected to participate in the simulation.

5.6.2 Instrument

The simulation scenario evaluation occurs during the development phase, initial testing of the simulation, and at the completion of the scenario with the participants. The Simulation Design Scale (SDS) evaluates the presence of the Design Characteristics of the simulation: objectives/information, student support, problem solving/complexity, fidelity (realism), and guided reflection/debriefing. Participants evaluated each of the design characteristics using a Likert scale from two perspectives. The first perspective is based on the students’ perceived amount of agreement or disagreement on the Presence
of the simulation design elements and then the amount of agreement or disagreement on the \textit{Importance} of the simulation design elements.

The unfolding HFHS scenario was evaluated during the design/development phase. The simulation was written using the NLN/Jeffries Simulation Framework to guide the process. The simulation room was set with a bed, overhead table, call bell, and heart monitor. The patient was dressed in a flannel shirt and tee shirt, jeans, ball cap, and sunglasses. His shoes were tattered and he had no socks or underwear. Make-up (mouelodge) displayed facial stubble. He had a rash under his arms, in both groins, and on his back. He had bilateral, large blisters on his feet. A small ulcer was on his right heel. His hands were dirty and there were cuts on his hands that were covered with band aides.

The simulation was pilot-tested to provide feedback and an opportunity to evaluate the presence of the \textit{Design Characteristics}. In spring 2012, seven, first semester students enrolled in the foundations of nursing course agreed to participate in the simulation and complete the SDS. The participants completed two of the unfolding scenarios during a two hour simulation. This gave them the opportunity to use the N-PADS© pocket cards and complete all phases of the nursing process. There were two debriefing sessions and a concept map was developed.

The participants completed the SDS after the last debriefing session. Participants had an overall score of 4.71 for \textit{Presence} of simulation design elements and an overall score of 4.86 for \textit{Importance} of the design elements. This data provided evidence to the researcher that the simulation scenario had excellent representation of the Simulation
Design Characteristics. Participants also were willing to complete the next two scenarios, but due to time constraints were unable.

Nursing Learning Resource Center simulation faculty (n=3) used the 20 – item SDS to measure the Presence of the simulation design components with results indicating an overall agreement for all components of 4.88 median. The fidelity (realism) component had a 5.0 agreement and the remaining components: objectives and information, support, problem solving, and feedback/guided reflection each had a 4.75 agreement. Therefore, there was evidence of strong support for the presence of the design elements in the unfolding HFHS scenario among the faculty.

One faculty member gave an anecdotal note in regards to her observations of the students who were observing the simulation in a remote classroom. She observed the group who should have been observing the simulation were more concerned about the role they were assigned in the next scenario and not being attentive to the other participants. The researcher considered this information and in the study all students were instructed to be prepared for all roles and the roles were not assigned until right before going to the simulation lab.

The participants in the pilot study, Nursing Learning Resource Faculty, and the participants in this study evaluated the simulation scenarios using the SDS. The results for the Presence and the Importance of the simulation design elements are good with all group scores reported above 4.52. The study sought to evaluate if there was a difference in the Presence and the Importance of the simulation design elements when evaluated for the time spent in the simulation. Further analysis of the research groups were conducted and the results of the statistical analysis are presented.
5.6.3 Statistical Analysis

The Statistical Package for Social Science (SPSS) 19.0 was used to analyze the data. All students who participated in either the two hour (n= 35) or four hour (n= 46) unfolding simulation scenarios completed the Simulation Design Scale (N= 81). The Independent Samples t(test) evaluated if the means were equal between groups on all items in relation to Presence of the elements and Importance of the elements.

5.6.4 Results

The t(test) was conducted to evaluate the mean scores for the Groups on the Likert scale on both the Presence and Importance of the simulation design elements. Levene’s Test for Equality of Variances was significant (p < .05) and Equal Variances not assumed. The analysis of the Presence of the Elements was not significant (t(58.8) = -1.66, p > .05) between the groups, but the analysis of the Importance of the Elements was significant (t(78.99) = 2.2, p < .05)(Table 5.1).

Table 5.1. Simulation Groups Statistics Overall Results on Simulation Design Scale

<table>
<thead>
<tr>
<th></th>
<th>Two Hour Group Mean (SD)</th>
<th>Four Hour Group Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Elements</td>
<td>4.43 (.48)</td>
<td>4.58 (.38)</td>
<td>-1.66</td>
<td>58.81</td>
<td>.103</td>
<td>-3.464 to .0328</td>
</tr>
<tr>
<td>Importance of Elements</td>
<td>4.76 (.35)</td>
<td>4.55 (.47)</td>
<td>2.21</td>
<td>78.99</td>
<td>.03*</td>
<td>.0202 to .3834</td>
</tr>
</tbody>
</table>

Note. SD = Standard Deviation, CI = Confidence Interval
*p < .05.

The Importance of the Elements was further evaluated (Table 5.2). The results of the t(test) for the five elements identify significant results for the element of Objectives
and Information ($t(68.56) = 3.3, p < .01$) and the element of Fidelity ($t(69.86) = 2.44, p < .05$). The two-hour simulation group’s mean was significantly higher on both these elements.
Table 5.2. Descriptive Data for the Presence of the Simulation Design Elements and Significance of the Simulation Design Elements

<table>
<thead>
<tr>
<th>Presence of Elements</th>
<th>Two Hour Group Mean (SD)</th>
<th>Four Hour Group Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective and Information</td>
<td>4.2 (.69)</td>
<td>4.4 (.78)</td>
<td>-1.2</td>
<td>79</td>
<td>.234</td>
<td>-.5315 to .1317</td>
</tr>
<tr>
<td>Support</td>
<td>4.3 (.79)</td>
<td>4.5 (.83)</td>
<td>-1.104</td>
<td>79</td>
<td>.273</td>
<td>-.5636 to .1614</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>4.4 (.62)</td>
<td>4.5 (.44)</td>
<td>-1.090</td>
<td>58.9</td>
<td>.28#</td>
<td>-.3806 to .1122</td>
</tr>
<tr>
<td>Feedback/Guided Reflection</td>
<td>4.7 (.39)</td>
<td>4.8 (.33)</td>
<td>-.904</td>
<td>79</td>
<td>.369</td>
<td>-.2316 to .0870</td>
</tr>
<tr>
<td>Fidelity (Realism)</td>
<td>4.6 (.59)</td>
<td>4.6 (.52)</td>
<td>.338</td>
<td>79</td>
<td>.736</td>
<td>-.2036 to .2868</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Importance of Elements</th>
<th>Two Hour Group Mean (SD)</th>
<th>Four Hour Group Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective and Information</td>
<td>4.8 (.39)</td>
<td>4.3 (.81)</td>
<td>3.297</td>
<td>68.56</td>
<td>.002#*</td>
<td>.1782 to .7246</td>
</tr>
<tr>
<td>Support</td>
<td>4.7 (.47)</td>
<td>4.5 (.87)</td>
<td>1.205</td>
<td>79</td>
<td>.232</td>
<td>-.1276 to .5195</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>4.6 (.49)</td>
<td>4.5 (.81)</td>
<td>1.073</td>
<td>79</td>
<td>.286</td>
<td>-.1417 to .4734</td>
</tr>
<tr>
<td>Feedback/Guided Reflection</td>
<td>4.8 (.31)</td>
<td>4.6 (.80)</td>
<td>1.612</td>
<td>61.61</td>
<td>.112#</td>
<td>-.0502 to .4682</td>
</tr>
<tr>
<td>Fidelity (Realism)</td>
<td>4.8 (.42)</td>
<td>4.5 (.82)</td>
<td>2.444</td>
<td>69.86</td>
<td>.017#*</td>
<td>.0631 to .6227</td>
</tr>
</tbody>
</table>

Note. SD = Standard Deviation.
# = Levene’s Test for Equality of Variances was significant and Equal Variances not assumed results reported.
*p < .05.
5.7 Discussion and Conclusions

The process of developing simulations is time intensive. It is more than the adjustment of a tried and true case study. There are tools available to the educator to write a simulation and guide the process based on evidence in simulation. The NLN/Jeffries Simulation Framework provides a model based on research and evidence into the best practices in simulation. An essential step in the process of writing simulations is the evaluation of the simulation.

Simulations should be evaluated at least three times: when writing them, prior to the implementation, and post simulation experience. The SDS provides data in the evaluation of the simulation for the presence of the design characteristics and that the simulation is representing what you want it to portray. Additionally, the simulation should be re-evaluated if modifications are made.

There was evidence provided that supports the importance of taking the time to evaluate a simulation during development using the SDS in this research. The simulation was originally designed using the NLN/Jeffries Simulation Framework and was found to have strong Presence of the simulation design elements and Importance of the simulation design elements.

The evaluation of the simulation provided an anecdotal note of an observation by a faculty member during the pilot study. Students that should have been observing the other students during the simulation were not. They were focusing on their upcoming role assignment and not the simulation. This occurred even though students were given all simulation materials prior to this laboratory. They were still anxious in regards to their
assignment. This gave valuable information for the upcoming study and students were not assigned their role until right before they went into the simulation.

There was agreement between groups on the *Presence of the simulation design elements*. The groups differed when evaluating for the *Importance of the simulation design elements*. Both the *Objective and Information element* and *Fidelity element* were scored significantly lower by Group #2 than Group #1. It is difficult to determine why this occurred.

A review of the research procedures was completed and it was determined that there was consistency for the introduction of the simulation for all groups. Both groups were oriented and read from a scripted sheet that included a review of the simulation objectives. Both groups received all supporting material during the Nursing Process lecture. There cannot be any conclusions as to how much of the assigned campus laboratory preparation was completed by the students in either group. The Groups were determined to be similar in entry to program requirements, age, gender, entrance examination, and prior health care education.

There were two differences in relation to the research design: time in simulation and completion of the classroom portion of the nursing process laboratory with the campus laboratory faculty member. Group #1 participated in the first two hours of a campus laboratory that discussed the nursing process and concept mapping. They then completed two hours of the HFHS which equated to completion of one entire phase of the nursing process. Group #2 completed four hours of the HFHS. They did not complete the laboratory packet during the campus laboratory with a faculty member. They did
complete two phases of the nursing process and a concept map. This allowed them to complete a "do over" of the simulation after debriefing.

These results suggest that as the time planned to be in the simulation increases more attention needs directed toward the evolution of the element of Objectives and Information and the maintenance of the level of Fidelity would be a factor when writing simulation scenarios. It also supports the need for a longer time for pre-simulation and review with faculty versus relying on students to pre-plan.

This finding is inconclusive as to the impact of time in simulation other than suggesting further evaluation of the objectives and information provided to students. This finding provides further support to the continuous need for evaluation of the simulation design and evaluation of the objectives when designing longer unfolding HFHS. Additionally, these findings may be indicating there is a point of exhaustion when participating in a simulation. Continued research is recommended.
References

American Heart Association. (2011). Understanding blood pressure readings. Retrieved December 3, 2011, from http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHi%C3%EF%BF%EF%BF%C3%C3%C3%C3%C3%C3%C3%C3%C3%C3%C3%C3%C3%C3%E1%B1%B1%B1%B1%B1%B1%B1ghBloodPressure/Understanding-Blood-Pressure-Readings_UCM_301764_Article.jsp


doi: 10.1016/j.jcc.2007.12.004


doi: 10.1053/j.nainr.2009.03.006

CHAPTER 6

6.0 Results

6.1 Introduction

The purpose of this study was to determine the outcomes of teaching and learning critical thinking skills of students taught the nursing process using traditional lecture techniques versus the addition of High Fidelity Human Simulation (HFHS) scenarios. The total sample for this study was 220, associate degree nursing students who completed the Foundation of Nursing Care course, on the first attempt. The demographic variables are described in relation to Factorial Group assigned for the study interventions. No statistically significant difference was found for the groups in relation to gender, age, ethnicity, and previous health related education and/or employment in healthcare, or NLN PAX - RN Composite examination scores.

The HFHS scenario written for this study was created using the Simulation Design Template and the NLN/Jeffries Simulation Framework. The scenarios were evaluated using the Simulation Design Scale with attention to the students and faculty evaluation of the Presence of the Simulation Design Elements and the Importance of these elements to the students. Students also used the Nursing Process Application During Simulation pocket references in Cohort year 2012. The Nursing Process examination and ATI Foundations examination measured participants for attainment of learning (knowledge) and critical thinking.

The calculated sample size using the GPower was determined to be 45 participants in each group with an alpha of .05 and power of .80. The actual power is reported for each analysis as appropriate.
6.2 Description of the Sample

The samples for this study were drawn from two different academic years of students enrolled in the Foundation of Nursing course at a rural community college. The fall 2011 cohort (N = 110) was used as the Control group (Group #1) in the 2 x 2 factorial design used for the study. These students were taught the nursing process content in a three-hour lecture and a four-hour campus laboratory. In the campus laboratory, students used case studies and developed a concept map.

The fall 2012 cohort had 114 students eligible to participate in the study. Four students did not complete the ATI examination and were eliminated from the study. The remaining participants (N = 110) were included in the remaining groups (Group #2, #3, and #4) in the factorial design. These students were taught the nursing process content in a three-hour lecture, and a four-hour campus laboratory. Each of these groups were given the Nursing Process Application During Simulation (N-PADS©) pocket reference to use during the campus laboratory and in the hospital clinical. Each group of students were taught the campus laboratories based on group assignment. Group #2 (n = 33) had a four hour campus laboratory with the last two hours of instruction using the N-PADS© in a case study developed by the researcher with similar content as the simulation scenarios. Students also developed a concept map.

Students in Group #3 (n = 34) had a four-hour campus laboratory. The last two hours of instruction had students using the N-PADS© in an unfolding high fidelity human simulation (HFHS) scenario. Students developed a concept map during the debriefing phase.
Students in Group #4 (n = 43) had a four hour campus laboratory. They did not complete the campus laboratory packet, but participated in a four hour unfolding high fidelity simulation scenario taught using the N-PADS©. Students developed a concept map during the four debriefing phases of the scenarios.

An analysis of the descriptive statistics was performed for each of the cohort years to determine sample characteristics. The demographic characteristics evaluated were age, gender, ethnic group, full time versus part time enrollment, previous health related education, and previous military background. The following sections will describe the findings based on cohort year and then as the factorial design group assignment.

