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UNIVERSITY OF MASSACHUSETTS WORCESTER

STUDENT NURSES' EXPERIENCE OF LEARNING WITH HUMAN PATIENT SIMULATION

By

Jay Kyle Ober

A DISSERTATION

Submitted to the Faculty
of the University of Massachusetts Worcester
in fulfillment of the requirements for
the degree of Doctor of Philosophy

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University of Massachusetts Worcester

Graduate School of Nursing

Student Nurses' Experience of Learning with Human Patient Simulation

A Dissertation Presented

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DEDICATION

This is dedicated to my mother, Elizabeth “Betsy” Ober, who, through her personal strength, courage and perseverance, put her children before herself allowing us the opportunity to achieve our dreams. It was because of your love and devotion that I pushed myself to achieve what I thought was impossible. Mom, thank you for convincing me to attend college, thank you for each word of encouragement and most importantly, thank you for believing in me.

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- Nilda “Nena” Peragallo, DrPH, for allowing me to build my dream and for her many contributions to my professional growth and success

- The School of Nursing and Health Studies students who participated in my study

ABSTRACT

STUDENT NURSES' EXPERIENCE OF LEARNING WITH HUMAN PATIENT SIMULATION

APRIL 2009

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Human patient simulation (HPS) has been used for over 40 years in medical education. A human patient simulator is a life-like, anatomically correct, computer driven mannequin with physiologic responses that mimic real patients. Since the introduction of computerized HPS in 2000, its use by medical and nursing students has grown exponentially. Approximately 500 nursing schools are using human patient simulators in nursing education. Researchers have suggested that using HPS can assist in reducing the gaps between theory and practice by improving critical thinking, decision making and patient outcomes. An increase in recognition of medical errors has dictated the need to improve education by allowing students and clinicians to learn in an environment that permits errors and do not put real patients in danger.

However, there is a dearth of research on the benefits, advantages and disadvantages of HPS as well as the learning experiences of students who used HPS in their nursing education. Therefore, the purpose of this qualitative study was to describe and analyze the learning experience of baccalaureate nursing students who used HPS during their education. Focus group interviews with HPS students were recorded and transcribed for content analysis in NVIVO, a qualitative analysis software program. The results of the analysis were categorized into four major themes: Structure, Environment, Instructor and Learning. The findings revealed that HPS students felt that structure was critical to optimize learning opportunities. Students wanted to be properly oriented to the environment of the HPS sessions, and they felt that the lack of realism of the simulators did not negatively affect their learning. Students wanted knowledgeable and competent instructors who had good interpersonal communication and interaction skills. Last, students expressed that there were benefits from acting as both the nurse and the observer during HPS. The opportunity to make mistakes without harming a patient and to experience different types of nurse-to-nurse reports were viewed as positive.

The findings of the study suggested that further research about student perceptions of HPS learning experiences could provide valuable information for educators and policymakers to improve the implementation of HPS in nursing and medical education.

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CHAPTER I

INTRODUCTION

Overview

Human patient simulation (HPS) has been used for over 40 years in medical education. Researchers have reported that HPS has improved team building, crisis management, critical thinking, decision making, and clinical skills (Feingold, Calaluce, & Kallen, 2004). Nursing embraced computerized HPS beginning in early 2000. However, in this short time, its adoption has grown exponentially. To illustrate, approximately 205 nursing programs use human patient simulators manufactured by Medical Education Technologies, Inc. (METI) and 80 are university based baccalaureate nursing students (BSN) programs (Dennis, D., personal communication, September 20, 2007). Approximately 500 nursing schools are using the Laerdal human patient simulator, SimMan, in nursing education (Manning, S., personal communication, October 1, 2007).

There are limited empirical data describing the benefits, advantages, and disadvantages of HPS as well as the learning experiences of students who used HPS in their nursing education. However, there are data suggesting students are enthusiastic about simulation learning and overall enjoy the experience (Bearnson & Wiker, 2005; Bremner, Aduddell, Bennett, & VanGeest, 2006; Feingold et al., 2004; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Robertson, 2006; Schoening, Sittner, & Todd, 2006). Despite the rapid increase in the use of HPS in nursing education, there have been few empirical studies that describe the experience of nursing students who use HPS during their education. Therefore, the purpose of this qualitative study was to describe and analyze the learning experience of baccalaureate nursing students who used HPS during their education.

Researchers have suggested that using HPS can assist in reducing the gaps between theory and practice by improving critical thinking, decision making and patient outcomes (Henneman & Cunningham, 2005; Morgan, Cleave-Hogg, DeSousa, & Lam-McCulloch, 2006). An increase in recognition of medical errors has dictated the need to improve education by allowing students and clinicians to learn in an environment that permits errors and do not put real patients in danger (Feingold et al., 2004; Henneman & Cunningham). The Institute of Medicine's (IOM) report on medical errors recommended the use of simulation to enhance behavioral, social and technical skills in medicine (Institute of Medicine, 2000). As a result, the number of human patient simulators has increased in health care education (Ziv, Wolpe, Small, & Glick, 2006).

Nurse educators play a key role in developing and preparing nursing students for safe clinical practice. This chapter presents the concept of simulation, the human patient simulator, and the evolution of HPS, including its use in medical and nursing education. The gaps in the empirical literature associated with HPS education are also identified.

Concept of Simulation

Simulation is defined as "the technique of imitating the behavior of some situations or process (weather, economic, military and mechanical) by means of a suitable analogous situation or apparatus, especially for the purpose of study or personnel training" (Bradley, 2006, p. 254). Learning through simulation has historical roots dating back to ancient Rome when soldiers prepared for war by using simulated figures of their opponents. Throughout history, simulation has transformed into a new learning method that has influenced training and education of nuclear power plant operators, airplane pilots, military personnel, businesspersons, and educators (Bradley; Issenberg et al., 1999; Salas, Wilson, Burke, & Priest, 2005). Simulation has been used in medical education since the 16th century, beginning with efforts to reduce maternal and

infant mortality by teaching obstetrics using simulators, which were known as “phantoms” (Ziv et al., 2006, p. 252). The use of simulation allows the educator to reproduce a realistic environment that places students in various situations where they must apply knowledge, refine technical skills, and make decisions. The simulated learning environment creates a virtual reality by requiring responses and interventions. Regardless of the decisions made and actions taken by the student, no harm can be done to a structure, individual, population, or society.

Simulation has been used to improve safety and reduce errors while offering a realistic, cost effective and safe environment for students to learn and demonstrate competencies needed for their jobs (Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005; Salas et al., 2005). Simulation allows for creation and progression of complexity in clinical situations. It also affords the opportunity to learn when practice with real patients is hampered by the number of students requiring the experience, the available opportunities and patient safety concerns (Black et al., 2006; Morgan et al., 2006; Takayesu et al., 2006; Wayne, Barsuk, & McGaghie, 2007). Learning through simulations can occur in a variety of environments and through the use of different types of simulators. For the purpose of this study, a human patient simulator was defined as a computer driven mannequin with physiologic responses that mimic real patients.

The Human Patient Simulator

One of the primary purposes of using a human patient simulator is to introduce the student to a clinical situation in which they assess a patient, make decisions, implement interventions and evaluate outcomes in a realistic environment (Feingold et al., 2004; Wayne et al, 2005). Any error made by a student related to assessment, decision making, or an intervention is a learning opportunity without consequence to a real patient.

Cooper and Taqueti (2004) defined a simulator as a "physical object or representation of the full or part task to be replicated" (p. 11). A human patient simulator is a life-like, anatomically correct, computer driven mannequin with physiologic responses that mimic real patients. Human patient simulators have realistic palpable pulses, audible blood pressure sounds (or Korotkoff sounds), respirations, lung sounds, heart sounds, pupil responses, hemodynamic rhythms, and body fluids, such as simulated blood, saliva, tears, and urine. Students interview and assess the patient by asking questions and performing physical exams during the HPS experience. When asked questions, the simulator answers with a voice that is produced from speakers located within the mannequin. Voices are either prerecorded or sent to the simulator from an instructor using a microphone connected to the simulator's computer. When interventions are performed by the student, the mannequin responds appropriately with hemodynamic and physiological changes similar to that of a human patient. Decisions made by the student, to intervene or not, influence the progression of the clinical scenario and the final clinical outcome for the human patient simulator (Haskvitz & Koop, 2004; Peteani, 2004; Seropian, Brown, Gavilanes, & Driggers, 2003; Yaeger et al., 2004).