6.2.1 Age

The combined data for participants (N = 220) for age revealed that 47% of participants were in the 25 and under category (n=103), with 17% in the 26 – 30 group (n=37), 23% in the 31 – 40 age group (n=51), 9% in the 41 – 50 age group (n=21), and 4% in the 51 – 60 age group (n=8).

The age of the participants in each Group were examined. All four groups had similar distribution of students in each age group (Table 6.1). The Pearson Chi-Square determined that this difference was not significant (p = .217). The Independent – Samples Kruskal – Wallis Test (p = 0.62) confirms the distribution of age of students is the same across categories of Factorial Group assigned.
Table 6.1. Age Distribution by Groups

<table>
<thead>
<tr>
<th>Age of Students</th>
<th>25 &amp; Under</th>
<th>26-30</th>
<th>31-40</th>
<th>41-50</th>
<th>51-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
</tbody>
</table>

Year Enrolled

<table>
<thead>
<tr>
<th>Year Enrolled</th>
<th>2011</th>
<th>2012</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2011</td>
<td>44 (40%)</td>
<td>18 (16%)</td>
<td>13 (12%)</td>
</tr>
<tr>
<td>Fall 2012</td>
<td>59 (54%)</td>
<td>19 (17%)</td>
<td>20 (18%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103 (47%)</td>
<td>37 (17%)</td>
<td>51 (23%)</td>
</tr>
</tbody>
</table>

Factorial Group

<table>
<thead>
<tr>
<th>Group #1</th>
<th>44 (40%)</th>
<th>18 (16%)</th>
<th>31 (28%)</th>
<th>13 (12%)</th>
<th>4 (4%)</th>
<th>110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group #2</td>
<td>21 (64%)</td>
<td>3 (9%)</td>
<td>7 (21%)</td>
<td>0 (0%)</td>
<td>2 (6%)</td>
<td>33</td>
</tr>
<tr>
<td>Group #3</td>
<td>19 (56%)</td>
<td>7 (20%)</td>
<td>5 (15%)</td>
<td>3 (9%)</td>
<td>0 (0%)</td>
<td>34</td>
</tr>
<tr>
<td>Group #4</td>
<td>19 (43%)</td>
<td>9 (21%)</td>
<td>8 (19%)</td>
<td>5 (12%)</td>
<td>2 (5%)</td>
<td>43</td>
</tr>
</tbody>
</table>

6.2.2 Gender

The combined data for gender revealed that the majority of participants were female 184 (84%) and 36 (16%) male. The Gender of the participants in each group revealed similar numbers of female versus male participants (Figure 6.1). The Pearson Chi – Square was not significant (p = .802).
6.2.3 Ethnic Group

Responses to ethnic group revealed that the study participants in each cohort year were predominately white, other than Hispanic N = 209 (95%), followed by Black, non–Hispanic N = 6 (2.7%), Hispanic N = 2 (.9%), Asian or Pacific Islander N = 2 (.9%), and American Indian or Alaskan Native N = 1 (.45%). The Pearson Chi-Square revealed that the groups are similar in ethnic breakdown (p = .447).

6.2.4 Full Time versus Part Time enrollment

Students self reported on enrollment status as either full time or part time. Full time was 12 or more credits a semester and part time as less than 12 credits a semester. The Pearson Chi-Square results indicated that the percentage of students reporting an enrollment status of full time was the same in each of the cohort years (p = .212). The
majority of students N = 134 (61%) reported enrollment status as full time as a whole and Fall 2011 and Fall 2012 at N = 63 (57%) and N = 71 (65%) respectively.

6.2.5 Previous Health Related Education

Overall, there were 79 (34%) participants reporting a previous health related education. In the Fall 2011 there were 42 (38.2%) and in the Fall 2012 there were 37 (33.6%). The Chi-Square test was not significant (p = .482).

The most frequently reported health related education for the combined years was certified nurse aide/nurse aide/residential assistant (n = 47) followed by medical assistant (n = 8), emergency medical technician (n = 6), phlebotomist (n = 2), Surgical tech (n = 2), paramedic (n = 2), and nuclear medicine/radiology (n = 2).

6.2.6 Previous Military Background

Of the 220 students, only seven reported a previous military background. No one reported being a Corpsman while in the military.

6.2.7 Comparison of the Groups

The groups in the cohort years and factorial group assigned revealed no significant differences in demographics as described in the preceding section. Next, the cohort groups were evaluated on their performance on the entrance examination used as part of the admission criteria to the nursing program. The results of the NLN PAX-RN will be presented in the following section.

6.2.8 NLN PAX-RN Admission Scoring

Analysis of the scores for both of the Cohort years and Factorial Group assignment on the NLN PAX-RN examination were conducted. First the NLN composite
score, verbal score, math score, and science score were evaluated to determine if the means of the Groups Cohort Years differed on this examination.

The \( t \) test was conducted to evaluate the mean scores for the Cohort Years on the NLN PAX-RN for the Composite score, verbal score, math score, and science score. The analysis of the Composite means was not significant \( (t(218) = 1.15, p > .05) \). This indicates that the participants in the Cohort Years for Fall 2011 and Fall 2012 scores reported on the NLN PAX-RN Composite score were not statistically different. The students’ Composite score is one of the criterions used for admission to the nursing program.

The analysis of the verbal, math, and science scores had a significant Levene’s \( t \) test for equality of variance \( (p < .000) \) therefore results for Equal Variances not assumed were used. Results for Cohort Year were significant on each \( (p < .000) \) (Table 6.2).

Table 6.2. Descriptive Statistics for Cohort Years

<table>
<thead>
<tr>
<th></th>
<th>Fall 2011</th>
<th>Fall 2012</th>
<th>( t )</th>
<th>df</th>
<th>( p )</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite</td>
<td>124.14 (13.43)</td>
<td>122.1 (12.9)</td>
<td>1.15</td>
<td>218</td>
<td>.251</td>
<td>-1.454 to 5.55</td>
</tr>
<tr>
<td>Verbal</td>
<td>41.7 (7.13)</td>
<td>66.1 (15.44)</td>
<td>-15.03</td>
<td>153.43</td>
<td>.000#</td>
<td>-27.58 to -21.17</td>
</tr>
<tr>
<td>Math</td>
<td>28.55 (5.4)</td>
<td>64.21 (16.9)</td>
<td>-21.09</td>
<td>130.84</td>
<td>.000#</td>
<td>-39.01 to -32.32</td>
</tr>
<tr>
<td>Science</td>
<td>39.48 (5.5)</td>
<td>60.04 (14.35)</td>
<td>-14.05</td>
<td>139.84</td>
<td>.000#</td>
<td>-23.46 to -17.67</td>
</tr>
</tbody>
</table>

Note. NLN PAX-RN = National League for Nursing Pre-Entrance Examination –RN, SD = Standard Deviation.
\# Levene’s Test for Equality of Variance Significant and Equal Variance not Assumed

The Cohort groups for Fall 2011 and Fall 2012 individual scores on the NLN PAX-RN verbal test, math test, and science test were significant \( (p < .01) \). By examining
the three components of the composite score, the researcher was able to determine that the Cohort year’s scores differed on all three of the individual tests (Figure 6.2). These results were further evaluated and are discussed in the upcoming section of this chapter that addresses students’ success in completion of the foundations of nursing course. However the raw scores on the verbal, math, and science examinations are used to determine the composite score (National League for Nursing, 2011) which is a standard score.

Figure 6.2. NLN-RN Scores by Cohort Year

The results of the NLN PAX-RN examination were then examined for participants’ base on Factorial Group assignments. Next, the NLN PAX-RN Composite, verbal, math, and science scores were evaluated to determine if the means of the Factorial Groups differed on this examination using a one-way multivariate analysis of variance (MANOVA). Since the sample sizes for the four Factorial Groups were unequal, the Box
\( M \) test was used to assess homogeneity and results were significant, \( F(30, 47109.141) = 32.198, p < .001 \). The Wilk’s lambda of .16 is significant, \( F(12, 563.837) = 46.718, p < .001 \) indicating that the population means on the tests are not the same. The Observed power with an alpha .05 was 1.0 is good and Partial Eta Squared was .456.

The Levene’s test was significant for the verbal, math, and science scores and Equality of Variance was not assumed (\( p < .001 \)). This result concurred with the Box \( M \) test.

The Test of Between Subjects Effects for the NLN PAX-RN Composite scores for the Factorial Groups was conducted using the Post Hoc test of multiple components, Bonferroni test revealed the NLN PAX-RN Composite scores for the groups were not significantly different (\( p > .05 \)). This indicates that the students mean score in each of the four groups were statistically the same based on the NLN PAX-RN Composite score.

The Post Hoc Test, Bonferroni procedure was used to control for a Type I error across the pairwise comparisons for the dependent variables. Post Hoc Tests of multiple comparisons report of the Bonferroni test for verbal score, math score, and science score were all significant (\( p = .000 \)) for the Control group as compared to the Two hour case study, Two hour unfolding simulation, and Four hour unfolding simulation (Table 6.3) (Figure 6.3). However, the multiple comparisons for the cohort year of Fall 2012 for the two hour case study, two hour unfolding simulation, and four hour unfolding simulation, which made up the experiment design results, were not significant (\( p > .05 \)).
Table 6.3. MANOVA Results for Factorial Groups and NLN PAX –RN

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>1 Mean (SE)</th>
<th>2 Mean (SE)</th>
<th>3 Mean (SE)</th>
<th>4 Mean (SE)</th>
<th>Significance Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite</td>
<td>124.1 (1.3)</td>
<td>123.2 (2.3)</td>
<td>120.9 (2.3)</td>
<td>122.2 (2.0)</td>
<td>.592 .621</td>
</tr>
<tr>
<td>Verbal</td>
<td>41.7 (1.1)</td>
<td>61.6 (2.1)</td>
<td>67.1 (2.0)</td>
<td>68.7 (1.8)</td>
<td>79.55 .000</td>
</tr>
<tr>
<td>Math</td>
<td>28.6 (1.2)</td>
<td>61.9 (2.2)</td>
<td>65.6 (2.2)</td>
<td>64.9 (1.9)</td>
<td>148.62 .000</td>
</tr>
<tr>
<td>Science</td>
<td>39.5 (1.0)</td>
<td>57.7 (1.9)</td>
<td>61.3 (1.9)</td>
<td>60.9 (1.7)</td>
<td>66.68 .000</td>
</tr>
</tbody>
</table>

MANOVA test, Wilk’s lambda = .16

Note. SE = Standard Error, 1 = Group #1, 2 = Group #2, 3 = Group #3, 4 = Group #4.
*df(3, 216) for all Outcome Variables

Figure 6.3. NLN – PAX RN Scores by Group
The descriptive statistics revealed the NLN PAX-RN Composite scores were similar between the Cohort years and Factorial group assignment (Table 6.3). Evaluation of the scores for verbal, math, and science revealed there was a difference in the mean between the cohort years (p < .001). Additionally, the cohort group fall 2012, did not differ in scores on any of the components and the Groups were similar.

As discussed in the review of the literature, it is not recommended to use the NLN PAX-RN as the sole determinate for admission to a nursing program. It is considered a tool to help predict a candidate’s chance for success in the foundations of nursing course. The results of the NLN PAX-RN Composite scores will be used to answer additional research questions in future sections.

6.3 Results

The results obtained from the instruments used for measurements in this study were analyzed as data became available over a four-month time. The HFHS unfolding simulation scenario was the experimental intervention for two groups: Group #3 (Two hour simulation) and Group #4 (four hour simulation). Group #2 (two hour case study) was taught with a case study based on the same patient developed for the unfolding scenarios. All three groups completed the assigned campus laboratory using the N-PADS© pocket reference created by the researcher and described in the methodology chapter.

6.3.2 Nursing Process Examination

The Nursing Process Examination was administered to both cohort groups in week four after students completed the nursing process campus laboratory. The results of the 25-point examination are presented.
The Fall 2011 cohort (N=110) mean score was 21.47, SD 1.78 and the Fall 2012 cohort (N=110) mean score was 21.15, SD 2.37. The Independent Samples \( t \) (test) was used to evaluate the relationship between cohort year assignment to either Fall 2011 or Fall 2012 and student performance on the Nursing Process Examination. The Levene’s Test of Equality of Error Variances was significant \( (p = .033) \) and equal variance are not assumed. The \( t \) (test) was not significant, \( F(1, 202.341) = 1.158, p = .248 \). With only two groups Post Hoc Tests were not performed.

Further evaluation of the data was indicated due to the violation of the One-Way ANOVA assumption of equal variance as indicated by the Levene’s test. The Independent Samples Mann – Whitney U Test was not significant \( (p = .588) \) and the distribution of Nursing Process examination is the same based on Cohort year assigned (Figure 6.4).

Figure 6.4. Distribution of Nursing Process Examination Scores by Cohort Year

![Distribution of Nursing Process Examination Scores by Cohort Year](image)

The data was then evaluated for the dependent variable of the Nursing Process Examination score based on Factorial Group assignment (Table 6.4).
Table 6.4. Descriptive Statistics for Dependent Variable Nursing Process Examination

<table>
<thead>
<tr>
<th>Factorial Group Assigned</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Range</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group #1</td>
<td>21.47</td>
<td>1.78</td>
<td>17-25</td>
<td>110</td>
</tr>
<tr>
<td>Group #2</td>
<td>21.06</td>
<td>1.95</td>
<td>15-24</td>
<td>33</td>
</tr>
<tr>
<td>Group #3</td>
<td>21.5</td>
<td>2.84</td>
<td>15-25</td>
<td>34</td>
</tr>
<tr>
<td>Group #4</td>
<td>20.93</td>
<td>2.27</td>
<td>16-25</td>
<td>43</td>
</tr>
</tbody>
</table>

The Levene’s test of Equality of Error Variances, $F(3,216) = 3.329$, $p = .02$ was significant and equal variance are not assumed. The ANOVA was not significant, $F(3, 216) = .939$, $p = .423$. Post Hoc Test for multiple comparisons of the Factorial Groups was conducted using the Bonferroni test and the results were not significant ($p > .05$). There were no statistically significant differences in overall performance on the Nursing Process Examination based on Factorial Group assignment.

However, the researcher observed a difference in the groups in the distribution of the scores. The samples sizes were all different and the graphing of the raw data can be deceptive. To control for this, the frequency scores on the examination were converted to the percentage of students earning each score. The lowest score needed was 20 (77%) to pass the examination and this became the cutoff score. The percentage of students passing the examination by groups demonstrates that the scores for participants in Group #3, the two hour simulation group had a higher percentage of students scoring 23 or greater points (Table 6.5), although statistically these results were not significant.
Table 6.5. Percentage of Scores by Group Assignment

<table>
<thead>
<tr>
<th>Group</th>
<th>25</th>
<th>24</th>
<th>23</th>
<th>22</th>
<th>21</th>
<th>20</th>
<th>Total Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group #1 (Control)</td>
<td>5%</td>
<td>9%</td>
<td>19%</td>
<td>30%</td>
<td>19%</td>
<td>18%</td>
<td>85%</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>8</td>
<td>18</td>
<td>28</td>
<td>18</td>
<td>17</td>
<td>94/110</td>
</tr>
<tr>
<td>Group #2 (Case)</td>
<td>0%</td>
<td>4%</td>
<td>27%</td>
<td>38%</td>
<td>12%</td>
<td>19%</td>
<td>79%</td>
</tr>
<tr>
<td>n</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>10</td>
<td>3</td>
<td>5</td>
<td>26/33</td>
</tr>
<tr>
<td>Group #3 (2 Hr. Sim)</td>
<td>19%</td>
<td>15%</td>
<td>22%</td>
<td>11%</td>
<td>26%</td>
<td>7%</td>
<td>79%</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>27/34</td>
</tr>
<tr>
<td>Group #4 (4 Hr. Sim)</td>
<td>3%</td>
<td>11%</td>
<td>20%</td>
<td>11%</td>
<td>37%</td>
<td>17%</td>
<td>81%</td>
</tr>
<tr>
<td>n</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>13</td>
<td>6</td>
<td>35/43</td>
</tr>
</tbody>
</table>

The bar graphs illustrate this anomaly (Figure 6.5 through Figure 6.8).

Additionally, recurrence of this pattern will be evaluated during the analysis of the ATI RN Fundamentals 2010 Assessment Form B section.
Figure 6.5. Percentage of Scores Group #1 Control

![Group #1 Control](image)

Figure 6.6. Percentage of Scores Group #2 Case Study

![Group #2 Case Study](image)
Figure 6.7. Percentage of Scores Group # 3

Group #3 Two Hour Simulation

Figure 6.8. Percentage of Scores Group # 4

Group #4 Four Hour Simulation
6.3.3 Research question 1.3.1

What is the effect of teaching the nursing process with HFHS scenarios on the development of critical thinking skills compared to the effect of not using a HFHS scenario on the Nursing Process examination?

The results of the statistical analysis for the Nursing Process examination resulted in the acceptance of the null hypothesis: $\mu_1=\mu_2=\mu_3=\mu_4$. There was not enough evidence to determine the effect of adding HFHS scenarios in the development of critical thinking skills.

6.3.4 Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B

The Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B was administered to both Cohort years in week 11 after the majority of lecture content had been delivered. The results of the examination are presented.

The $t$ (test) was conducted to evaluate the mean scores on the ATI scores were evaluated by Cohort Year. The Levene’s Test for Equality of Variances was not significant and Equality of Variances assumed. The ATI Adjusted Individual Score means for Cohort years were not significant, ($t(218) = -.359$, $p = .72$). Next, each of the sub-categories of the ATI Fundamentals exam was examined to determine students’ level of achievement for each component of the examination by Cohort Year (Table 6.6). The Independent $t$ (test) was conducted to determine if the Cohort Years differed in performance on the examinations. The component of Planning ($t(214.876) = -2.271$, $p = .024$) was significant between the Cohort years with the Fall 2012 mean being higher.
The component of Analysis/Diagnosis ($t(217.375) = 1.937, p = .054$) is almost significant between the cohort years with the Fall 2011 mean being higher.

Table 6.6. Cohort Year Enrolled Group Descriptive Data for the ATI Fundamentals 2010 Form B Examination

<table>
<thead>
<tr>
<th>Component</th>
<th>Fall 2011 Mean (SD)</th>
<th>Fall 2012 Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted Individual</td>
<td>66.71 (7.78)</td>
<td>67.06 (6.57)</td>
<td>-.359</td>
<td>218</td>
<td>.72</td>
<td>-2.263 to 1.565</td>
</tr>
<tr>
<td>Foundational Thinking in Nursing</td>
<td>55.53 (9.56)</td>
<td>57.46 (8.96)</td>
<td>-1.55</td>
<td>218</td>
<td>.124</td>
<td>-4.393 to .5317</td>
</tr>
<tr>
<td>Clinical Judgment/Critical Thinking in Nursing</td>
<td>69.58 (10.16)</td>
<td>68.12 (8.21)</td>
<td>1.18</td>
<td>208.75</td>
<td>.24</td>
<td>-9892 to 3.922</td>
</tr>
<tr>
<td>Priority Setting</td>
<td>73.41 (15.98)</td>
<td>71.02 (14.16)</td>
<td>1.17</td>
<td>218</td>
<td>.242</td>
<td>-1.626 to 6.399</td>
</tr>
<tr>
<td>Assessment</td>
<td>59.99 (17.59)</td>
<td>62.06 (17.98)</td>
<td>-.836</td>
<td>218</td>
<td>.389</td>
<td>-6.795 to 2.657</td>
</tr>
<tr>
<td>Analysis/Diagnosis</td>
<td>62.72 (16.06)</td>
<td>58.64 (15.22)</td>
<td>1.94</td>
<td>218</td>
<td>.054</td>
<td>-.0711 to 8.246</td>
</tr>
<tr>
<td>Planning</td>
<td>76.72 (13.07)</td>
<td>80.15 (8.96)</td>
<td>-2.27</td>
<td>192.93</td>
<td>.024*</td>
<td>-6.412 to -4516</td>
</tr>
<tr>
<td>Implementation Therapeutic Nursing Intervention</td>
<td>55.66 (10.67)</td>
<td>56.14 (10.09)</td>
<td>-.337</td>
<td>218</td>
<td>.736</td>
<td>-3.231 to 2.288</td>
</tr>
<tr>
<td>Evaluation</td>
<td>63.1 (13.89)</td>
<td>62.94 (13.9)</td>
<td>.089</td>
<td>218</td>
<td>.929</td>
<td>-3.527 to 3.859</td>
</tr>
</tbody>
</table>

Note. CI = Confidence Interval.

The Levene’s Test for Equality of Variance was significant for Critical Judgment/Critical Thinking in Nursing ($p < .05$) and Planning ($p < .001$) and equal variances not assumed and reported as such for these two components of the t(test).

*p < .05.
The NLN PAX-RN composite, verbal, math, and science scores were evaluated to determine if the means of the Factorial Groups differed on the ATI Individual score and component scores using the MANOVA. Since sample sizes for the four Factorial Groups were unequal, the Box M test was used to assess homogeneity and results were significant, $F(135, 38875.949) = 4.577, p = .000$ and there are differences in matrices. The Wilkes’s lambda of .87 is not significant, $F(27, 608) = 1.1, p = .331$ indicating that the population means on the tests are the same. The observed power reported was .883. The Partial Eta Squared was .045. Post Hoc Tests were conducted based on Factorial Group assigned and components of the ATI examination using the Bonferroni method for multiple comparisons and the results were not significant (Table 6.7).
Table 6.7. Factorial Group Statistics for the ATI Fundamental 2010 Form B Examination Test of Between Subjects Effects

<table>
<thead>
<tr>
<th></th>
<th>Significance Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Mean(SD)</td>
</tr>
<tr>
<td>Adjusted Individual Scores</td>
<td>66.7 (7.9)</td>
</tr>
<tr>
<td>Foundational Thinking in Nursing</td>
<td>55.5 (9.6)</td>
</tr>
<tr>
<td>Clinical Judgment/Critical Thinking in Nursing</td>
<td>69.6 (10.2)</td>
</tr>
<tr>
<td>Priority Setting</td>
<td>73.4 (16.0)</td>
</tr>
<tr>
<td>Assessment</td>
<td>59.9 (17.6)</td>
</tr>
<tr>
<td>Analysis/Diagnosis</td>
<td>62.7 (16.1)</td>
</tr>
<tr>
<td>Planning</td>
<td>76.7 (13.1)</td>
</tr>
<tr>
<td>Implement/Therapeutic Nursing Intervention</td>
<td>55.7 (10.7)</td>
</tr>
<tr>
<td>Evaluation</td>
<td>63.1 (13.9)</td>
</tr>
</tbody>
</table>

Note. Group #1-Control Group (n = 110), Group #2 – Two Hour Case Study (n= 33), Group #3- Two Hour Unfolding Simulation Group (n= 34), Group #4 – Four Hour Unfolding Simulation group (n= 43). Df for all Groups = (3, 216). *P = .05.
The ATI Fundamental Individual results for each student is reported as a proficiency level for the examination as a whole. A Level I Proficiency is the minimum knowledge required to demonstrate minimal knowledge of the fundamentals of nursing. The research site established the Level I Proficiency as the minimum score required to pass the examination. Students have three opportunities to pass this examination, but only the test results for the first attempt are included in this study. The frequencies of scores for proficiency levels is presented for the Factorial Groups (Table 6.8).

Table 6.8. Frequencies of Scores by Proficiency Levels by Factorial Groups

<table>
<thead>
<tr>
<th>ATI Level</th>
<th>Control</th>
<th>Case Study</th>
<th>2 Hr. Sim.</th>
<th>4 Hr. Sim.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Level 3</td>
<td>80-100%</td>
<td>4 (4%)</td>
<td>0 (0%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Level 2</td>
<td>66.7-78.3%</td>
<td>63 (57%)</td>
<td>15 (45%)</td>
<td>17 (50%)</td>
</tr>
<tr>
<td>Level 1</td>
<td>58.3-65%</td>
<td>31 (28%)</td>
<td>16 (48%)</td>
<td>16 (47%)</td>
</tr>
<tr>
<td>Below Level 1</td>
<td>&lt; 58.3%</td>
<td>12 (11%)</td>
<td>2 (6%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Bar graphs were developed using the percentage of students achieving the score to compensate for the disparate group sizes to determine if the clustering of scores recurred in a similar pattern to the pattern observed on the Nursing Process examination results (Figure 6.9 to Figure 6.12). It is noted that Group #3 had no students scoring Below Level I.
Figure 6.9 ATI Individual Scores Frequency by Percentage for Group #1

Figure 6.10. ATI Individual Scores Frequency by Percentage for Group #2
Figure 6.11. ATI Individual Scores Frequency by Percentage for Group #3

Group #3 Two Hour Simulation

Figure 6.12. ATI Individual Scores Frequency by Percentage for Group #4

Group #4 Four Hour Simulation
6.3.5 Research Question 1.3.2

*What is the effect of teaching the nursing process with HFHS scenarios on students’ performance on the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B?*

The results of the statistical analysis for the Factorial Group Assignment for the ATI examination resulted in the acceptance of the null hypothesis: Ho: µ1=µ2=µ3=µ4. There was not enough evidence to determine what effect of adding HFHS scenarios in the development of critical thinking on the ATI examination. It was observed that Group #3 had all participants scoring at or above the Level I Proficiency Level.

6.3.6 Simulation Effect on Progress to Second Semester in Program

The researcher sought to determine if the Factorial Group Assignment had an effect on students’ progression to the second semester in the nursing program. The Factorial Groups descriptive data was evaluated for success in passing the Foundations of Nursing Course and progressing to NSG 120 course (Table 6.9). The ANOVA between groups results for dependent variable of final score in NSG 111 course was not significant, $F(3, 216) = .829, p > .05$. The Welch Robust Test of Equality of Means results were not significant, $F(3, 90.496 = .65, p > .05$. The Post Hoc Test for multiple comparisons, Bonferonni, for the final score on NSG 111 course and Factorial Group assigned was not significant (p > .699).
Table 6.9. Percentage of Students Progressing to NSG 120 by Factorial Group Assignment

<table>
<thead>
<tr>
<th>NSG 111</th>
<th>Final Grade</th>
<th>Passed</th>
<th>Failed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Group #1 Control</td>
<td>82.25</td>
<td>7.64</td>
<td>97 (88%)</td>
<td>13 (12%)</td>
</tr>
<tr>
<td>Group #2 Two Hour Case Study</td>
<td>81.64</td>
<td>5.25</td>
<td>29 (88%)</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Group #3 Two Hour Simulation</td>
<td>81.65</td>
<td>4.18</td>
<td>31 (91%)</td>
<td>9 (9%)</td>
</tr>
<tr>
<td>Group #4 Four Hour Simulation</td>
<td>80.28</td>
<td>7.84</td>
<td>34 (79%)</td>
<td>9 (21%)</td>
</tr>
</tbody>
</table>

Note. SD = Standard Deviation

Next, a Correlations analysis was conducted for the Final Score on NSG 111 Course, Passes onto NSG 120, and Factorial Group Assigned. The data revealed a strong correlation between the final score in NSG 111 and passing onto NSG 120 that one would expect. The results for Factorial Group assignment and passing onto NSG 120 and the final score in NSG 111 was not significant (p > .05)(Table 6.10).

Table 6.10. Correlations

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Final Score NSG 111</td>
<td>Pearson Correlation</td>
<td>-.617**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>2. Passes onto NSG 120</td>
<td>Pearson Correlation</td>
<td>-.101</td>
<td>.075</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.136</td>
<td>.268</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>3. Factorial Group Assigned</td>
<td>Pearson Correlation</td>
<td>.288**</td>
<td>-.116</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.087</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>4. NLN PAX-RN</td>
<td>Pearson Correlation</td>
<td>.077</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.255</td>
<td>.255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
6.3.7 Research Question 1.3.3

What effect, if any did the teaching with HFHS have on the retention rate of students progressing in the Foundations of Nursing course to the second semester in the nursing program?

The results of the statistical analysis for the Factorial Group Assignment for completion of the NSG 111 course and Passing onto NSG 120 resulted in the acceptance of the null hypothesis: Ho: μ1=μ2=μ3=μ4. There was not enough evidence to support what effect of adding HFHS scenarios in the development of critical thinking.

6.3.8 NLN PAX-RN Prediction for Success in Foundations Course

The data was analyzed for a correlation between the NLN PAX-RN Composite score as a predictor of success in the first semester of a nursing program. The correlation between the NLN PAX-RN Composite and Final Score NSG 111 was significant, \( r(218) = .288, p < .01 \) (Table 6.10.). Figure 6.13 provides a scatter plot.