Evolution of the Human Patient Simulator

The first human patient simulator can be traced back to the 1960s, when Asmund Laerdal developed Resusci-Anne, a mannequin used to teach mouth-to-mouth resuscitation (Grenvik & Schaefer, 2004). Resusci-Anne was later redesigned with a spring-loaded mechanism to allow closed chest compressions. With the combination of airway and cardiac abilities, Resusci-Anne became the most widely used human patient simulator for cardiopulmonary resuscitation (CPR) training (Cooper & Taqueti, 2004; Grenvik & Schaefer).

The first computer controlled human patient simulator, Sim One, was introduced in the late-1960s (Cooper & Taqueti, 2004). Sim One featured functionally and anatomically correct body parts such as blinking eyes, dilating and constricting pupils, a moving jaw, and respiratory chest movements. Sim One was used to train anesthesiologists to intubate, and to perform early experiments on responses to anesthesia procedures. The computer technology was too expensive to be sold commercially, and the narrow functionality and limited abilities of Sim One failed to create a significant demand for its continued production (Cooper & Taqueti).

Harvey, the Cardiology Patient Simulator, is an adult sized mannequin that simulates over 20 cardiac conditions, and was made available in late 1968 (Issenberg, Gordon, Gordon, Safford, & Hart, 2001). Harvey has grown in popularity and is currently used by medicine and nursing training programs to improve recognition of abnormal cardiac and pulmonary assessment findings (Cooper & Taqueti, 2004; Issenberg et al.).

To improve patient safety in anesthesia, the Case System was introduced in 1987. It was the first realistic, full body, human patient simulator developed to study human performance for anesthesiologists (Cooper & Taqueti, 2004). By integrating mathematical physiological models, waveform generators and the latest in computing technology, the Case System permitted the replication of realistic patient cases. This allowed clinicians to practice caring for patients with complex medical situations without putting actual patients at risk (Cooper & Taqueti).

Using the advancements in computer technology and building on early human patient simulators, a more advanced human patient simulator was developed in 1989 that used mathematical models to emulate physiologic and pharmacologic responses to anesthesia (Cooper & Taqueti, 2004). One model was called the Anesthesia Simulator Recorder. Although not a

full body human patient simulator, this computer screen based simulator contributed to the further development of increasingly realistic HPS (Cooper & Taqueti).

Around the same time that the Case System was being developed and introduced, the Gainesville Anesthesia Simulator (GAS) was made available (Cooper & Taqueti, 2004). The GAS had a sophisticated lung that recognized anesthetic gases and responded appropriately to settings that were either predefined or manually adjusted by the trainer during the simulation exercise. The success of this simulator influenced the formation of a new company, Medical Education Technologies (METI), which further developed the GAS into what is now known as the Human Patient Simulator (Cooper & Taqueti).

The high cost ($210,000) of the Human Patient Simulator led to the development of a more affordable patient simulator in the mid 1990s by Medical Plastics Lab (Cooper & Taqueti, 2004). Laerdal Medical Corporation acquired Medical Plastics Lab and finished the development and production of what is now known as SimMan. Shortly thereafter, METI introduced the adult Emergency Care Simulator (ECS), a low-cost human patient simulator. At a cost of approximately $40,000, the low-cost, full body patient simulators (SimMan and ECS) provide an affordable alternative to the more expensive human patient simulators previously available (Cooper & Taqueti). In 1999, Gaumard Scientific developed Noelle, a full body replica of a pregnant female that also doubles as a birthing simulator. Noelle presents various stages of labor, complications, and delivery of a baby. The delivered baby also becomes a simulator for which the health care clinician or student must provide appropriate interventions (Robertson, 2006).

With the advancement and improvement of computer technology, reduced cost, and the initiatives set forth by the IOM, human patient simulators are being purchased by health care

institutions to improve clinical performance (Seropian et al., 2004), minimize the gap between theory and practice (Henneman & Cunningham, 2005; Ronen & Eliahu, 2000), and reduce medical and nursing errors (Paparella, Mariani, Layton, & Carpenter, 2004). Nursing educators are attempting to integrate HPS into nursing education by using data available from medicine. Consequently, nurse researchers have identified major gaps in the empirical evidence about how to guide the successful use of HPS in nursing education (Bremner et al., 2006).

Current Uses of Human Patient Simulation in Nursing Education

The use of HPS in nursing education has increased over the past several years (Seropian et al., 2004). Human patient simulation has been used for the education of hospital nursing personnel during orientation, annual assessment of nursing competencies, remediation in education (Haskvitz & Koop, 2004), new graduate registered nurse orientation (Beyea, von Reyn, & Slattery, 2007), acute care/critical care nursing (Comer, 2005; Henneman & Cunningham, 2005; Parr & Sweeney, 2006), care of the cardiac surgical patient (Rauen, 2004) and neonatal nursing (Yaeger et al., 2004). Nationally, many associate, baccalaureate and graduate degree nursing programs have purchased human patient simulators in an effort to improve student critical thinking, decision making, confidence, communication, and transfer of knowledge to the actual clinical setting (Medley & Horne, 2005).

Descriptive studies have been published over the past several years about the use of HPS in nursing. Furthermore, there is limited data from the student perspective that describes the 'student experience' of learning through the use of HPS, and what components and teaching strategies best contribute to the learning experience. Following is a synthesized review of the literature about the use of HPS in health care education.

Review of the Literature

Much of the research evaluating HPS is from medical education, specifically anesthesia. This section will first review the medical literature with a focus on the use of HPS in the education of medical students, physicians, and multidisciplinary teams, and conclude with a review of the limited literature specific to the use of HPS in nursing education.

For the purpose of this study, the literature search was carried out using the research databases PUBMED, MEDLINE, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The search was restricted to English language items for pragmatic purposes, and initially only research publications during the period of 2000-2007 were reviewed to ensure currency. Due to limited findings, the search was expanded to 1965-2007 to allow review of the seminal work in human patient simulation. Key words used to identify relevant sources were:

1. Simulation
2. Human patient simulation
3. Human patient simulator
4. Patient simulation
5. Nursing simulation
6. Medical simulation

In addition, the reference lists of the articles reviewed were checked to see if they cited references not identified by the electronic searches. For the purpose of the review of the literature, the author utilized a self-developed checklist to evaluate the articles retrieved. Articles were retained for further review if they utilized a full size human patient simulator as an educational or evaluation tool for medical students, residents, nurses, or interdisciplinary health

care teams. Last, only articles that contained some form of qualitative response from participants discussing students' perception or experiences were included in the final review.

Using these criteria, a total of 1,244 articles were retrieved that had the term "simulation" associated with the title. To narrow the search, only articles that had the terms "human patient simulation" or "human patient simulator" within the body of the research articles were retained for further review. After refining the search, 60 articles were located. Although the titles initially seemed relevant, after reading the abstracts, 20 were selected for review.

In the integrative research review, major limitations for most studies were: limited sample size (*N* = 16 to 165), lack of theory, framework or teaching methods to guide the use of HPS, lack of a standardized framework for simulation implementation, and a lack of inclusion of the experience of nursing students about HPS. The review is organized as follows: sample, instrumentation, results, and students perception of the HPS experience.

Human Patient Simulation in Medical Education

Sample

Based on the articles selected for review, sample sizes varied greatly (*N* = 16-165). Morgan et al. (2003) reported the largest sample (*N* = 165), and the remaining studies reported on samples of *N* = <130. Only one study provided a priori sample estimation and power analysis (Yee et al., 2005). See Table 1 for sample sizes in studies using human patient simulation in medical education.

Table 1

Sample Size in Studies using Human Patient Simulation in Medical Education

Author	Year	Sample Size
Hammond et al.	2002	16
Yee et al.	2005	20
Gordon et al.	2001	27
Murray et al.	2004	28
Holcomb et al.	2002	30
Wayne et al.	2005	38
Mayo et al.	2004	50
McMahon et al.	2005	71
Takayesu et al.	2006	95
Schwid et al.	2002	99
DeVita et al.	2005	138
Morgan et al.	2003	165

Methodological Designs and Framework

Of the 12 studies selected, 10 utilized quantitative methods and 3 used qualitative methods. Three of the studies reported the use of a framework to guide their studies (McMahon, Monaghan, Falchuk, Gordon, & Alexander, 2005; Wayne et al., 2005; Wayne et al., 2007). McMahon (2005) applied a general curricular framework with internal medicine clerkship students. Wayne et al. (2005) used a deliberate practice model that provided the students the opportunity to practice, receive feedback on their performance and be shown the correct way to

successfully meet the set learning objectives. In a second study by Wayne et al., the researchers applied a mastery learning model in the study of residents using a human patient simulator.