Figure 6.13. Scatter plot Correlation.
6.3.9 Research Question 1.3.4

*Is there a correlation between the National League for Nursing Pre-Entrance RN examination test results and success in completion of the Foundations of Nursing course?*

The results of the statistical analysis for the correlation between students scores on the NLN PAX – RN Composite Examination and success in the completion of the NSG 111 course and Passing onto NSG 120 was significant. There was evidence of the predictive correlation.

6.3.10 Research Question 1.3.5

To evaluate Factorial Group Assigned to Campus Lab and Clinical Lab faculty employment status a cross tabulation was conducted. Table 6.11 clearly shows the majority of students were assigned to a part time faculty for campus lab and clinical lab classes. However, Group #2 had two (6%) students assigned to a full time faculty for clinical and Group #3 had 22 (65%) assigned to full time faculty for clinical lab.
Table 6.11. Factorial Group Assigned, Campus Lab and Clinical Faculty Status

<table>
<thead>
<tr>
<th>Group</th>
<th>Campus Lab</th>
<th></th>
<th></th>
<th>Clinical Lab</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Full Time n (%)</td>
<td>Part Time n (%)</td>
<td></td>
<td>Full Time n (%)</td>
</tr>
<tr>
<td>Fall 2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group #1 Control</td>
<td>23 (21%)</td>
<td>87 (79%)</td>
<td>28 (25%)</td>
<td>82 (75%)</td>
<td>110</td>
</tr>
<tr>
<td>Fall 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group #2 Case Study</td>
<td>7 (21%)</td>
<td>26 (79%)</td>
<td>2 (6%)</td>
<td>31 (94%)</td>
<td>33</td>
</tr>
<tr>
<td>Group #3 2 Hr. Sim.</td>
<td>8 (24%)</td>
<td>26 (76%)</td>
<td>22 (65%)</td>
<td>12 (35%)</td>
<td>34</td>
</tr>
<tr>
<td>Group #4 4 Hr. Sim.</td>
<td>17 (40%)</td>
<td>26 (60%)</td>
<td>10 (23%)</td>
<td>33 (77%)</td>
<td>43</td>
</tr>
<tr>
<td>TOTAL</td>
<td>55 (25%)</td>
<td>165 (75%)</td>
<td>62 (28%)</td>
<td>158 (72%)</td>
<td>220</td>
</tr>
</tbody>
</table>

A MANOVA test was performed for the Between-Subjects Factors of Factorial Group assigned, Campus lab, and Clinical lab instructor status for the ATI Fundamentals 2010 Form B Individual Scores. The Wilks’s lamba for all groups is not significant, $F(2, 206) = .877, p > .05$, indicating that we can accept the null hypothesis that the means on the dependent variable, ATI examination, are the same for students without regard to the Factorial Group assigned and Instructor Status.

The data was also analyzed for a correlation between the ATI fundamentals 2010 Form B Individual score and assignment to either a full-time or part-time faculty member based on Factorial Group Assignment. There was a correlation between Campus Lab and
Clinical Lab \( r(-.198) \). There was also a correlation between Campus Lab and Factorial Group \( r(-.145) \). These correlations are most likely the result of the random assignment to the group campus lab and clinical group and Factorial Group assignment. The significance of this finding cannot be determined from available data. All lecture content was taught by a full time faculty member. Nursing programs are dependent on the part time faculty and assignment to either a full time faculty or part time faculty appears not to be an influence on performance. Students are studying the content and are successful in passing the course when learning is facilitated by a combination of full time and part time faculty. There is not a correlation between ATI Individual score and instructor status.

Results of the test can be seen in Table 6.12.

Table 6.12. Correlations of Factorial Group Assigned to ATI Test Results and Employment Status of Campus Lab and Clinical Lab Instructor

<table>
<thead>
<tr>
<th></th>
<th>Factorial Group</th>
<th>ATI Fundamental</th>
<th>Campus Lab</th>
<th>Clinical Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factorial Group</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.048</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>ATI Fundamental</td>
<td>Pearson correlation</td>
<td>-.145*</td>
<td>-.086</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tail)</td>
<td>.032</td>
<td>.205</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Campus Lab</td>
<td>Pearson Correlation</td>
<td>-.094</td>
<td>-.008</td>
<td>-.198**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.163</td>
<td>.902</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Clinical Lab</td>
<td>Pearson Correlation</td>
<td>-.198**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

A Between subjects factorial ANOVA was calculated comparing the final score for NSG 111 for participants for instructor employment status for campus laboratory and clinical laboratory. The main effect for campus laboratory was not significant \( F(1, 216) = .63, p > .05 \). The main effect for clinical laboratory was not significant \( F(1, 216) = 3.02, \).
p > .05. Finally the interaction was also not significant $F(1, 216) = .43, p > .05$. It appears that instructor employment status for campus laboratory or clinical laboratory does not have any significant effect on the final NSG 111 score.

Is there a difference in ATI test performance between students assigned to full-time versus part-time faculty for both clinical portion and campus laboratory portion of the course for both the control and experimental groups?

The results of the statistical analysis for the correlation between students’ scores on the ATI Fundamental Examination and instructor employment status was not significant. There was significance on the correlations (Table 6.12), but were expected since the majority of students are assigned to a part time faculty and pass the course.

6.4 Discussion

Chapter 6 reported the data analysis for this research study. A discussion of the study sample and demographic characteristic of the cohorts was presented. It was established that the Factorial groups were similar on these variables and normally distributed. An in depth manuscript presented the High Fidelity Human Simulator (HFHS) scenarios developed using the NLN/Jeffries Simulation Framework. The Simulation Design Scale (SDS) tool was used to evaluate the scenarios for the Simulation Design Elements (Chapter 5) and results of the analysis were discussed.

The Nursing Process Examination and the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B student test results were analyzed for two of the NLN/Jeffries Simulation Framework outcomes of simulation: learning (knowledge) and critical thinking during the application of the nursing process. Further analysis of the ATI examination explored the key components of the following categories: Foundation

A description of the Simulation Effect on Progress to the Second Semester in the program, the success of the NLN PAX – RN prediction of success in the Foundation course, and effect of having a full time versus part time faculty teaching the campus laboratory or clinical laboratory was presented.

In fall 2011, the nursing program received notification that the National Counsel Licensure Examination (NCLEX) RN test results for first time pass rates dropped below the required 80% first time pass rate. This resulted in actions to increase the rigor of the curriculum to improve the first time NCLEX-RN pass rates.

The Nursing Process examination was one of the instruments for this study. In preparation for this study, the examination was determined to have the majority of test questions written at the application or above level. Bloom’s Taxonomy for the Cognitive Domain was used for evaluation purposes as thoroughly discussed in the Methodology chapter. Therefore, the Nursing Process examination was not altered and remained the same for both Cohort years.

However, the other course examinations were evaluated and revised using Bloom’s Taxonomy for the Cognitive Domain. This resulted in the tests for Cohort Year 2012 having the majority of questions at or above the application level.

Another change was the addition of a comprehensive final examination for the fall 2012 Cohort. It is unknown what influenced if any that these changes had on the students’ performance on the ATI Foundations examination. It is important to note that
the fall 2012 cohort had the same pass rate as the fall 2011 cohort after these increases in course difficulty occurred.
CHAPTER 7

7.0 Summary and Recommendations

7.1 Introduction

The purpose of this study was to determine the outcomes of teaching and learning critical thinking skills of students taught the nursing process using traditional lecture techniques versus the addition of High Fidelity Human Simulation (HFHS) scenarios in the first course in an associate degree nursing program. The simulations required the students to apply the concepts taught regarding the nursing process to a very basic clinical situation to engage them in applying critical thinking towards a clinical decision. The researcher sought to determine if differences in examination performance occurred between the teaching strategies.

The previous two chapters presented a thorough review of the results of this study. These results are discussed and recommendation for nursing practice, education, limitation of this study, and future research studies are made.

7.2 Implications for Nursing Practice

This study added to the expanding body of knowledge on simulation, especially with research on associate degree nursing students. The study was unique because it used HFHS to teach students the application of the nursing process. The unfolding simulation scenarios were written under the guide of the NLN/Jeffries Simulation Framework with attention given to the five components. The simulations were evaluated using the Simulation Design Scale (SDS) to measure the degree of Presence of the Simulation Design Characteristics of objectives, fidelity, problem solving, support, and debriefing.
Findings from the SDS revealed no significant difference between the two hour and four hour simulation groups in the Presence of the simulation design characteristics.

However, there was a significant difference between the two hour and four hour simulation groups on the SDS for Importance of the simulation design characteristics of objective and information (p = .002) and fidelity (p = .017). Each of the unfolding simulation scenarios had time for review of the objectives, 20 minutes in scenario, 20 minutes in debriefing, and 10-15 minutes for the concept map development. The two hour simulation group completed two scenarios and the four hour simulation group completed four scenarios. The results in this study suggested that as time in simulation increases more attention needs directed to these elements. There might be a point of exhaustion for participants and they begin to lose focus. The manuscript in Chapter 5 provides a thorough discussion of the results of using the NLN/Jeffries Simulation Framework and evaluation of the scenarios.

All students were given an opportunity to participate in the HFHS scenarios at the conclusion of data collection. A date and time was announced for students who did not complete the four hours of simulation or participated in the case study to do so. Only two students expressed an interest, but elected not to participate. This finding is consistent with findings from other studies in that students do not do optional (Jeffries & Rizzolo, 2006).

The learning outcomes from participating in the simulation for this study measured were learning (knowledge) and critical thinking. The Nursing Process examination measured the participants’ initial attainment of knowledge in regards to the nursing process. Results for the test were not significant for the Cohort years or the
Factorial Group assignment (p > .05). It was noted that the Group #3, the Two Hour Simulation group, test results had a larger percentage of students earning a score above 20 than the other groups, although statistically it was not significant.

The ATI RN Fundamentals 2010 Assessment Form B measured the learning (knowledge) and critical thinking obtained during the foundations course. This examination evaluated students on individual scores, foundational thinking in nursing, clinical judgment/critical thinking in nursing, priority setting, assessment, analysis/diagnosis, planning, implementation of therapeutic nursing intervention, and evaluation. There was not a significant difference in the student performance based upon Cohort year or Factorial Group assignment. Of interest was the performance of the students in Group #3, the Two Hour Simulation group, when evaluated the percentage of students scoring at or above the Level I Proficiency level. All students assigned to Group #3 scored at or above the Level I Proficiency. This is similar to the scoring found on the Nursing Process examination. This result further suggests or indicates that the time spent in simulation is attributing to the learning and critical thinking that is occurring.

Although it is required that students obtain a minimum of a Level I Proficiency Level to pass the foundations course, they have three tries to obtain this level. The test is a pass/fail in the clinical portion of the foundations course. It is unknown what level of importance students place on their performance on the ATI examination when they know they have several attempts. It would be interesting to evaluate the difference on performance for these examinations if the results were included in the final computation of the course grade.
It is difficult to determine why there was not a significant difference in the test results for the Factorial Groups, although Group #3, the two hour simulation group, had a larger percentage of students scoring higher on both of the examinations. Previous studies reported a significant increase in knowledge for the HFHS intervention groups (Burns et al., 2010; Howard et al., 2010; P. R. Jeffries & Rizzolo, 2006; Shinnick et al., 2012). This researcher proposes that the difference in the outcomes of HFHS might be related to the content being measured. In the above referenced studies, students were taught the care of a patient related to a medical condition or peri-operative care. The duration of the simulations also varied in length.

It is postulated that the concepts of the nursing process are more abstract and require students to apply them to many nursing situations. The nursing process is a method to make clinical decisions and judgments used by nurses. The simulation scenario developed for this study included a basic illness, heat exhaustion. Outcomes on these examinations might change if HFHS scenarios are integrated in additional content areas in the foundations of nursing course. Additionally, the time spent in the simulation scenarios needs further exploration.

There was not a significant difference in the number of students progressing to the second semester in the program based upon Cohort year or Factorial Group assignment. Assignment to full time or part time faculty was not significant in performance of students.

The data analysis for the ability of the NLN PAX-RN composite score to predict success in the foundations course was significant (p < .01). This provides support to
continue to use the Composite score as one of the entrance criteria for the program. This result was anticipated (National League for Nursing, 2011).

The effect of students using the Nursing Process Application During Simulation (N-PADS) pocket reference cannot be determined from this study. The results from all measures did not reveal an advantage gained between the Cohort years or the Factorial Group assignment. The pocket reference was used before, during, and in debriefing with students to help them work through the phases of data collection, interpretation, planning, and developing the concept maps. Both simulation groups developed similar concept maps and made connections between the concept maps and data. There was guidance in the development of the concept maps by this researcher and the facilitator for the case study groups.

### 7.3 Study Limitations

Although the sample size for the study (N=220) was large and produced a satisfactory level of power, generalization of the results must be made with a degree of caution. The population was from a convenience sample of students enrolled in an associate degree nursing program and obtained from two distinct cohort years.

The Cohort Groups and the Factorial Group assignment were evaluated for the demographic variables of age distribution, gender, ethnic background, full time versus part time enrollment, previous health education, and military background. Results indicated that there was not a significant difference between the groups based on these factors. There was not a statistically significant difference when the groups were evaluated on the Composite score for the NLN PAX-RN examination.
The control for extraneous variables in educational research is difficult. Faculty and students bring life experiences to the learning environment. Additionally, this study did not anticipate the need for curriculum revisions based on the NCLEX-RN first time pass rates dropping below 80%. This resulted in changes to the tests in the Foundations of Care course for students in fall 2012, which composed Group #2, #3, and #4. The Nursing Process examination was not affected and was the same examination for both Cohort years.

The remaining course examinations were re-written at an application or higher level and a comprehensive examination was given. It is not known what the outcome would have been if this change had not occurred. However, even with this elevated level of expectations for achievement in the fall 2012 cohort, students were able to perform and pass the course.

7.4 Recommendations

This study examined the NLN/Jeffries Simulation Framework from the perspective of the five conceptual elements. There was evidence to support the theoretical framework components for the simulation design characteristics, especially when writing the scenario. Support for the evaluation of the simulation scenario at all stages of development was presented. Results from students on the Simulation Design Scale (SDS) indicate the Presence of the elements, but identified a difference for Importance of the elements when students were engaged in a longer time in simulation. This study identified and recommends that all phases of a simulation scenario be evaluated during the development phase of the simulation.
7.5 Suggestions for Further Research

The writing and use of simulation scenarios is not just the re-writing of case studies. It involves the use of an organized process. The NLN/Jeffries Simulation Framework was developed to guide the processes used for simulation. It also provides instruments to evaluate the scenarios to ensure that the elements and simulation design characteristics are present.

Educators who write simulations need to continue to use these tools in researching the simulation scenarios in regards to the Presence and Importance of the design elements. This study suggested that the longer students are in a simulation (four hour group) the more attention needs to be directed to the evolution of the objectives and instructions and fidelity. There needs to be evaluation of this factor when educators are considering substituting simulation for clinical time. How much time in simulation is enough and how does it equate to the time in the clinical setting? This has not been determined.

Performance on knowledge examinations and development of critical thinking were evaluated in this study. Findings suggest that time in simulation affects the test performance of the participants. The Factorial Group #3, the two hour simulation group, had higher scores on both the Nursing Process examination and the ATI examination, although this result was not significant. It is recommended that additional studies be conducted and outcomes on these examinations might change if HFHS scenarios are integrated in additional content areas in the foundations of nursing course. Additionally, the time spent in the simulation scenarios needs further exploration.
Further research on this topic is warranted. The NLN/Jeffries Simulation Framework will continue to evolve as nurse researchers contribute to the body of knowledge. This was the first study that had associate degree nursing students in the role of the registered nurse performing phases of the nursing process in a simulation scenario. The nursing process HFHS scenario used a basic nursing concept introduced early in the education of student nurses. Replication of this study is needed to evaluate the early introduction of simulation and the teaching of the nursing process with application during simulation can make an impact on the development of clinical judgment and clinical decision making skills.

7.6 Summary

This chapter discussed the findings of this study and the contributions to the body of knowledge in regards to the use of simulation in teaching nursing students. Included was the discussion of study limitations and implications for future nursing research. Although the evaluation of the learning (knowledge) did not result in significant findings, there was learning that occurred. Additionally, evidence suggesting that the longer time spent in simulation resulted in lower scoring for the importance of the design elements objectives and information, and fidelity by students participating in the four hour simulation (Group #4). Length of time in simulation will need further examination.

Support was given for the time necessary to develop, write, and evaluate simulation scenarios to ensure that the goal for the simulation is met. The NLN/Jeffries Simulation Framework was supported from the findings in this study for designing of simulation scenarios. Continued exploration into the impact simulation has on the education of future nurses is warranted.
Appendix A
Nursing Process: Application During Simulation (NPADS) ©

By
Ruth E. Irwin, MSN, RN
Copyright 2011
1. Knock on the Door Before Entering the Room
   a. Consider the time of day and if your patient is sleeping
   b. Look around the room and observe the environment.
2. Introduce yourself to the patient and any visitors.
3. Let them know you are a student nurse at WCCC.
4. Tell them how long you will be taking care of them.
5. Ask the patient how they would like you to address them
6. Make sure you wash your hands with soap and water or use the alcoholic based hand sanitizer.
7. Explain the purpose of this meeting.
8. Orient them to the environment.
9. Tell them how to contact you if needed.
10. Write your name on the whiteboard.

Introduction
You will gather data and assess the patient’s physical status for both subjective and objective data.

**Types of assessments:** Initial screening admission or Problem focused

**Subjective Data** – Patient’s opinion of symptoms
“Please tell me why you came to the hospital today”.

**Objective Data** – Factual signs
What the nurse can observe and measure. The Health History and Physical Examination Systematic Data Collection: from top to bottom: inspection, auscultation, palpation, and percussion.
Document your findings during data collection.
**Next, compare the objective data to the subjective data.**
Quick Reference Range for Adults

Normal Temperature Range: 36.5° C to 37.5° C or 96.8° F to 99.5° F
Normal Pulse Range: 60 to 100/ minute
Normal Respiratory Range: 12 – 20/ minute
Normal oxygen saturation:
Pulse Oximeter: 95 to 100 percent

Chart adapted from American Heart Association (American Heart Association, 2011; Berman & Snyder, 2012)

<table>
<thead>
<tr>
<th>Blood Pressure Category</th>
<th>Systolic mm Hg</th>
<th>Diastolic mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>High BP Stage 1</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>High BP Stage 2</td>
<td>160&gt;</td>
<td>or 100&gt;</td>
</tr>
<tr>
<td>Hypertensive Crisis</td>
<td>&gt;180</td>
<td>or &gt;110</td>
</tr>
</tbody>
</table>

Review the Assessment data from your patient and evaluate areas that are abnormal or problematic.
Compare your findings to normal reference ranges.
Identify risk factors, opportunities for patient education,
Actual versus Potential Nursing Diagnosis.
Wellness Nursing Diagnosis.
Components of a Nursing Diagnosis:
1. Problem and its definition
2. The etiology - causes of the response
3. The defining characteristics - signs and symptoms

Diagnosing
Three Types of Planning: Initial, Ongoing, Discharge

1. Review the assessment and Nursing Diagnosis(es)
2. Prioritize the nursing diagnosis(es)
3. Involve the patient and/or significant other to set goals
4. What are the outcomes to achieve from the interaction
   a. Outcomes are observable responses to interventions
5. Decide on nursing interventions that focus on the goals
   a. Independent interventions
   b. Dependent interventions
   c. Collaborative interventions
The nurse takes actions and completes the interventions developed in the planning phase.

**Necessary Skills:**

- **Cognitive** – Knowledge needed to complete the intervention
- **Interpersonal Skills** – Communication Verbal/ NonVerbal
- **Technical Skills** – Ability to perform the skill, knowledge of the procedure, and eye-hand coordination

**Steps:**

- Re-assess the patient
- Determine need for assistance
- Complete the intervention or delegate as appropriate
- Re-assess the patient response
- Document the results of the intervention

**Implementing**
After each intervention, the nurse evaluates the patients’ response.  
**The evaluation phase helps the nurse make clinical judgment as to the:**  
- Effectiveness of the intervention  
- Determine if the intervention should be continued or altered  
- Provide data that might influence the priority nursing diagnosis and interventions based on patients’ response  

**Evaluation includes, but not limited to:**  
- Re-assessment of vital sounds, lung, and bowel sounds  
- Re-assessment of pain relief or return of pain, using the pain scale.  
- Tolerance of intravenous fluids  
- Activity, Mobility
It is important to finish the patient encounter with accurate documentation and communication of the details.  

Communication:  
Report is given anytime there is a change in care provider during your shift: Hand off Report, End of Shift Report, Report of condition changes to other healthcare workers  

**SBAR-R**  

S – Situation  
State your name, unit, patient name, and problem  

B – Background  
Patient admission diagnosis, date of admission, past medical history and summary of care to date, code status  

A – Assessment  
Vital signs, pain scale, change from prior assessment  

R – Recommendations  
Tell what action you want, ask for orders, if no improvement when want a return call.  

R – Read-back of orders/diagnostic reports  

**SBAR-R**
Appendix B
Introduction

The following simulation was designed as an unfolding scenario to guide beginning nursing students in the application of the nursing process in a clinical situation. The Simulation Design Template and the Nursing Education Simulation Framework Model guided the development of these simulations (Jeffries, 2007).

Simulation

Orlin Damian Quinones-Perez, Migrant farm worker

Developed for Foundations Course: Nursing Process: Application During Simulation
Completed in week 4
Written by Ruth E. Irwin, MSN, RN

Simulation Time: 20 minutes: Location in the Nursing Learning Resource Center
Debriefing Time: 20 minutes: Location in the classroom with both participants and observers
Total Scenario Scenes Available: Four sets of simulation and debriefing

Admission Date: Fall 2012
Patient Name: Orlin Damian Quinones-Perez
Gender: Male Age: 45 Race: Hispanic Weight: 176 lbs. Height: 5’6”
Religion: Roman Catholic Major Support: Co-worker
Phone: 724-331-0000
Allergies: No known allergies
Immunizations: Unknown
Attending Physician: no primary care physician, usually goes to clinic as needed
Past Medical History: no history of illness
History of present illness: Orlin Damian was working today at the local farm harvesting tomatoes and passed out.
Social History: married, 3 children who live with their mother in Mexico
Primary Medical Diagnosis: syncope, unknown origin
Surgical History: Unknown
Nursing Diagnosis:

Pschomotor Skills Required Prior to Simulation:

1. Completed introduction to SimMan orientation during first week of classes
2. Completion of Assessment and Data collection lab:
   - assessment skills - inspection, auscultation, palpation, percussion
   - Head to toe assessment and data gathering
   - Communication and health history

Cognitive Activities Required Prior to Simulation

1. Readings:
• Irwin, R. E. (2011) Nursing Process: Application During Simulation (NPADS)©. Review the information under each of the seven tabs and be prepared to complete each step of the nursing process
• Review the Pre-Planning Data Sheet

2. Lecture:
   • Opportunity to attend the Nursing Process – three hour lecture
   • Opportunity to attend the Assessing Health – three hour lecture

3. Campus Lab:
   • Attendance and participation in the assisting with hygiene lab – four hour lab
   • Attendance and participation in the assessment and data collection lab – four hours
   • Attendance and participation in the nursing process lab – four hour lab

Simulation Learning Objectives – for learner

1. Conduct a health history and head to toe assessment of the patient.
2. Compare subjective data with objective data.
3. Interpret assessment data for abnormalities.
4. Prioritize the assessment findings.
5. Develop a three part nursing diagnosis.
6. Identify what actions need implemented.
7. Evaluate outcome of the nursing actions.
8. Compose a SBAR-R communication for the next shift.
9. Construct a mind mapping based upon this patient encounter.

Simulation Learning Objectives – for faculty

1. Guide students, as needed, in the completion of a head to toe assessment.
2. Complete a comparison of subjective and objective data
3. Complete all stages of the nursing process
4. Evaluate patients response to the care he received
5. Complete an accurate end of shift report using the SBAR-R
6. Guide students in development of a mind mapping

Simulation Set-Up and Preparation Scene One and Two

Setting/Environment

This simulation will begin in the Emergency Department of a community hospital. The patient is a new arrival entering the department through the triage station.
The triage nurse completed the basic assessment of a brief history of present illness, vital
signs, and began documentation. The triage nurse put on the patient identification
bracelet and brought the patient back to the treatment room, connected him to the heart
monitor, and is given oxygen by nasal cannula at 4 Liters.

**Simulator**

This simulation will use the Laerdal High Fidelity Human Simulator. It will use
both a pre-programmed scenario and use manual control for unanticipated student
responses. The scenario - Nursing Process: Application During Simulation will be
running. The *Initial State* will be programmed as follows:

- **Sinus Tachycardia:** 116 bpm
- **Auscultation sounds:** *Left lung:* clear  *Right lung:* clear  **Heart:** volume 4
- **Airway:** SpO2 = 92%
- **Temperature peripheral:** 102° F
- **Respiratory rate:** 20 per minute  **CO2 exhalation:** off
- **Blood Pressure:** 90/56
- **Handler:**
  - Oxygen (occurs)
  - Introduction
  - Patient Opinion Symptoms
  - Assessment
  - Diagnosing
  - Implementing
  - Evaluating
  - SBAR-R
- **Trend:** Heat exhaustion progression-Start trend: heat stroke after 15 minutes no
  action

The Simulator monitor will display the following vital signs: BP 90/56, T 102° F,
P 116, and R 20. Since students have not had the lecture content or practice with vital
signs, the researcher will guide them in assessing this information. A reference list on
vital signs is included in the NPADS© for verification of vital signs. The handler details
are in Appendix A.
The patient will be diagnosed with heat exhaustion resulting from working in excessive heat and not drinking enough fluids. It is mid September and the temperature in the sun is over 90 degrees. The signs and symptoms of heat exhaustion can include paleness, dizziness, nausea, vomiting, fainting, moderate temperature elevation (101° F to 102° F). Other causes can be dehydration, alcohol use, and over dressing. The priority will be to reverse the effects of heat exhaustion.

There will be an opportunity for patient teaching. The student will be able to teach the patient to recognize the early signs and symptoms of heat exhaustion; dry mouth, thirst, headache, dizzy, cramps, and fatigue. The teaching will also include the preventative measures of dressing light, taking rest periods in the shade, drinking plenty of fluids, avoiding alcohol, and paying attention to muscle cramps (Center for Disease Control 2011).

**Equipment Needs**

Upon arrival, the simulator will be dressed as a migrant farm worker dressed with the following:

- Tan work boots
- White tube socks and white briefs
- Jeans with a white tee shirt and cotton long sleeve shirt tucked into the jeans.
- Belt on jeans
- Ball cap over a bandanna
- Wrist watch
- Band-Aids on several fingers
- Hands will be dirty (picking crops in field)
- Blisters will be on the soles of the feet and small toes
- Heat rash – redden groin, under arms (areas where skin touches skin)
- Facial hair for mustache and beard
- Wrist identification bracelet
In scenario two, simulator will be in a hospital gown with a 20-gauge angiocath inserted into the left hand. Intravenous fluid 1000 mL D5/NSS connected to pump set at 200 mLs per hour.

**Documentation Forms**

**White Board with the following information:**

- Room number
- Date
- Nurses name(s)

**Triage Forms will include:**

- NSG 111 Pre-Planning Clinical Forms for data gathering
- Blank mind mapping
- Physician Order Sheet with ED orders written in scene three and four

**Student Roles**

There are eight nurse roles available for students. Depending on the number of students, roles will be combined.

- Introduction Nurse
- Assessing Nurse
- Diagnosing Nurse
- Planning Nurse
- Implementing Nurse
- Evaluation Nurse
- SBAR-R Nurse
- Observers
Students will conduct themselves as the registered nurse giving care to a patient. The student will fully engage in the simulation mindful that this is a real situation. Students will come to the simulation dressed in full uniform and bring stethoscope, watch with second hand, and portable device with electronic books installed. All students will have a role. Those not at the bedside will be assigned as observers and required to document on the NSG 111 Pre-Planning Clinical Forms. They will watch the simulation from a remote location. They will participate in the debriefing process. After the debriefing session, students will switch roles: those who were at the bedside will now be observers and the observers will become active participants.

**Scripted Introduction to the Simulation**

An introductory script has been developed for the researcher to read to participants. It is intended to set the stage for the simulation activity and expectations of the students. Three introductory scripts are available to read to appropriate group and is adjusted based on participation length of simulation scenario. See Appendix B. The informed consent process to participate in the research project will already been completed and students assigned appropriately.