Instrumentation

Several factors must be taken into account to effectively evaluate the performance of participants during a simulation as part of a research study. Many researchers have used checklists or individually developed grading rubrics to evaluate performance during a HPS experience. It is imperative that the instruments used in research measure what they are designed to measure. Instrument developers must ensure that the assessment instrument is aligned with the desired outcomes and learning opportunities.

Nine out of the 12 studies included a description of how they measured their participants' use of HPS (DeVita, Schaerfer, Lutz, Dongilli, & Wang, 2004; Hammond, Bermann, Chen, & Kushins, 2002; Holcomb et al., 2002; Mayo, Hackney, Mueck, Ribaudo, & Schneider, 2004; Morgan, Cleave-Hogg, Desousa, & Tarshis, 2003; Murray et al., 2004; Schwid et al., 2002; Wayne et al., 2005; Yee et al., 2005). The measures included Likert-type scales and checklists of student performance (DeVita et al.; Hammond et al.; Holcomb et al.; Mayo et al.; Murray et al.; Schwid et al.; Wayne et al.; Yee et al.). Five provided detailed components of the instrument (Holcomb et al; Mayo et al.; Murray et al.; Schwid et al.; Yee et al.), but only two provided the instrument for review (Holcomb et al.; Schwid et al.). Three studies reported psychometric testing of the instruments used for their research (Murray et al.; Schwid et al.; Wayne et al.). Schwid et al. reported that construct validity was demonstrated by improvement of simulation scores with level of training (e.g., level 1 residents = mean score 36.0 +/- 12; level 4 residents = mean score 57.9 +/- 12). They also reported that low criterion validity was established by

comparing the simulator scores with faculty evaluation (r = 0.37-0.41) and mock oral board examinations (r = 0.44-0.47).

Murray et al. (2004) reported that their scoring system had construct validity because the system differentiated between junior (n = 12) and senior residents (n = 16). The senior residents (overall score = 54.3 +/- 7.3) outperformed the junior residents group (overall score = 48.1 +/- 11.3).

Study Results

Twelve studies were found that used HPS in the education of medical students, physicians and military medical teams. One of the studies reported on an evaluation of the instruments used to rate participant performance (Holcomb et al., 2002). The other 11 studies reported on participant performance during HPS. Multiple healthcare team members were evaluated in the 12 studies. These included: surgical residents (Hammond et al., 2002), military trauma team (Holcomb et al.), residents (Wayne et al., 2005) internal medicine interns (Mayo et al., 2004), medical students (Gordon et al., 2001; McMahon, Monaghan, Falchuk, Gordon, & Alexander, 2005; Morgan et al., 2003), anesthesiology residents (Schwid et al., 2002; Murray et al., 2004; Yee et al., 2005) and multidisciplinary crisis team members (DeVita et al., 2004; Holcomb et al.).

One of the 12 studies used HPS to assess participant deficiencies and evaluated the effectiveness of didactic course content (Hammond et al., 2002). Hammond et al. indicated that HPS could be used to identify human error and provide follow-up remediation during a simulation experience (N = 16). Data collected during the simulation could be used further to refine the course curriculum and improve the overall quality of the learning program.

Two studies were multidisciplinary (DeVita et al., 2004; Holcomb et al., 2002). DeVita et al. focused on crisis resource management of a multidisciplinary team (critical care nurses [n = 69],

respiratory therapists [n = 21] and physicians [n = 48]) that participated in five simulated scenarios (ventricular tachycardia, acute myocardial infarction, morphine overdose, acute stroke, and ventricular fibrillation). They reported that after three simulations, a group of 10 clinicians demonstrated statistically significant improvement in completion of tasks associated with the simulation case (Kendall's W, 0.91; $p < .001$). Holcomb et al. focused on performance of physicians, nurses and medics (N = 30) after completing a formal trauma course. They did not break down the sample size per discipline. They used two standardized trauma scenarios to evaluate trauma teams at the start and again at the completion of their trauma course. The study groups also were compared against a control group, teams of expert trauma surgeons and nurses (N = 5). Their performance was measured by a Human Performance Assessment Tool that included eight timed and five scored tasks. Results showed that the ten military teams demonstrated significant improvement in the five-scored items (Wilcoxon test 4 out of 5; $p < 0.05$) and timed items (6 out of 8; $p < 0.05$) at the completion of the trauma course. The study groups' scores were initially worse than the expert group in all areas, but their final scores were only lower than the expert group in 2 of the 13 categories. Holcomb et al. demonstrated that HPS could be used to evaluate performance in a reproducible manner, as well as to document improvement of the study participants when compared to an expert group.

Mayo et al. (2004) studied the ability of internal medicine interns (N = 50) to competently manage emergency airways. Groups received immediate training (N = 20), delayed training (N= 20) and no-training (N = 10). The initial performance of all participants was consistent with an actual case that resulted in negligent homicide charges. The investigators noted that participant performance during an anaphylaxis simulation experience improved by only 10% after using patient simulation for both immediate and delayed training groups. There were low correlations

of performance scores from one HPS experience with faculty trauma course evaluations (r = 0.37-.041, $p < 0.01$), mock oral boards at completion of the trauma course (r = 0.44-0.49, $p <$ 0.01), and written exams at the completion of the trauma course (r = 0.44-0.49, $p < 0.01$). The correlations may have been low because the students had only one exposure to HPS. Mayo et al. concluded that there was a statistically significant difference between the study and control groups at the 4 week evaluation point. The immediate training (IT) group scored significantly better than the delayed training (DT) group on initial airway management (80% vs. 0%, $p <$ 0.001). When tested at week 4, the no training (NTI) group had similar scores as the IT and DT groups during their initial evaluation period at week 1. Ten months following the training program, investigators reported that 41 out of the 50 interns who received the training were involved in actual clinical situations that required airway management and they performed 91-100% correctly. Nine were not observed.

Wayne et al. (2005) studied the ACLS clinical skills of second-year residents (n = 38) after participating in a simulation-based educational intervention. The study design was a randomized controlled trial with a wait-list control group with crossover. The participants were randomized into one of two groups (Group A or Group B). Both groups completed a baseline test prior to the intervention. Group A completed four 2-hour HPS sessions while Group B waited 3 months prior to participating in the HPS sessions. Both groups were given a second test prior to the crossover. After Group B completed the HPS session, a third test was given 3 months later. Participants were evaluated using a skill checklists created by the researchers.

Checklist score reliability was estimated by both inter-rater reliability, using Kappa (κ) coefficient, and by Cronbach's Alpha (α) coefficient. The participant ACLS performance checklist was compared with participant USMLE scores Steps 1 and 2 by using Pearson

correlations. The intervention versus wait-list control group differences at each testing interval were analyzed using independent samples t tests.

Wayne et al. (2005) reported no association between ACLS scenario performance and USMLE Step 1 and 2 scores (median correlation = -0.05). Group A (M = 192.8, SD = 42.4) and Group B (M = 190.7, SD = 24.9) did not differ significantly (t [36] = -0.19, ns). After the first simulation intervention, ACLS performance for Group A (M = 265.6, SD = 9.5) was 38% higher than the total score for the wait-list control Group B (M = 192.5, SD = 35.9) which demonstrated a highly significant difference (t [36] = -8.58, $p < 0.0001$). Following the crossover, the total ACLS scores for Group A (M = 256.15, SD = 20.28) and Group B (M = 268.98, SD = 12.63) were very similar yet significantly different on statistical grounds (t [36] = 2.34, $p < 0.05$).

Students Perceptions of the Human Patient Simulation Experience

Three of the 12 studies reviewed used a qualitative design specifically examining the students' perceptions of the use of HPS in their education (Gordon, Wilkerson, Shaffer, & Armstrong, 2001; McMahon et al., 2005; Takayesu et al., 2006). Takayesu et al. studied medical students and physician assistant students (N = 95) using a human patient simulator to replicate a clinical encounter (respiratory failure, myocardial infarction, or multisystem trauma). Participants were asked to write about the strengths and weaknesses of learning with HPS. The investigators coded the data into categories resulting in six themes. The qualitative method was not described. The theme of 'knowledge and curriculum' referred to the opportunity for clinical learning. 'Applied cognition and critical thought' reflected the opportunities for decision making and learning by doing. 'Teamwork and communication' represented the participation and interaction as a team. 'Procedural/hands-on skills' refers to the technical practice afforded by simulation. 'Teaching/learning environment' represented the realism of the experience.