**Significant Lab Values**

None available at the start

**Physician Orders**

None available at the start

**Student Information Needed Prior to Scenario**

- All students have completed an orientation to the simulation lab and the simulation equipment.
- Guidelines for the simulation have been reviewed along with the expectations during the scenario
• Students will complete the pre-simulation work and understand their roles
• Students will have the NPADS© for reference on the nursing process and normal ranges for vital signs.

Report Students Receive From Triage Nurse

Time: 1400 hours. Mr. Quinones-Perez was brought into the ED after a syncopal episode.

He is a 45 year old male working as a migrant field worker. He was working in the field picking bushels of tomatoes today since 0600. He did eat lunch at 1200 hours. Vital signs: T- 102° F, BP 90/56, P 116, R 20. His skin is flushed and dry. He is alert and oriented. English is a second language for him. That is all I have for you.

Simulation #1: Scenario Progression and Programming

<table>
<thead>
<tr>
<th>Timing (approximate)</th>
<th>Manikin Actions</th>
<th>Student Expected Interventions</th>
<th>If No Student Action May use the following Cues from the Manikin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 minutes</td>
<td>Fully dressed on ED bed Looking towards the students O2 on via N/C @ 2L “Orlin Damian is fine” “I was born the 26 day of August”</td>
<td>Wash hands Acknowledges the patient Introduce self and others Asks patient how he prefers to be addressed. Asks Birthday/checks ID bracelet</td>
<td>Cue: “Who are all these people”?</td>
</tr>
<tr>
<td>3-5 minutes</td>
<td>“Oh, how would you say it? I must have passed out”. “Once before in Florida” “I’m hot”</td>
<td>Asks patient what is the reason for his visit to the ED today? Has that ever happened before? Need to put on hospital gown</td>
<td>Cue: “I must have passes out today” Cue: “This happened to me in Florida”</td>
</tr>
<tr>
<td>5-15 minutes</td>
<td>Pre-recorded verbal responses related to data collection questions-</td>
<td>Begins systematic data collection. Uses NSG 111 Pre-</td>
<td>Cues: As needed from researcher</td>
</tr>
<tr>
<td>Timing (approximate)</td>
<td>Manikin Actions</td>
<td>Student Expected Interventions</td>
<td>If No Student Action May use the following Cues from the Manikin</td>
</tr>
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<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>saved in software program.</td>
<td>Planning Form for guidance Head to toe Obtains health history</td>
<td>Cue: “What do you need to know? I have to get back to work”?</td>
</tr>
<tr>
<td>15-20 minutes</td>
<td></td>
<td>Compares data to normal values Identifies abnormal findings, risks Opportunities patient education Actual versus Potential Nursing Diagnosis Wellness Nursing Diagnosis Identifies and writes a priority diagnosis Problem and definition, etiology, defining characteristics – signs and symptoms</td>
<td>Cues: “What are you trying to figure out?”</td>
</tr>
</tbody>
</table>

End of Phase One Scenario – Debriefing 20 minutes

**Debriefing Questions for Scenario One**

These questions are suggestions to focus the students on the scenario and their performance. Debriefing occurs in a safe environment and free of criticism. Using the reflection on performance allows the student to identify opportunities to improve performance. All students will participate.

1. Looking at the objectives for the simulation, which ones were you able to achieve?

2. Did you have the knowledge and skills to meet the objectives?
3. If you were able to repeat the scenario, what would you do different?

4. Observers, what did you notice?

5. Do all agree with the primary nursing diagnosis?

Simulation #2: Scenario Progression and Programming

<table>
<thead>
<tr>
<th>Timing (approximate)</th>
<th>Manikin Actions</th>
<th>Student Expected Interventions</th>
<th>If No Student Action May use the following Cues from the Manikin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 minutes</td>
<td>“Hello, where did the others go”?</td>
<td>Review the assessment and Nursing Diagnosis</td>
<td>Cues: As needed from researcher</td>
</tr>
<tr>
<td></td>
<td>“I’m thirsty, can I have a drink”?</td>
<td>Prioritize the nursing diagnosis</td>
<td>Cue: “What are you working on”?</td>
</tr>
<tr>
<td></td>
<td>“Get me better so I can go back to work”?</td>
<td>Involve patient to set goals</td>
<td>“I need to leave, where are my clothes”?</td>
</tr>
<tr>
<td></td>
<td>“What’s an IV”?</td>
<td>What are outcomes to achieve</td>
<td>“What is the plan”?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decide on nursing interventions (1 each)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Independent-put on gown, sheet covering him, look under band aides</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Dependent-report vital signs to MD, orders for hydration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Collaborative-call IV team</td>
<td></td>
</tr>
<tr>
<td>10-18 minutes</td>
<td>“My lips aren’t as dry”</td>
<td>The nurse takes action: Re-assess the patient</td>
<td>Cues: As needed from researcher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Determine if you need help</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Complete the intervention or delegate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Re-assess the patient response</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Document the results of the intervention</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effectiveness of the</td>
<td></td>
</tr>
</tbody>
</table>
### Timing (approximate) | Manikin Actions | Student Expected Interventions | If No Student Action May use the following Cues from the Manikin
--- | --- | --- | ---
“Is my fever gone”? | intervention Provide data that might change priority nursing diagnosis Re-assess vital sounds, lung and bowel sounds Re-assessment of pain with pain scale Tolerance of intravenous fluids Activity, mobility | | |
18-20 minutes | Gives change of shift report to new nurses Situation Background Assessment Recommendations Read back of any lab or diagnostic values | Cues: As needed from researcher |

**End of Phase Two Scenario – Debriefing 20 minutes**
*Group Three completes Mind Mapping*

**Debriefing Questions for Scenario Two**

In scenario two, the simulation progresses through the planning, implementing, evaluating, and SBAR-R phase of the nursing process. Think about these phases and reflect upon your actions as the debriefing occurs.

1. Describe the objectives that you were able to achieve.
2. How did you feel during scenario two?
3. Did you have the knowledge and skills to meet objectives?
4. Can you identify something you would do different?
5. Observers, what did notice?
6. How were you able to use the NPADS© in the care of this patient?

7. What are the relationships of the data to the patient and how will you draw a mind mapping?

**Simulation Set-Up and Preparation for Scene Three and Four**

Simulation Three and Four are a continuation of the previous two scenarios. Orlin Damian Quinones-Perez has been receiving an IV fluid bolus since 1430 hours. It is now 1900 hours and you are beginning your shift. You receive the following SBAR-R report from the day shift nurse.

**S** - In bed two is Mr. Quinones-Perez who is a 45 year old man brought to the hospital around 1400 hours after a syncope episode today. He was working in the fields picking tomatoes since 0600 hours.

**B** - His current diagnosis is heat exhaustion with syncope. His past medical history includes one prior episode of “fainting” while working in Florida. His past medical history is negative for diabetes, hypertension, epilepsy, pulmonary or cardiac disease. He reports no history of allergies to foods, medications. He has no family in the area, only work friends. He is a full code.

**A** - His last set of vital signs: BP initially was 90/55 and last reading was 100/60 at 1700 hours, P 120, R 20, SpO2 94% and Temperature 101° F after receiving Tylenol. He does have blisters on both feet soles and small toes. I removed and cleaned several cuts on his hands earlier, applied Neosporin ointment and reapplied band aide. The IV of 1000 mL of D5/ NSS is running at 200 mL per hour. He has received 1000 mL so far and I hung a new bag around 1900 hours. He has not voided yet.
**R** – You are going to need to check with the doctor to see if he wants to give him a tetanus vaccine due to the hand cuts. When he came in to the ED he was dehydrated so make sure you watch him for any urination.

**R** – Orders: 20 gauge angiocath in left hand with 1000 mL D5/NSS running at 200 mLs per hour. Monitor VS every two hours, O2 via N/C @ 4L.

The focus on the next two scenes is the continuation of care using the nursing process and NPADS© to guide clinical judgment and decision making. The students will begin with the change of shift assessment.

### Simulation #3: Scenario Progression and Programming

<table>
<thead>
<tr>
<th>Timing (approximate)</th>
<th>Manikin Actions</th>
<th>Student Expected Interventions</th>
<th>If No Student Action May use the following Cues from the Manikin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 minutes</td>
<td>Dressed in patient gown.</td>
<td>Wash hands Acknowledges the patient Introduce self and others Asks patient how he prefers to be addressed. Asks Birthday/checks ID bracelet</td>
<td>Cue: “You better wash your hands”. Cue: “Who are all these people”?</td>
</tr>
<tr>
<td></td>
<td>“Orlin Damian is fine”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“I was born the 26 day of August”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-5 minutes</td>
<td>“That’s right”</td>
<td>Orlin Damian, I understand you passed out in the field working today? “Now that you have been getting the IV fluids how do you feel now”? Gives explanation for length of treatment</td>
<td>Cue: “I must have passes out today” Cue: “I am tired”. Cue: “When are you going to take this needle out”?</td>
</tr>
<tr>
<td></td>
<td>“I am very tired. How long do I need this needle”?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timing (approximate)</td>
<td>Manikin Actions</td>
<td>Student Expected Interventions</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Checks IV site, fluid, pump for rate                                                                --------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>5-15 minutes</td>
<td>Pre-recorded verbal responses related to data collection questions.</td>
<td>Begins focused assessment based on report received with systematic data collection. Head to toe Looks to monitor for vital signs: TPR, BP, SpO2 – writes them down. Explains to patient what doing Must assess bladder due to not voiding since admission Bladder is palpated. Firm. Urinal given. Reviews NSG 111 Pre-Planning Form for guidance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“The other nurse just did this”. Monitor for manikin changes to TPR, BP, SpO2 within normal limits.</td>
<td>Cues: As needed from researcher Manikin: “What do you need to know? I have to get back to work”?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pt. states, “I think I need to pee”.</td>
<td>Cue: “I need to pee”.</td>
<td></td>
</tr>
<tr>
<td>15-20 minutes</td>
<td>“Here, take this urinal away”.</td>
<td>Compares new data to normal values and previous values Evaluates urine output Notifies MD of changes Re-evaluates Actual versus Potential Nursing Diagnosis Identifies and writes a priority diagnosis Problem and definition, etiology, defining characteristics – signs and symptoms</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cues: “What are you trying to figure out?” Cues: As needed from researcher</td>
<td></td>
</tr>
</tbody>
</table>

End of Phase Three Scenario – Debriefing 20 minutes
All students will participate in Debriefing. The questions are similar to the first scenario, but adapted to reflect a focus assessment with confirmation and adjustment of priority diagnosis.

1. Looking at the objectives for the simulation, which ones were you able to achieve?
2. What differences are there in a focused assessment versus the admission assessment?
3. Did you have the knowledge and skills to meet the objectives?
4. If you were able to repeat the scenario, what would you do different?
5. Observers, what did you notice?
6. Did the priority nursing diagnosis change?
7. Why?

The final scene of the scenario occurs about one hour later. Mr. Quinones-Perez is more alert and expressing the desire to go home. He is asking questions of the nurse as to what caused the episode and if it could happen again. The nurse returns to evaluate Mr. Quinones-Perez progress to determine if ready for discharge planning.

**Simulation #4: Scenario Progression and Programming**

<table>
<thead>
<tr>
<th>Timing (approximate)</th>
<th>Manikin Actions</th>
<th>Student Expected Interventions</th>
<th>If No Student Action May use the following Cues from the Manikin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 minutes</td>
<td>“Hello, where did the others go”?</td>
<td>Review the assessment and Nursing Diagnosis</td>
<td>Cues: As needed from researcher</td>
</tr>
<tr>
<td></td>
<td>“Hey, why did this happen to me”?</td>
<td>What are the outcomes of the care given today</td>
<td>Cue: “What are you working on”?</td>
</tr>
<tr>
<td></td>
<td>“I’ll call my amigo. He come”</td>
<td>Asks about discharge plans</td>
<td>Cue: “What is the</td>
</tr>
<tr>
<td>Timing (approximate)</td>
<td>Manikin Actions</td>
<td>Student Expected Interventions</td>
<td>If No Student Action May use the following Cues from the Manikin</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------</td>
<td>-------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>10-18 minutes</td>
<td>pick me up”.</td>
<td>Review MD orders</td>
<td>plan”?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opportunities for teaching – prevention</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The nurse takes action:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Re-assess the patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPR, looks at monitor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remove cardiac</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>monitor, SPO2, and oxygen.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assesses band aids on hands</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and feet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Should ask IV team to</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>remove angiocath from arm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note amount of IV fluid</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>remaining</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>teaching for discharge</td>
<td></td>
</tr>
<tr>
<td>18-20 minutes</td>
<td>“You need to take</td>
<td>IV removed and discharge</td>
<td>Cues: As needed from researcher</td>
</tr>
<tr>
<td></td>
<td>this out of my</td>
<td>given to friend</td>
<td></td>
</tr>
<tr>
<td></td>
<td>arm”.</td>
<td>Document</td>
<td></td>
</tr>
</tbody>
</table>

**End of Phase Four Scenario – Debriefing 30 minutes**

**Group Four completes Mind Mapping and longer Debriefing**

Final debriefing for group four is 30 minutes. First part is the response to the debriefing questions for scenario four followed by the development of the mind mapping. Students will draw the mapping on the white board and show relationships. Questions for debriefing and guided reflection:

1. Was this simulation able to guide you in the use of the nursing process?
2. Which objectives were you able to achieve?
3. Would you change anything you did during the simulation?

4. Observers, what did you see during the simulation that was good?

5. What could be improved?

6. When did you realize the primary nursing diagnosis changed?

7. What were the opportunities for patient teaching that resulted from the data collection?

8. Would you like to add anything else?
Appendix C
Unfolding Paper-Pencil Case Study
Nursing Process – Heat Exhaustion

Patient Situation
Admission Date: Fall 2012
Patient Name: Orlin Damian Quinones-Perez
Gender: Male Age: 45 Race: Hispanic Weight: 176 lbs. Height: 5’ 6”
Religion: Roman Catholic Major Support: Co-worker
Phone: 724-331-0000
Allergies: No known allergies
Immunizations: Unknown
Attending Physician: no primary care physician, usually goes to clinic as needed
Past Medical History: no history of illness
History of present illness: Orlin Damian was working today at the local farm harvesting tomatoes and passed out.
Social History: married, 3 children who live with their mother in Mexico
Primary Medical Diagnosis: syncope, unknown origin
Surgical History: Unknown

Setting/Environment

The patient is a new arrival entering the department through the triage station. The triage nurse completed the basic assessment of a brief history of present illness, vital signs, and began documentation. The triage nurse put on the patient identification bracelet and brought the patient back to the treatment room, connected him to the heart monitor, and is given oxygen by nasal cannula at 4 Liters.

Background:

Time: 1400 hours. Mr. Quinones-Perez was brought into the ED after a syncopal episode. He is a 45 year old male working as a migrant field worker. He was working in the field picking bushels of tomatoes today since 0600. He did eat lunch at 1200 hours. His skin is flushed and dry. He is alert and oriented. English is a second language for him. Vital signs: T- 102° F, BP 90/56, P 116, R 20. That is all I have for you.

Physician Orders:

Oxygen at two liters via nasal cannula
Intravenous of 1000 mL D5/NSS at 200 mLs per hour.

Continuation of case study:

It is now five hours since admission to the emergency department. You receive the following SBAR-R report from the day shift nurse:
S - In bed two is Mr. Quinones-Perez who is a 45 year old man brought to the hospital around 1400 hours after a syncope episode today. He was working in the fields picking tomatoes since 0600 hours.

B - His current diagnosis is heat exhaustion with syncope. His past medical history includes one prior episode of “fainting” while working in Florida. His past medical history is negative for diabetes, hypertension, epilepsy, pulmonary or cardiac disease. He reports no history of allergies to foods, medications. He has no family in the area, only work friends. He is a full code.

A - His last set of vital signs: BP initially was 90/55 and last reading was 100/60 at 1700 hours, P 120, R 20, SpO2 94% and Temperature 101°F after receiving Tylenol. He does have blisters on both feet soles and small toes. I removed and cleaned several cuts on his hands earlier, applied Neosporin ointment and reapplied band aide. The IV of 1000 mL of D5/ NSS is running at 200 mL per hour. He has received 1000 mL so far and I hung a new bag around 1900 hours. He has not voided yet.

R – You are going to need to check with the doctor to see if he wants to give him a tetanus vaccine due to the hand cuts. When he came in to the ED he was dehydrated so make sure you watch him for any urination.

R – Orders: 20 gauge angiocath in left hand with 1000 mL D5/NSS running at 200 mLs per hour. Monitor VS every two hours, O2 via N/C @ 4L.

The focus is on the continuation of care using the nursing process and the NPADS© to guide clinical judgment and decision making. Students will also develop a concept map for this patient.
Campus Lab Packet for Nursing Process Content Fall 2011 and Fall 2012

**Objectives:**
Upon completion of this campus laboratory, you should be able to:
1. Describe the activities that occur in each step of the nursing process.
2. Describe the methods used to collect data: observation, interview, physical examination.
3. Describe an appropriate interview setting.
4. Use open and closed ended questions when conducting an interview.
5. Conduct a basic assessment, using all methods of data collection, to collect subjective and objective information.
6. Use appropriate assessment and interview techniques to collect and validate pertinent data.
7. Form a three part nursing diagnosis, goal and plan of care using collaborative independent and dependent nursing interventions.
8. Discuss the importance of evaluating goals and interventions.

**Activities**

**Activity 1:**
Review the sample concept map: Ineffective Airway Clearance (Gas Exchange) on page 233 in the Kozier et al. textbook (attached). Various types of nursing care plan forms are used in clinical facilities; you will discuss how the form is developed, changed, who changes it and when, and how it is evaluated. (30 minutes)

**Activity 2:**
You will role play the two patient-nurse case studies with your instructor (60 minutes each) who will give you index cards with the necessary information for the case studies.
In the first case study (pneumonia), your instructor will be the nurse and one student volunteer will be the patient and one a family member.
In the second case study (pain), your instructor will be the patient and you will all play the role of the nurse and family member.
You will go through the process of data collection and concept mapping (as a group) with your instructor; and will
Use appropriate assessment and interview techniques to collect and validate pertinent data.
Use the student care planning concept map form (attached) to collect data, cluster data, and identify appropriate nursing diagnoses, goals, plans, and interventions.

**Activity 3: Mary Jones Interview**
You will view the DVD: Mary Jones Interview and will have a focused discussion (attached) after viewing (30 minutes)

**Mary Jones Interview Objectives and Questions for Focused Discussion**

**Objective 1**
To conduct a basic interview
Did the nurse in each scenario accomplish the five purposes of an interview? Did they
1. Tell the patient why they need to know information
2. Establish a relationship and build rapport
3. Provide the patient with information
4. Teach about a condition and treatment
5. Identify problems
How did they accomplish the five purposes and what behaviors did you observe? Did they
1. Identify the patient?
2. Maintain privacy and confidentiality?
3. Use three parts (opening, body, closing) of the interview?
4. Use non gendered terms - not him and her but rather your friend, your partner?

**Objective 2**
**To collect both subjective and objective information**
1. Did the nurse collect both subjective and objective data? Did she validate subjective data with objective data? If so, how?
2. Was the nurse able to establish congruency with what she observed and what the patient indicated to her both verbally and non-verbally? If so how and if not, why not?

**Objective 3**
**To determine congruency between patient statements and objective data**
1. Can the nurse validate what the patient is saying by what she sees and hears?
2. Can the nurse validate the congruency in facial expressions and body language with what Mary is telling her?

**Objective 4**
**To recognize the significance of non verbal communication**
What non-verbal communication did you observe among the nurse, the patient, and the friend?
What was their interpretation of it? For example,
1. The meaning of body position, leaning back or forward, tightness in muscle tension, facial expressions of impatient, disgust, fear, anxiety
2. The meaning of inability to make eye contact; Mary made no eye contact.

**Additional insight**
**Activity 4: Student Interview**
Pair up with another student. One student will interview the partner for five minutes about a favorite gift using only open-ended questions. Then the other student will then interview the partner about a favorite vacation using only closed questions. As a group, discuss the pros and cons of closed and open-ended questions (If time permits).
MIND MAPPING SHEET:

Pt. Initials: ________ Age: __________
Medical Diagnosis: ____________________
Nursing Diagnosis: ____________________
Appendix E
**Please be sure there are no stray marks on your answer sheet and that all erasures are complete.**

Nursing Process (Questions 1 - 25)

1. The components of the nursing process generally occur in which order?
   - A. Assessing, planning, diagnosing, evaluating, implementing
   - B. Assessing, diagnosing, planning, implementing, evaluating
   - C. Planning, assessing, diagnosing, implementing, evaluating
   - D. Diagnosing, implementing, evaluating, assessing, planning

2. When learning how to implement the nursing process into a plan of care, the student nurse realizes that part of the purpose of the nursing process is to:
   - A. Deliver patient care in an organized manner.
   - B. Make sure that standardized are is available to all patients.
   - C. Identify patient needs and deliver care to meet those needs.
   - D. Implement care that is close to the medical model.

3. The nurse is performing a dressing change and notices there is a new area of skin breakdown near the site of the dressing. On closer examination, the nurse suspects this is caused by the tape used to secure the dressing. This would be an example of which phase of the nursing process?
   - A. Assessment
   - B. Diagnosis
   - C. Implementation
   - D. Evaluation

4. Which statement is appropriate during the introduction stage of the assessment interview?
   - A. “It is almost time for me to leave. Do you have any questions for me?”
   - B. “Describe your pain.”
   - C. “Describe the number and characteristic of your bowel movements.”
   - D. “I need to ask you a few questions about your health so we can better plan your care.”

5. Which questions or statements are appropriate to use during the directive or formal type of patient interview?
   - A. “Tell me about your stomach pain.”
   - B. “Are you having chest pain now?”
   - C. “How are you feeling now?”
   - D. None of the above statements
6. The nurse is performing an initial assessment patient interview. Which assessment data is subjective?
   A. Unable to move right leg
   B. Complains of pain in her hip
   C. Blood pressure 142/86
   D. X-ray report indicates a fractured hip

7. The nurse performs a postoperative assessment. Which are examples of objective data? (Please select all that apply)
   A. Nausea
   B. Vomiting
   C. Dilated pupils
   D. Headache

8. The patient states, “My lips feel numb, and I can’t see very well.” What type of data is this?
   A. Subjective data from a primary source
   B. Objective data from a primary source
   C. Subjective data from a secondary source
   D. Objective data from a secondary source

9. Based on the nurses’ documentation below, identify the secondary source subjective data.

   9/20/11 1420
   Admitted to room 2209. Patient complaining of stomach pain and rates pain as a 5 on a scale of 0 to 10. Wife states he had been “doubled over” since this morning. Abdomen tender to palpation.

   Joyce Morton, RN

   A. Complaining of stomach pain
   B. “Doubled over” since this morning
   C. Rates pain as a 5 on a scale of 0-10
   D. Abdomen tender to palpation

10. To be most effective, how should the nurse individualize the interview setting for a patient of Asian descent?
    A. Sit 4 feet from the bed in a position that allows direct eye contact
    B. Stand a little closer than usual; about 2 feet from the bed
    C. Sit at least 4 feet from the bed and avoid direct eye contact
    D. None of the above; it is the same for any individual regardless of culture

11. The nurse conducts a patient assessment in the emergency department and asks, “Has anyone ever hit you?” This an example of what type of question?
    A. Closed
    B. Open-ended
    C. Leading
    D. Neutral
12. A patient diagnosed with pneumonia has been hospitalized for several days. Which is a priority nursing diagnosis for this patient?
   A. Altered oral mucous membranes related to dry mouth
   B. Activity intolerance related to fatigue
   C. Knowledge deficit related to medication regimen
   D. Ineffective airway clearance related to increased secretions

13. Why is it important for the nurse to identify the etiology of a nursing diagnosis correctly?
   A. It enables the nurse to individualize interventions
   B. It describes the pathology of the patient’s disease
   C. It determines whether the problem is actual or potential
   D. It includes the defining characteristics of the nursing diagnosis

14. What is the main difference between the medical and nursing diagnosis?
   A. The medical diagnosis focuses on preventing disease
   B. The medical diagnosis focuses on maintaining health
   C. The medical diagnosis is devoted to curing disease
   D. The medical diagnosis is most concerned with the interrelationships between body, mind, and spirit

15. Which diagnostic statement uses the PES (problem, etiology, and symptomatology) format?
   A. Risk for impaired skin integrity as manifested by poor skin turgor and immobility
   B. Risk for impaired skin integrity related to decreased peripheral circulation secondary to diabetes
   C. Altered nutrition: less than body requirements related to anorexia and dyspnea
   D. Altered nutrition: more than body requirements related to excessive eating when depressed as manifested by weight of 50% more than recommended for height and patient reporting food intake of more than 4,000 calories per day.

16. Which is the second part of a three-part nursing diagnosis?
   A. Etiology
   B. Outcome
   C. Treatment
   D. Diagnostic label

17. The planning step of the nursing process includes which activity?
   A. Formulating a nursing diagnosis
   B. Analyzing patient data
   C. Developing patient goals or desired outcomes
   D. Carrying out a nursing order
18. When is the optimal time for the nurse to begin discharge planning?
   A. Upon admission
   B. The day before discharge
   C. 24-hours after admission
   D. When the patient is feeling well

19. The nurse identifies: *Fluid volume deficit related to active fluid loss*, as the priority nursing diagnosis for patient with severe diarrhea. Which is the appropriately written goal statement for this diagnosis?
   A. Patient will drink more fluids.
   B. Patient will have good skin turgor.
   C. Patient will have moist mucous membranes.
   D. Patient will have an intake of at least 1000 ml within 24 hours.

20. The nurse assigns the unlicensed personnel (ULP) certified nurse’s aide to take vital signs for several patients. The aide completes the task and documents the findings accordingly. One of the patients had a reading of 200/110, and it wasn’t until the end of the shift that the nurse realized this value. The nurse notified the physician and the patient received treatment for the high blood pressure. What does this situation demonstrate?
   A. Inappropriate delegation
   B. Inadequate nurse aide knowledge base
   C. Inadequate supervision
   D. All of the above

21. Which is an example of a dependent nursing action?
   A. Position for comfort
   B. Cleanse wound with normal saline and pack with ½ inch sterile gauze strips
   C. Assess skin for pressure areas and redness
   D. Monitor for signs and symptoms of infection

22. Which step should the nurse perform first when initiating the implementation phase of the nursing process?
   A. Carry out the intervention
   B. Determine the need for assistance
   C. Reassess the patient
   D. Document the intervention

23. The wound nurse makes the decision to look at alternatives for wound care with a patient who has a leg ulcer that has been treated over the past two weeks. The nurse was hopeful to see more improvement by this time. This represents which phase of the nursing process?
   A. Assessment
   B. Diagnosis
   C. Implementation
   D. Evaluation
24. When should the evaluation step of the nursing process be carried out?
   A. At the end of the shift
   B. Once a week
   C. Upon discharge from the medical facility
   D. Continually

25. Which term best describes the process to promote excellence in patient care within a facility or organization?
   A. Quality assurance (QA)
   B. Nursing process
   C. Critical pathway
   D. Standard of care

P. Freedberg (2011)
Appendix F
RN FUNDAMENTALS 2010 FORM B PROCTORED ASSESSMENT TOPIC DESCRIPTORS
BASIC CARE AND COMFORT (14)
- Bowel Elimination Needs: Assessing for Fecal Impaction
- Complementary Alternative Therapies: Need for Additional Teaching Related to Herbal Preparations
- Hygiene: Bathing Clients with Dementia
- Hygiene: Oral Care for Client Who is Unconscious
- Hygiene: Providing Instruction about Foot Care
- Mobility and Immobility: Appropriate Use of Ice Packs
- Mobility and Immobility: Manifestations of Impaired Skin Integrity
- Mobility and Immobility: Preventing Complications
- Mobility and Immobility: Preventing Plantar Flexion
- Nutrition and Oral Hydration: Appropriate Food Selection for Full Liquid Diet
- Nutrition and Oral Hydration: Diet Progression
- Rest and Sleep: Recognizing Sleep Deprivation
- Sensory Perception: Implementations for Hearing Impairment
- Sensory Perception: Planning for Impaired Verbal Communication
HEALTH PROMOTION AND MAINTENANCE (7)
- Client Education: Domains of Learning
- Health Promotion and Disease Prevention: Older Adult
- Health Promotion and Disease Prevention: Steps in Smoking Cessation
- Infection Control: Risk for Health-Care Associated Infections
- Middle Adult: Abnormal Physical Assessment Findings
- Older Adult (65 Years and Older): Meeting Developmental Tasks
- Vital Signs: Demonstrating Correct Technique
MANAGEMENT OF CARE (6)
- Admissions, Transfers, and Discharge: Documenting Priorities of Care
- Delegation and Supervision: Using the 5 Rights
- Ethical Responsibilities: Advocating for Client Rights
- Information Technology: Use of Restraints
- Legal Responsibilities: Informed Consent
- Legal Responsibility: Disclosure of Inmate Health Status
PHARMACOLOGICAL AND PARENTERAL THERAPIES (6)
- Dosage Calculation: Intravenous Medication
- Dosage Calculation: Liquid Medication
- Intravenous Therapy: IV Medication Administration Per Pump
- Pharmacokinetics and Routes of Administration: Epidural Analgesia
- Pharmacokinetics and Routes of Administration: Self-Administration of Insulin
- Safe Medication Administration and Error Reduction: Indications for Z-track Use
PHYSIOLOGICAL ADAPTATION (3)
- Medical Surgical Asepsis: Appropriate Technique
- Respiratory Management: Procedure for Suctioning a Tracheostomy
- Vital Signs: Treating Hyperthermia
PSYCHOSOCIAL INTEGRITY (5)
Cultural and Spiritual Nursing Care: Cultural Considerations Regarding Pain Assessment
Grief, Loss, and Palliative Care: Evaluating Client Acceptance
Grief, Loss, and Palliative: Planning Client Outcomes
Therapeutic Communication: Responding to Angry Client
Therapeutic Communication: Responding to Parental Concerns