‘Suggestions for use in medical education’ was largely a recommendation for more simulation. The participants described their overall experience as positive. The researchers did not seek clarification of the themes by member checks nor were they able to ask additional questions based on responses from the participants. Table 2 shows categories of commentary that emerged from the free text analysis of the student’s reactions to high fidelity patient simulation. These data reflects the strengths of high-fidelity patient simulation.

Table 2

Categories of Commentary Emerging from Free Text Analysis of Student Reactions to High-Fidelity Patient Simulation (N = 95 students). (Takayesu et al., 2006)

Qualitative Comment Groupings	Students % (No.)
KNOWLEDGE & CURRICULUM	35 (33)
Self-assessment/clarification/confidence in knowledge	14 (13)
Recall and memory	13 (12)
Basic science learning	4 (4)
Clinical topics/framework	9 (9)
Motivate further study	3 (3)
APPLIED COGNITION & CRITICAL THOUGHT	53 (50)
Make decisions	17 (16)
Thinking quickly/on feet/expose to firsthand clinical reasoning	26 (25)
Integrate/apply concepts	11 (10)
Learning by doing	5 (5)
Sometimes only way to learn something	1 (1)
TEAMWORK & COMMUNICATION	12 (11)
Teamwork	9 (9)
Communication	2 (2)
PROCEDURAL/HANDS-ON SKILLS	12 (11)
Hands on	7 (7)
Procedural	4 (4)

Table 2 *(continued)*

Categories of Commentary Emerging from Free Text Analysis of Student Reactions to High-Fidelity Patient Simulation (N = 95 students). (Takayesu et al., 2006)

Qualitative Comment Groupings	Students % (No.)
TEACHING/LEARNING ENVIRONMENT	80 (76)
Realistic/clinical reality	39 (37)
Interactive	3 (3)
Risk free/safe	6 (6)
Emotional/stressful	11 (10)
Format/logistics	19 (18)
Quality of instructors	9 (9)
Debriefing/discussion and feedback	15 (14)
Other/general comments/superlatives/criticism	17 (16)
SUGGESTIONS FOR USE/PLACE IN UNDERGRAD MED ED	22 (21)
Mandatory/more frequent	16 (15)
Prerequiring coursework for simulation	4 (4)
Other/general use as a learning/assessment tool	5 (5)

McMahon et al. (2005) studied 3rd-year Internal Medicine students' (*N* = 90) experience using HPS as a learning method. Three questionnaires were used to assess the HPS learning experience. Each participant completed an entry questionnaire prior to the start of the HPS experience. The entry questionnaire asked participants about their preparation prior to the HPS session and questioned their prior exposure to real critical events that were similar to the planned

HPS cases. The exit questionnaire asked participants about their overall experience learning with HPS, the perceived utility and desire for future HPS experiences. A third questionnaire was completed by the last consecutive students who completed the HPS experience (*N* = 29). The third questionnaire asked the participants to compare and interpret their prior clinical and didactic learning with their HPS experience. Analysis of the qualitative comments identified common themes related to the participants experience with HPS. Of the 130 comments, 9 (7%) requested additional written or didactic material, 9 (7%) technical matters (specific issues not identified by the authors), 18 (14%) ideas for improvement (requested weekly sessions to help connect classroom lecture with ward practice and receive handouts providing students with a summary of concepts at the end of each HPS), 24 (18%) requested more time with the simulator, and 44 (34%) were related to teaching style. No further delineation or description of these categories was provided. Twenty- six (20%) additional comments were made that were classified as nonspecific and general in nature. Participants rated their overall experience with HPS as excellent (87.8%) and a useful learning exercise (100%). Table 3 shows questionnaire responses from the participants.

Table 3

Questionnaire Responses of 90 3rd-Year Internal Medicine Students Who Participated in the Simulator-Based Curriculum, Harvard Medical School, Boston, Massachusetts, 2002-03. (McMahon et al., 2005)

Statement	Students % (No.)	
Medical student's perception of the simulator exercise		
Useful	100	(90)
Note useful	0	(0)
Rating of overall quality of the simulator learning experience		
Excellent	87.8	(79)
Very good	11.1	(10)
Average	1.1	(1)
Poor	0	(0)
Routine use of this curriculum in the internal medicine clerkship recommended by the students		
Yes	94.4	(85)
Maybe	5.6	(5)
No	0	(0)

Table 3 *(continued)*

Questionnaire Responses of 90 3rd-Year Internal Medicine Students Who Participated in the Simulator-Based Curriculum, Harvard Medical School, Boston, Massachusetts, 2002-03. (McMahon et al., 2005)

Statement	Students % (No.)
Number of learning sessions utilizing this curriculum format desired by medical students during their three-month internal medicine clerkship	
0	0 (0)
1	2.2 (2)
2	30.0 (27)
3	38.8 (35)
>3	28.8 (26)

Gordon et al. (2001) studied the experiences of third and fourth year emergency medical students (*N* = 27) and medical educators (*N* = 33) who participated in a HPS experience. After completing two HPS sessions, the medical students rated their experience as excellent (85%) and suggested that HPS should be a mandatory part of medical curriculum (89%). Additional comments made by the students are displayed in Table 4. The medical educators rated the experience as very good to excellent (89%) and indicated that HPS should be a mandatory part of medical curriculum (85%). Table 5 displays additional comments made by the medical educators.

Table 4

Responses of 27 Medical Students to their Experience with a High-Fidelity Patient Simulator, 1999. (Gordon et al., 2001)

Qualitative Comment Groupings	Students % (No.)
Overall assessment	*48 (13)*
Generally good experience	41 (11)
Generally useful experience	11 (3)
Process descriptors	*59 (16)*
Realistic experience	30 (8)
Impact of pressured environment	19 (5)
General process comments	19 (5)
Limitations of scenario	11 (3)
Personalization or other statements	4 (1)
Teaching utility	*30 (8)*
Good teaching or learning tool	30 (8)
Pedagogic efficacy	*63 (17)*
Practice	37 (10)
Opportunity for active learning	22 (6)
Promote critical thinking	7 (2)
Confidence building	7 (2)
Fills void in curriculum	4 (1)

Table 4 *(continued)*

Responses of 27 Medical Students to their Experience with a High-Fidelity Patient Simulator, 1999. (Gordon et al., 2001)

Qualitative Comment Groupings	Students % (No.)
Goals for future use	*48 (13)*
More exposure desired	19 (5)
Bridge between preclinical and clinical	15 (4)
Testing vehicle	11 (3)
Practice for internship	7 (2)
Format suggestions	7 (2)
Make it mandatory	7 (2)

Table 5

Responses of 32 Medical Educators to their Experience with a High-Fidelity Patient Simulator, 1999. (Gordon et al., 2001)

Qualitative Comment Groupings	Educators % (No.)
Overall assessment	*38 (12)*
Generally good experience	38 (12)
Process descriptors	*56 (18)*
Realistic experience	38 (12)
General process comments or limitations	19 (6)
Not a realistic experience	6 (2)
Personalization or other statements	6 (2)
Teaching utility	*50 (16)*
Address breadth of issues (problem solving, teamwork)	13 (4)
High potential as broad education tool	9 (3)
Should be part of our institution or curriculum	9 (3)
Good for emergency or acute care training	9 (3)
Best for students or practitioners?	9 (3)
Good testing or evaluation tool	3 (1)
Pedagogic efficacy	*6 (2)*
Promote enhanced memory-retention	6 (2)

Table 5 *(continued)*

Responses of 32 Medical Educators to their Experience with a High-Fidelity Patient Simulator, 1999. (Gordon et al., 2001)

Qualitative Comment Groupings	Educators % (No.)
Goals for future use	*84 (27)*
Clinical science teaching	44 (14)
Realistic practice sessions	25 (8)
Part of overall teaching and evaluation	19 (6)
Basic science teaching	16 (5)
Critical thinking exercises	9 (3)
Teamwork exercises	6 (2)

Human Patient Simulation in Nursing

Sample

In review of the nursing studies about HPS, sample sizes were small, ranging from 12–65. One study did not report a sample size (Bearnson & Wiker, 2005). All of the participants in the studies were baccalaureate nursing students in university settings. See Table 6 for sample size of human patient simulation in nursing education.

Table 6

Sample Size of Human Patient Simulation in Nursing Education

Author	Year	Sample Size
Bearnson et al.	2005	Not Reported
Radhakrishnan et al.	2005	12
Robertson et al.	2006	20
Rhodes et al.	2005	21
Parr et al.	2006	21
Bremner et al.	2006	56
Schoening et al.	2006	60
Feingold et al.	2004	65

Methodological Designs and Framework

Of the eight studies found, all used quantitative methods (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold et al., 2004; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Radhakrishnan, Roche, & Cunningham, 2007; Robertson, 2006; Schoening, Sittner, & Todd, 2006). Only one of the eight studies reviewed identified the use of a framework to guide the study (Schoening et al.). Schoening et al. described the use of Joyce and Weil's four-phase teaching model for simulation. This model is a four phase simulation learning model that represents seven major outcomes including: concepts and skills, critical thinking and decision making, empathy, knowledge of political and economic systems, awareness of the role of chance, facing consequences and sense of effectiveness (Joyce & Weil, 2003; Schoening et al.). Schoening et al. supported Joyce and Weil's model by identifying the themes of skill,

confidence, critical thinking and decision making, realism, transferability and communication for nursing students during HPS.

Instrumentation

Seven of the eight studies used evaluation instruments with Likert-type scales that were developed by the authors (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold, 2004; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Robertson, 2006; Schoening et al., 2006). Of the seven studies that used a Likert-type instrument, four of the studies also included open-ended questions allowing students to provide additional information (Bearnson & Wiker; Bremner et al.; Robertson; Schoening et al.). Two studies provided the instrument for review (Parr & Sweeney, 2006; Radhakrishnan et al., 2007). Psychometric testing of the instruments was not reported in any of the studies. Radhakrishnan et al. used a research designed checklist for the purposes of evaluating student performance.

Study Results

Of the 8 studies reviewed, 6 stated the purpose was to evaluate the students' perceptions of the use of HPS during specific cases studies (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold, 2004; Parr & Sweeney, 2006; Robertson, 2006; Schoening et al., 2006). One study focused on evaluating the effects of HPS on the clinical performance (Radhakrishnan et al., 2007) and one on improving critical thinking and clinical judgment skills for the care of patients' with complex nursing situations (Rhodes & Curran, 2005).

The results from the eight studies noted that HPS contributed to critical thinking, decision making, transferability, student confidence, and realism. Overall, students reported that they enjoyed their HPS experiences.

Critical thinking. Of the eight studies reviewed, four reported that HPS allowed students to exercise critical thinking skills (Bearnson & Wiker, 2005; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Schoening et al., 2006). Only one article briefly mentioned that students commented that they used critical thinking skills during the simulation, but the authors did not elaborate on specifics nor did they describe how the students defined critical thinking (Rhodes & Curran). Parr and Sweeney suggested that a lack of critical thinking was demonstrated by students when they failed to request information necessary for assessment during HPS. In contrast, Schoening et al. reported students used critical thinking skills to make decisions as the simulation scenario progressed. Bremner et al. (2006) stated that students demonstrated critical thinking skills, but they did not report how they measured critical thinking. Another study reported that students stated they used critical thinking to develop a plan of care during the simulation (Bearnson & Wiker).

Decision-making. Four studies reported that using HPS improved decision making skills of nursing students (Feingold et al., 2004; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Schoening et al., 2006). Parr and Sweeney said that students made decisions based on the data they received, but did not mention whether the decisions were made correctly, how they were influenced, or how a decision was defined. Feingold et al. and Schoening et al. stated that students mentioned that they used decision making skills, but did not elaborate on how or what contributed to decision making opportunities. Bremner et al. (2006) stated that the survey they used would demonstrate decision making skills, but did not report results or mention how and if students reported differences in decision making skills through the use of HPS.

Transferability. Schoening et al. (2006) reported that students suggested using HPS allowed them to put all of the pieces together when caring for the simulated patient. Students said that

they did not always have the opportunity to ‘put the pieces’ together in the real clinical setting. The students expressed that using HPS would make them better nurses at the actual bedside. Feingold et al. (2004) reported that 55% (*N* = 35) of the students felt that simulation prepared them to function in a real clinical setting. Bremner et al. (2006) reported that 42% (*N* = 23) of the students in their study stated that simulation reduced some stress associated with the first clinical day with real patients. Bearnson and Wiker (2005) reported that students drew on previous simulation experience when engaging in a new simulation case, but did not report if students felt that their experience with HPS would transfer to the actual clinical setting.

Confidence. Students reported that learning through HPS improved their confidence (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold et al., 2004; Schoening et al., 2006). Feingold et al. reported that 47% (*N* = 30) of the students indicated that HPS increased their confidence. Bearnson & Wiker reported an increase in students’ confidence in medication administration, and Schoening et al. reported student confidence increased with hands-on-skills.

Realism. Four of the eight studies reviewed reported that students perceived the simulation experience as realistic. Robertson (2006) reported that students perceived the simulated learning experience as realistic, because they had to respond as they would in a real situation and that the scenario was true to life. They did not report the number or percentage of students. Feingold et al. (2004) reported that the majority of students perceived the setting (*N* = 73; 76.2%), pace and flow of the scenario (*N* = 70; 73.0%), and the human patient simulator as realistic (*N* = 62; 64.1%), when compared to a real human patient. Bremner et al. (2006) reported that (*N* = 10; 24%) of the students provided positive comments on the realism of the HPS experience, and only (*N* = 1; 2%) felt the simulator was not realistic because it could not smile. Rhodes and Curran

(2005) commented that students reported that it was difficult to treat the human patient simulator as a real person despite the simulation scenario being realistic.

Reaction to the simulation experience. Of the eight research studies reviewed, seven studies indicated that students rated their overall simulation experience as positive (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold et al., 2004; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Robertson, 2006; Schoening et al., 2006). Only one study did not report the students' ratings of the experience (Radhakrishnan et al., 2007).

Gaps in the Literature

In general, there are significant gaps in the literature pertaining to the use of HPS in nursing education. Research is virtually nonexistent in the areas about how nursing knowledge is learned with HPS or how educators can blend HPS with other different learning methods to most effectively address desired learning outcomes. Last, and perhaps most importantly, there is no research describing the nursing students' overall experience of learning with HPS. In the articles reviewed, the authors identified gaps in current knowledge about the use of HPS in nursing education. These gaps include transfer of learning and comparison between traditional teaching methods and HPS.

Transfer of Learning

Feingold et al. (2004) reported that 44% of the students (N = 28) did not feel learning through HPS could prepare them for a real clinical experience. The authors recommended further research to explore why some students do not feel that HPS prepares them for real clinical practice. In a study done by Bearnson and Wiker (2005), the authors suggested that since only intravenous medications could be given to a human patient simulator that some realism is lost.

Parr and Sweeney (2006) recommended the collection of sociodemographic data about students' characteristics in order to examine which students benefit the most from HPS.

Comparison between Traditional Teaching Methods and Human Patient Simulation

Rhodes and Curran (2005) noted a gap in measuring and comparing nursing knowledge between HPS and traditional lecture based learning. Schoening et al. (2004) suggested additional research be conducted in skill mastery and transferability to compare traditional lecture and problem based learning with HPS.

Evaluation of Learning through Human Patient Simulation

The lack of a pretest and posttest design prevented measuring what the students learned related to technical skills with the HPS experience (Rhodes & Curran, 2005). Feingold et al. (2004) did not compare course grades with the students' HPS performance so it is not known whether HPS influenced knowledge acquisition. The use of investigator-developed questionnaires without testing for validity and reliability may have resulted in measurement error (Bearnson & Wiker, 2005; Bremner et al., 2006; Feingold et al.; Parr & Sweeney, 2006; Rhodes & Curran; Radhakrishnan et al., 2007; Robertson, 2006; Schoening et al., 2006).

In summary, medical researchers have provided evidence that HPS experiences have improved decision making (DeVita et al., 2004; Hammond et al., 2002; Holcomb et al., 2002; Mayo et al., 2004; McMahon et al., 2005; Morgan et al., 2003; Murray et al., 2004; Schwid et al., 2002; Wayne et al., 2005; Yee et al., 2005), retention of learning (McMahon et al; Wayne et al.), and transference to clinical practice (Holcomb et al.; Wayne et al.). These studies have been based on a framework tied to curricula (McMahon et al.; Wayne et al.), learning theories (McMahon et al.; Wayne et al.), or concepts of deliberate practice (Wayne et al.). Furthermore,

medical researchers have researched medical students' perceptions and experiences related to the use of HPS.