REDUCTION OF RISK POTENTIAL (5)
Pressure Ulcers, Wounds, and Wound Management: Preventing Skin Breakdown
Pressure Ulcers, Wounds, and Wound Management: Risk for Impaired Wound Healing
Respiratory Management: Sputum
Thorax, Heart, and Abdomen: Auscultating Heart Sounds
Vital Signs: Use of Electronic Thermometer

RN FUNDAMENTALS 2010 FORM B PROCTORED ASSESSMENT TOPIC DESCRIPTORS

SAFETY AND INFECTION CONTROL (14)
Client Safety: Appropriate Use of Restraints
Client Safety: Proper Use of Restraints
Home Safety: Client Teaching
Home Safety: Evaluating Client Safety
Infection Control: Appropriate Handwashing Technique
Infection Control: Appropriate Use of Protective Equipment During Suctioning
Infection Control: Methicillin-Resistant Staphylococcus Aureus
Infection Control: Transmission Precautions
Information Technology: Appropriate Action for Medication Error
Medical and Surgical Asepsis: Applying a Surgical Mask
Medical and Surgical Asepsis: Preparing a Sterile Field
Medical and Surgical Asepsis: Putting on Sterile Gloves
Urinary Elimination: Home Care of a Client with an Indwelling Catheter
Vital Signs: Assessing for Complications

Assessment Technologies Institute®, LLC
7500 West 160th Street • Stilwell, KS 66085
Toll-Free: 800.667.7531 • Fax: 913.685.2381 • www.atitesting.com
Appendix G
WESTMORELAND COUNTY COMMUNITY COLLEGE
NURSING PROGRAM

STUDENT DATA SHEET

DATE ____________________________

Any information you provide on this form is used for statistical and reporting purposes only and is not identifiable by individual.

It has no bearing on admission to Westmoreland County Community College or the Nursing Program. The College does not discriminate on the basis of race, color, religion, national origin, sex, age, or disability.

NAME: ____________________________

(First) (Middle) (Last) (Maiden Name if Married)

Age: _____ Female: ____ Male: _____ Birthdate: _____________

Address: _______________________________________________________

(City) (State) (Zip-code)

Home phone ____________ Work: ____________ Cell: ____________

Home E-mail address: ____________________________________________

WCCC E-mail address: ____________________________________________

Social Security Number ____________________________

Ethnic Group (Check (1) only): Age:

☐ American Indian or Alaskan Native ☐ 25 & under

☐ Asian or Pacific Islander ☐ 26-30

☐ Black, Non-Hispanic ☐ 31-40

☐ Hispanic ☐ 41-50

☐ White, other than Hispanic ☐ 51-60

☐ Older than 60

☐ Full-Time (12 Credits or more per semester)

☐ Part-Time (less than 12 Credits per semester)

☐ Financial Aid ☐ Yes ☐ No

Person to Notify in an Emergency:

Name ____________________________ Relationship ________

Address ____________________________ Home Phone ________

VERIFICATION OF PRELIMINARY EDUCATION

Name of High School from which you graduated ____________________

City and State of High School ____________________________________

Month and Year of Graduation _________________________________

OR

Number of Pennsylvania GED ___________________ Year Obtained ___________

OR

Certificate of Preliminary Education Number ___________ Year Obtained ___________

Do you hold a license as a Practical Nurse? ☐ Yes ☐ No

If yes, indicate State _______________ and License Number ____________________
REQUEST FOR TRANSFER OF CREDIT

COPIES OF ALL TRANSCRIPTS MUST BE PLACED ON FILE IN THE NURSING OFFICE
WITH A COPY OF THE APPROVED TRANSFER OF CREDIT

School/College/University    Year(s) Attended   Major   Diploma/Degree Awarded

Please Check any Previous Non-Nursing Degrees and Major
☐ Doctorate  Major ________________________  ☐ Master  Major ________________________
☐ Bachelor  Major ________________________  ☐ Associate  Major ________________________

Please Check Previous Education
LPN ☐ Nurse Aide ☐ Certification # _____________________________  e.g., EMT (Please specify)

Other Health Care Providers areas ____________________________ e.g., EMT (Please specify)

☐ Paramedic  Yes ☐ No ☐  ☐ Respiratory Therapist  Yes ☐ No ☐
☐ EMT  Yes ☐ No ☐  ☐ Surgical Technician  Yes ☐ No ☐
☐ Nursing Assistant  Yes ☐ No ☐  ☐ Laboratory Technician  Yes ☐ No ☐
☐ Medical Assistant  Yes ☐ No ☐  ☐ Other ☐ (Please specify)

Have you served time in the Military?  Yes ☐ No ☐
Were you a corpsman?  Yes ☐ No ☐

WORK EXPERIENCE: (Identify the inclusive dates for each work experience; begin with current or most recent employment)

<table>
<thead>
<tr>
<th>EMPLOYER</th>
<th>TYPE OF WORK</th>
<th>DATES OF EMPLOYMENT</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Beginning</td>
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<tr>
<td></td>
<td></td>
<td>Ending</td>
</tr>
</tbody>
</table>

Write a brief statement explaining why you want to obtain a Nursing education.

The State Board of Nursing prohibits issuance of licenses to applicants who have been convicted of felonious acts prohibited by “the controlled substance, drug, device and cosmetic act,” unless at least ten years has elapsed since conviction and applicants can satisfactorily demonstrate personal rehabilitation to the State Board.

My Signature below indicates that I am aware of the additional Nursing Program requirements
and I am responsible for all material enclosed in this packet.

__________________________________________  ____________
Signature                                      Date

Please turn this form, along with two 2x2 passport photos to:
Ruth E. Irwin, MSN, RN
Director of Nursing
145 Pavilion Lane
Youngwood, PA 15697
724-925-5987
Appendix H
Simulation Design Scale (Student Version)

In order to measure if the best simulation design elements were implemented in your simulation, please complete the survey below as you perceive it. There are no right or wrong answers, only your perceived amount of agreement or disagreement.

Please use the following code to answer the questions.

Use the following rating system when assessing the simulation design elements:
- 1 - Strongly Disagree with the statement
- 2 - Disagree with the statement
- 3 - Undecided - you neither agree or disagree with the statement
- 4 - Agree with the statement
- 5 - Strongly Agree with the statement

NA - Not Applicable; the statement does not pertain to the simulation activity performed.

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>NA</th>
<th>1</th>
<th>2</th>
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<tr>
<td>Objectives and Information</td>
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<tr>
<td>1. There was enough information provided at the beginning of the simulation to provide direction and encouragement.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
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<tr>
<td>2. I clearly understood the purpose and objectives of the simulation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
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<tr>
<td>3. The simulation provided enough information in a clear manner for me to problem-solve the situation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
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<tr>
<td>4. There was enough information provided to me during the simulation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
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<tr>
<td>5. The cases were appropriate and geared to promote my understanding.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<tr>
<td>Support</td>
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<tr>
<td>6. Support was offered in a timely manner.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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</tr>
<tr>
<td>7. My need for help was recognized.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<td>O5</td>
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<tr>
<td>8. I felt supported by the teacher's assistance during the simulation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<tr>
<td>9. I was supported in the learning process.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
</tr>
</tbody>
</table>

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Revised December 22, 2004
Simulation Design Scale (Student Version)

Use the following rating system when assessing the simulation design elements:
1 - Strongly Disagree with the statement  
2 - Disagree with the statement  
3 - Undecided - you neither agree or disagree with the statement  
4 - Agree with the statement  
5 - Strongly Agree with the statement  
NA - Not Applicable; the statement does not pertain to the simulation activity performed.

Rate each item based upon how important that item is to you.
1 - Not Important  
2 - Somewhat Important  
3 - Neutral  
4 - Important  
5 - Very Important

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<thead>
<tr>
<th>Item</th>
<th>1</th>
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<td><strong>Problem Solving</strong></td>
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<tr>
<td>10. Independent problem-solving was facilitated.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
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<td>O5</td>
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<tr>
<td>11. I was encouraged to explore all possibilities of the simulation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<td>O4</td>
<td>O5</td>
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<tr>
<td>12. The simulation was designed for my specific level of knowledge and skills.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
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<td>O5</td>
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<tr>
<td>13. The simulation allowed me the opportunity to prioritize nursing assessments and care.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<td>O4</td>
<td>O5</td>
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<tr>
<td>14. The simulation provided me an opportunity to goal set for my patient.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
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<tr>
<td><strong>Feedback/Guided Reflection</strong></td>
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<td>15. Feedback provided was constructive.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
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<tr>
<td>16. Feedback was provided in a timely manner.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
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<tr>
<td>17. The simulation allowed me to analyze my own behavior and actions.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
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<tr>
<td>18. There was an opportunity after the simulation to obtain guidance/feedback from the teacher in order to build knowledge to another level.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
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<tr>
<td><strong>Fidelity (Realism)</strong></td>
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<td>19. The scenario resembled a real-life situation.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
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<td>O5</td>
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<tr>
<td>20. Real life factors, situations, and variables were built into the simulation scenario.</td>
<td>O1</td>
<td>O2</td>
<td>O3</td>
<td>O4</td>
<td>O5</td>
<td>O NA</td>
<td>O1</td>
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<td>O5</td>
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</table>
Appendix I
CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: The Evaluation of Teaching the Nursing Process Using Traditional Lecture, Campus Laboratory, Clinical, and the Addition of High Fidelity Human Simulation (HFHS) Unfolding Scenarios

Advisor/INVESTIGATOR: Lynn Coletta Simko, PhD, RN, CCRN, Clinical Associate Professor, Duquesne University, School of Nursing 515 Fisher Hall, Pittsburgh, PA 15282 412-396-5096

Student-INVESTIGATOR: Ruth E. Irwin, PhD Candidate, RN Duquesne University, School of Nursing 1659 Ridge Road, Jeannette PA, 15644 W- 724-925-5987 H- 724-523-8272

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the Doctor of Philosophy in Nursing at Duquesne University.

PURPOSE: The researcher is interested in the most effective teaching methods to use with nursing students. You are being asked to participate in a research project that investigates the effects of teaching the nursing process using a High Fidelity Human Simulation (HFHS) unfolding scenario. You are enrolled in the NSG 111 Foundations of Nursing Care course. The normal components of this course include a nursing process examination and the Assessment Technology Institute (ATI) RN Fundamentals 2010 Assessment Form B. The ATI assessment tests your knowledge of fundamental concepts of nursing based on the criteria used by the National Council Licensure Examination (NCLEX) RN test map. The addition of a HFHS unfolding simulation scenario, which is videotaped, will be added to some of the campus labs for this course and will require a maximum of two hours of your time.

For this study, you are being asked to allow us to access the information you provided upon admission to the program, specifically, the National League for Nursing (NLN) Pre-Entrance RN examination and a demographic survey. The only requests being made of you is permission to include your information from these sources in the study. Participation in this study will not result in any additional test or surveys beyond those already provided as a student of the program enrolled in
this course. Course instructors will not have access to the analysis of this data. These are the only requests that will be asked of you.

**RISKS AND BENEFITS:** There are no known risks greater than those encountered in everyday life. There are also no direct benefits for you to participate other than the knowledge that the results of this study may contribute to the body of knowledge on HFHS and thus help other nursing students in the future.

**COMPENSATION:** There is no compensation for your participation in this study. However, participation in the project will require no time or monetary cost to you.

**CONFIDENTIALITY:** Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All written materials and consent forms will be stored in a locked file in the researcher's home. All data will be stored on password protected flash and hard drives. Your response(s) will only appear in statistical data summaries. All materials will be destroyed at the completion of the research and publication of the results.

**RIGHT TO WITHDRAW:** Participation in the educational activities of NSG 111 is a requirement of the course. You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time. Your grade in the course or progression in the program will not be affected by participating, not participating, or withdrawing from the study.

**SUMMARY OF RESULTS:** A summary of the results of this research will be supplied to you, at no cost, upon request.

**VOLUNTARY CONSENT:** I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. I am greater than 18 years of age. On these terms, I certify that I am willing to participate in this research project. I will receive a copy of this signed consent. I understand that should I have any further questions about my participation in this study, I may call Ruth E. Irwin, Co-Investigator at 724-925-5987, Dr. Lynn Coletta Simko, PhD, RN, Principal Investigator at 412-396-5096, and Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board, 412-396-1151.

Participant's Signature ___________________________ Date ________________

Researcher's Signature ___________________________ Date ________________
REFERENCES


doi: 10.2202/1548-923X.2035


doi: 10.1016/j.ecns.2009.07.005


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


doi: 10.3758/BRM.41.4.1149


doi: 10.1111/j.1365-2648.2010.05385.x
doi: 11097/mcc.06013e3282f1bb32


doi: 10.1016/S0002-9610(00)00302-0


doi: 10.1097/NCN0b013e3181ec2540

doi: 10.3928/01484834-20101130-03


doi: 10.1016/j.reln.2008.07.004


doi: 10.3928/00220124-20100701-02


doi: 10.2202/1548-923X.1603


doi: 10.3928/01484834-20091113-06


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