Nursing researchers have suggested that HPS improves critical thinking (Bearnson & Wiker, 2005; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Schoening et al., 2006), decision making (Feingold et al., 2004; Parr & Sweeney; Rhodes & Curran; Schoening et al.), transfer of learning (Bremner et al., 2006; Feingold et al.; Schoening et al.), and confidence (Bearnson & Wiker; Bremner et al; Feingold et al; Schoening et al.) based on studies that used small sample sizes. In addition, nursing researchers lacked the use of an empirically based framework to guide the development, implementation, and evaluation of HPS experiences. Nursing researchers have studied HPS experiences using a variety of HPS case studies, implementation techniques, and evaluation criteria. The lack of use of an empirically supported framework based on learning theories has resulted in inconsistencies in the development and implementation of HPS experiences. In order to optimize learning with HPS, researchers must explore students' experiences and perceptions of the use of HPS to contribute to the development or refinement of empirically based framework that provide effective, organized and systematic HPS experiences.

Summary

The introduction and use of HPS into baccalaureate nursing education has grown tremendously over the past few years. Nursing researchers have published very few empirical research articles that suggest student learning benefits with the use HPS. Medical researchers have provided evidence of successful integration of HPS into medical curricula with supportive frameworks, measurements, and analysis of medical students' perceptions and experiences of learning with HPS. The nursing studies reviewed lacked theoretical frameworks, were descriptive in nature, and used investigator created instruments which lacked psychometric

testing. Despite these limitations, the results suggest that HPS may have improved critical thinking, decision making and transfer of learning. However, there have been no qualitative studies about nursing students' experiences of learning using HPS. The National League for Nursing has developed a simulation framework to guide the educator in the use of HPS. This framework will be discussed further in chapter 2. Better understanding of the student experience about HPS will contribute to the continuing improvement/development of a simulation framework that is reliable and valid, yet flexible enough to allow its use across varying nursing school curricula and program types.

The purpose of this qualitative descriptive study was to describe the experiences of BSN nursing students' experiences with HPS. The specific aims of this study follow.

Specific Aims

1. Describe the baccalaureate nursing students' educational practice experiences with HPS
2. Describe the baccalaureate students' experiences with the specific simulation design characteristics associated with HPS
3. Describe the baccalaureate students' experiences with learning outcomes when using HPS

CHAPTER II

THE NURSING EDUCATION SIMULATION FRAMEWORK

Introduction

This chapter describes the National League for Nursing's (NLN) Nursing Education Simulation (NES) Framework, which will help guide the focus group questions. The framework was selected because it includes characteristics that are considered essential to the successful implementation of HPS experiences. The concepts provided by the NLN's NES Framework, depict the essential aspects necessary for teaching and learning through human patient simulation.

The Nursing Education Simulation Framework

The NLN’s Simulation Framework was developed as a result of the need for a consistent and empirically supported model, which will guide nurse educators in designing and implementing effective, organized and systematic HPS experiences. The NES Framework embraces education through the concept of experience and activities which promote development of cognitive understanding. Developed by a panel of experts in nursing education and HPS, the NES Framework integrates classic and contemporary nursing education styles into a framework that addresses the major learning styles of nursing students (Jeffries, 2007).

Theoretical Framework

Human patient simulation encompasses the use of traditional and contemporary educational theoretical perspectives such as collaborative learning, computer-based teaching strategies, learner-centered practices, constructivism, and collaboration. Combining and blending learning theories sets the pace to maximize learning potential in a creative, realistic and student centered environment. Whereas collaborative learning is based on behavioral, cognitive information

processing, humanistic and socio-cultural theories (Jeffries, 2007); computer-based teaching strategies are based on adult learning, cognitive learning, and constructivist learning theories (Jeffries, 2007). Combined, they offer a rich framework that guides learning and fosters the development of an environment that promotes communication, collaboration, and reflection (Jeffries, 2005, 2007).

Learning based on information processing emphasizes remembering so the correct actions are reinforced. Experiential learning promotes cognitive networks and understanding. Socio-cultural dialogue leads the learner to practice in a community of practice where their peers and the educators unite as a team (Jeffries, 2007). Figure 1 shows the NLN's NES Framework.

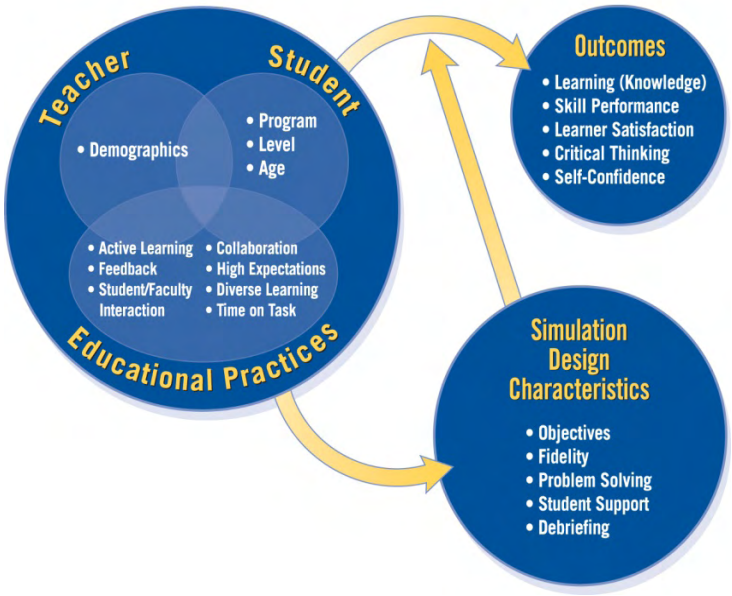

Figure 1. The nursing education simulation framework. From "Simulation in nursing education: From conceptualization to evaluation," by P. R. Jeffries. New York: National League for Nursing.

Framework Components

The Teacher

The use of HPS as a teaching method is a move away from traditional styles of teaching nursing which view the student as a receiver of knowledge. As nurse educators begin to view students as active participants in learning, the use of HPS has the potential to improve such characteristics as critical thinking (Bearnson & Wiker, 2005; Parr & Sweeney, 2006; Jeffries, 2005, 2007; Rhodes & Curran, 2005; Schoening et al., 2006) and decision making (Feingold et al., 2004; Parr & Sweeney; Rhodes & Curran; Schoening et al.). Human patient simulation transitions the role of the teacher into a facilitator and evaluator in which they enhance the learning experience by providing support and encouragement during the learning process. The educator also guides the HPS experience by creating a realistic environment that allows guidance of a student through the care of a simulated patient. In addition, the educator may provide probes (cues), such as laboratory results, to the student throughout the HPS to enhance the experience and maximize the reality of the environment. At the completion of the HPS experience, the educator will facilitate the debriefing or reflection session that allows students to verbalize their experience and express how they feel they did or could improve during future encounters. The demographics of the teacher, such as age, clinical expertise, and years of experience, are believed to be related to the comfort and willingness of the nurse educator to use simulation in nursing education (Jeffries, 2007).

The Student

During a HPS experience, the student moves from a passive learner to an active learner, where s/he plays various roles, such as nurse, family member, or other health care provider (Jeffries, 2007). During the HPS, the learners have the opportunity to demonstrate their abilities

to care for a realistic, simulated patient by performing actual technical skills, clinical decision making, critical thinking, and evaluation of their interventions (Jeffries, 2005, 2007). In addition, the student has the opportunity to work in a team environment communicating with patients, family members, physicians, nurse practitioners, and other health care providers (Jeffries, 2005, 2007).

Each student has the opportunity to be an observer of other students performing in HPS. The observer participates in active learning because they are trying to solve the patient case scenario simultaneously with the student performing the actual care. The observer also participates in the debriefing session offering their thoughts, suggestions, and opinions about the care of the patient (Jeffries, 2007). Similar to the teacher concept of the simulation framework, students' age, previous nursing experience and formal education may affect the students' HPS experience (Jeffries). Jeffries recommended further research to explore these variables and how they impact students experience with HPS and learning outcomes.

Educational Practices

During the design, implementation, and evaluation of a HPS experience, the educator must consider the learning styles of the student. The simulation framework used to guide this study addresses the following components: active learning, feedback, diverse learning, student/faculty interaction, collaboration, high expectations, and time on task (Jeffries, 2007).

Active learning. In active learning, the learner has the opportunity to participate in the learning process (Jeffries 2005, 2007). HPS promotes critical thinking because the students must practice decision making and problem solving abilities (Bearnson & Wiker, 2005; Jeffries, 2005, 2007; Parr & Sweeney, 2006; Rhodes & Curran, 2005; Schoening et al., 2006). At the end of the HPS experience, the educator facilitates group discussion that promotes active learning by

having the students evaluate the care, decisions, and problem solving from the HPS experience (Jeffries, 2007).

Feedback. Student feedback is an essential and important part of the HPS experience and may be incorporated during or after the HPS experience (Jeffries, 2007). The extent and depth of feedback provided to the students by the teacher needs further research and consideration (Jeffries). Extensive feedback may not be appropriate and may hinder the learning process by interfering with the learning process. Students should be allowed to make decisions and mistakes during the HPS experience and the teacher should provide constructive guidance and feedback to promote performance improvement for future encounters (Jeffries).

Diverse learning. Learning occurs through a variety of different learning styles. Jeffries (2005, 2007) suggested that HPS enhances learning in a dynamic environment allowing the student to learn through kinesthetic, tactile, visual, and auditory learning. Kinesthetic learning is promoted with the use of actual equipment and supplies during the HPS. Tactile learning occurs with hands-on patient assessments (e.g., auscultation of heart, lung, and bowel sounds). Visual learning is promoted through the realism of the environment in which the simulated room, patient, and equipment are consistent with a real patient care situation. Auditory learning occurs through audio reports about the simulated patients as well as verbal responses from the human patient simulator, simulated family members, and other health care providers (Jeffries, 2005, 2007).

Student-faculty interaction. During each HPS experience, the student-faculty relationship will influence the overall learning experience as well as the exchange of information. Students will have the opportunity to learn while collaborating with the educator in various ways during the HPS experience.

Collaboration. During the HPS experience, the student and the educator have the opportunity to interact in order to promote individual growth and development through performance feedback. The educator interacts with the student in a one-to-one or small group environment that allows the student to learn from both correct and incorrect actions and interventions that have the potential for transfer to real patient care (Feingold et al., 2004; Jeffries, 2005, 2007; Schoening et al., 2006).

High expectations. Human patient simulation provides an environment for students to learn by empowering them to identify individual learning needs and for them to set goals that will improve their performance (Jeffries, 2007). The educator will promote learning by holding high expectations for the learner. During the HPS experience, especially the debriefing session, the educator provides feedback on the students' performance. Through feedback, the student will interpret the information and self-identify individual learning needs to improve future performance in HPS or in the real clinical environment (Jeffries).

Time on task. Following constructive feedback and collaboration with the educator, students are held accountable for their learning, and in collaboration with the educator, the student will have the opportunity to strengthen their assessment, thinking, and decision making skills (Jeffries, 2007).

Simulation Design Characteristics

Each HPS experience includes consistent characteristics, yet allows for flexibility in meeting students' different learning styles and needs. The characteristics of each HPS experience include objectives, fidelity, problem solving, student support, and reflective thinking/debriefing (Jeffries, 2007).

Objectives. Objectives provide the learner with behavioral outcomes and expectations necessary to maximize learning during a HPS experience. The educator uses the objectives as a guide to designing, implementing and evaluating each HPS experience (Jeffries, 2007). Students are provided the objectives prior to the start of each HPS experience and the educator utilizes the objectives again during the debriefing session to guide the discussion (Jeffries).

Fidelity. Fidelity refers to the extent to which the HPS experience reflects reality. HPS utilizes three levels of fidelity: low, moderate, or high. HPS experiences may be designed for the purpose of technical skill acquisition, such as intravenous access, intramuscular injections, and medication administration (Jeffries, 2007). HPS for technical skills may require only low fidelity, which can be accomplished through the use of static mannequins or partial task trainers, such as simulated arms, muscles and genitalia (Jeffries). Moderate fidelity simulations use mannequins that are realistic appearing but lack some features, such as skin color and temperature (Jeffries). In high fidelity simulation, the mannequins are realistic in anatomy, physiology, and functionality that mimic a real human (Jeffries). The student interacts with the human patient simulator as they would with a real patient. The realism of the HPS environment also enhances the reality of the experience, thus increasing the fidelity (Bremner et al., 2006; Jeffries; Roberts, 2006).

Problem solving. With each HPS experience, the student may have the opportunity to solve problems relevant to their level of knowledge and experience (Jeffries, 2007). The HPS experience must be designed and implemented at a level of complexity that facilitates learning, but does not overwhelm the learner (Jeffries). Careful attention to learning objectives, level of the students, and appropriate fidelity will assure problem solving at the appropriate level for students (Jeffries).

Student support. Student support refers to assistance given to the student during an HPS session. Students may require a prompt or cue to guide them in recognizing signs and symptoms that they may have missed (Jeffries, 2007). By offering a cue, the educator provides the student with an opportunity or a second chance to reassess the care and implement alternative care during the HPS experience.

Reflective thinking/debriefing. Immediately following an HPS experience, the students have the opportunity to reflect on the simulation and discuss how to improve or correct on decisions and interventions (Jeffries, 2007). The reflective thinking/debriefing session allows the educator and the students to share their evaluations of the HPS experience (Jeffries, 2005, 2007). The evaluation of decisions and interventions from HPS has potential for transfer to nursing care with real patients (Feingold, 2004; Jeffries, 2005, 2007; Schoening et al., 2006).

Outcomes. The final component of the simulation framework is the evaluation of outcomes. The objectives guide the entire simulation experience and must be evaluated to ensure that the students have met or exceeded the minimal behavioral expectancies (Jeffries, 2007). The educator must assess and evaluate that the student has demonstrated a gain in knowledge and applied critical thinking during the HPS experience. In addition, the educator must evaluate the learners' satisfaction and if an improvement in self-confidence occurred. Last, any technical skills performed by the student must be evaluated for competency and remediation as necessary.

Summary

The NLN Nursing Education Simulation Framework guided this research and offered a structured format examining the delivery of HPS experiences. This study explored HPS from the student's experience. It was anticipated that the students would reflect on the characteristics from the NLN framework related to the educational practices, HPS, and learned outcomes.

CHAPTER III

METHODS

Introduction

This chapter describes the selected research methodology, philosophical underpinnings, and organizing framework of this study. In addition, procedures for data collection, management, and analysis are outlined, as are considerations for human subjects, trustworthiness, and potential study limitations.

Qualitative Descriptive Design

Qualitative research methods are well suited for studying what a group of people think and to explore or describe their perceptions and experiences of a particular issue (Colucci, 2007; Creswell, 1997; Denzin & Lincoln, 2000; Gallo & Dumas, 1996; Guba & Lincoln, 1985). Qualitative descriptive designs are especially well suited for obtaining answers to questions relevant to the participants' experience and development of policies. Data collection typically includes interviews with open-ended questions allowing discovery of events or experiences as viewed by the participants (Sandelowski, 2000). In addition, focus groups typically use qualitative description as the qualitative approach. For the purpose of this study, the researcher used a qualitative descriptive approach with focus group interviews to explore the BSN students' experience learning with HPS. Qualitative descriptive studies allow the researcher to capture essential elements while putting data together to best identify the main themes associated with the phenomena of interest (Sandelowski).

Focus group interviews are an ideal choice when exploring or evaluating a process (Andrews et al., 2006; Happell, 2007; Krueger & Casey, 2000; Morgan & Kruger, 1998). Focus groups are useful for better understanding the experiences of a group when related to a predefined topic

(Curtis & Redmond, 2007; Krueger & Casey; Morgan & Krueger). In addition, focus group interviews can assess a group's needs, expand knowledge about decision-making processes, guide program planning, test new ideas or programs, generate information to develop a questionnaire, and improve existing programs (Curtis & Redmond; Krueger & Casey). A qualitative design was chosen for this study because a review of the literature found no data describing the experiences of BSN students who used HPS in their nursing education.

Philosophical Underpinnings

Qualitative descriptive studies are guided by the principles of naturalistic inquiry (Sandelowski, 2000). This alternative paradigm recognizes variation in what is considered real in shared experiences (Guba & Lincoln, 1985) and encourages rich descriptions of individual experiences. The researcher and the research participants are interactive. Naturalistic inquiry is least interested in pre-existing theoretical perspectives; however, the knowledge gained from the focus group data may contribute to further development of the NLN NES framework described in chapter 2.

Organizing Framework

For the purpose of this study, the researcher was interested in the experiences of BSN nursing students' who used HPS in their nursing education. Because of a lack of published empirical findings, it was appropriate to begin by exploring the experiences of nursing students when HPS was used in their nursing education. The questions asked during the focus groups were guided by the NES components.

Setting

This study was conducted at a large university in the south eastern United States. The simulation center had three main Human Patient Simulation Learning Laboratories that

encompassed 5,500 square feet and housed over 20 human patient simulators. The School of Nursing had both undergraduate and graduate nursing programs.

The Human Patient Simulation Learning Laboratories were fully equipped and provided a realistic training environment that had all the same equipment, supplies, and medications as an actual acute care hospital. The simulation laboratories were designed to identically replicate an actual acute care hospital patient care room in a real hospital. All equipment was functional with plumbed medical gases for oxygen, air, and suction.

Simulation Instructor Staff

All simulation instructors were registered nurses with a minimum of a BSN and at least 5 years of clinical practice experience. All simulation instructors completed a basic introductory simulation course, were mentored and supervised for six months, and were oriented to each HPS protocol prior to being allowed to independently manage a HPS experience. All simulation instructors followed the NLN NES framework for designing, implementing, and evaluating a HPS experience as described in chapter 2. All of the simulation instructors were evaluated regularly through review of their recorded HPS sessions to ensure they followed the prescribed HPS protocols.

Human Patient Simulation Protocol

All BSN nursing students participated in a variety (cardiac, pulmonary, neurology, endocrine, and surgical) of human patient simulation experiences during their education at the University. For each clinical course, a series of simulation case scenarios was created by content experts using evidence based literature and current curricular map. Simulation learning objectives were clearly defined and linked to the associated course and clinical learning objectives. Students accessed an audio patient report that was posted online in the designated course Blackboard

website, and had access to the simulated patient's medical record, diagnostic tests, progress notes, and physician orders. All students were required to complete pre-simulation assignments before they attended the scheduled simulation session (e.g., review audio report) by accessing the prescribed simulation protocol files located in the designated course Blackboard site. Pre-simulation activities may have included reading assignments, relevant to the protocol, reviewing questions related to drug calculations, and/or developing a nursing care plan for the simulated patient.

The simulation session started with a single student or a team of three to four students taking care of the simulated patient while other classmates observed the simulation from a designated location such as a room that received the broadcast, or by sitting in chairs in the same room as the simulation. Typically, the total group size was 10 students. During the simulation experience, students had access to electronic medical records, paper medical records, diagnostic information, medication carts, and a telephone to call the instructor who acted in the role of an advanced practice nurse or physician. Upon completion of the simulation, all students entered the post conference or debriefing session where they were asked to verbalize their experience and receive feedback from their peers and instructor. The typical debriefing session lasted approximately 20 minutes. The simulation instructor asked general open-ended questions allowing students to speak about their experiences and provided feedback on their performance as well as the performance of others in the group. All students were encouraged to participate actively in the discussion. Students were not graded during the HPS experience. The simulation instructor was provided with debriefing guidelines to help facilitate questions and probe inquiry (Appendix A).

Human Patient Simulation Protocol Requirements

Each student had to self-schedule, attend, and successfully participate in all HPS experiences as outlined in their course syllabi. Each student had the opportunity to actively participate as a primary nurse caring for the human patient simulator as well as having the experience of observing the HPS experience. The number of prescribed HPS experiences varied depending on the specific course in which the student was registered. The minimum number of HPS experiences a student is exposed to in a course was five, with a maximum of 10. Each simulation scenario was reviewed with all simulation instructors the week before the actual protocol is used with students to ensure accuracy and consistency in delivery. Each simulation instructor followed the same protocol for each class ensuring all experiences were similar. There was a minimum of one simulation instructor present for each HPS session.

Sample Study Population

A convenience sample of accelerated option, senior and junior BSN students (enrolled at School of Nursing) was recruited for the study. The School enrollment in 2006-2007 was 530 students: 447 nursing students and 83 health science students. Male students constituted 11% of nursing student enrollment in comparison to roughly 9% nationwide. In 2006-2007, the student body was 40% Hispanic, 29% White, 26% Black or African American, and 5% Asian American. The final sample size was determined by the number of participants needed to reach data saturation. For the purpose of this study, three to four focus groups were held before a decision was made to not add additional focus groups to gather additional information (Krueger & Casey, 2000). All focus groups began with the moderator reading the guidelines for participation and conduct during the discussion (Appendix B). The recommended number of participants per focus group is typically 10 to 12, but when a topic is considered complex or if the participants

are particularly knowledgeable about the topic, it is recommended that the group size be limited to 6 to 8, allowing enough time for each to participate in the discussion (Krueger & Casey).

Efforts were made to assure the sample represented the diversity of the population. Minorities represented 71% of the total students, and composed part of the sample. The three to four planned groups were conducted with a sample that represented the student minority and gender composition (i.e., 11% male, 40% Hispanic, 26% Black, 5% Asian). Participants were recruited from the School of Nursing senior and junior BSN classes. Recruitment of participants began after a letter of support from the Dean of the School of Nursing, as well as written approvals from the University Institutional Review Board (IRB) and the University of Massachusetts Worcester IRB, were received (see Appendix C). The BSN students were chosen because they had consistently been enrolled in nursing courses that used HPS experiences since the beginning of their nursing education.

The participants from which the sample was drawn consisted of 141 nursing students eligible for graduation from the School of Nursing. The researcher sent email invitations to the eligible students to participate in the focus groups one day after the senior final exam and four days prior to graduation (Appendices D and E, respectively). Table 7 presents the demographic description of the eligible sample. The participants eligible for the study were disproportionately female (*n* = 120, 85%) vs. male (*n* = 21, 15%) of which 40% were Latin 26% White, 20% Black, and 10% unknown. The average age of eligible participants was 27 and they ranged in age from 21-37 (see Table 7).

Table 7

Demographic Characteristics of Eligible Sample

Characteristic	Number of Participants	Percentage of Participants
Gender		
Female	120	85%
Male	21	15%
Race/Ethnicity		
Asian or Pacific Islander	6	4%
Black Non-Latin	28	20%
Latin	56	40%
Multi Ethnic/Racial	1	0.71%
Unknown	14	10%
White Non-Latin	36	26%
Average Age	27	

Twenty-five BSN senior graduate nurses participated in the focus groups, resulting in 18% of the eligible sample. In order to meet inclusion criteria, only senior students who successfully passed all nursing courses and were eligible for graduation were recruited. The short time frame between the students final exam, graduation, and relocation of many graduates posed an initial challenge for scheduling the focus groups. The focus groups were strategically scheduled during days and times that did not conflict with nursing review courses, heavy local traffic, or commencement. It was also important that the focus group sessions were held as close to graduation as possible in order to recruit participants before they started nursing orientation for newly accepted positions.

The participants in the focus groups were a mixture of traditional BSN students (48%) and Accelerated Option senior students (52%). Of the participants, 19 (76%) were female, 10 (40%) were White, 10 (40%) were Latin, three (12%) were Black, and two (8%) were Asian (Table 8).

Table 8

Focus Group Participant Demographics

Characteristic	Number of Participants	Percentage of Participants
Gender		
Female	19	76%
Male	6	24%
Race/Ethnicity		
Asian or Pacific Islander	2	8%
Black Non-Latin	3	12%
Latin	10	40%
White Non-Latin	10	40%
Average Age	27	

The participants were eager to participate and each participant became involved in the discussion. Participants were provided with pizza and soft drinks, and prior to the focus groups they received a StarBucks coffee gift card as a thank-you for their participation. Each session was animated and lively with very few periods of silence. Participants were respectful to each other and allowed others to complete their thoughts without interrupting them. Each participant was provided a piece of paper and pencil to allow them to write down thoughts when another participant was speaking. In addition, if participants disagreed with another participant, they replied with respect and offered another insight for each participant to consider. Overall, when the sessions ended, the participants were not in a rush to leave. Many approached and thanked the researcher for inviting them to participate and offered to return if further information was needed. Five participants returned for the review of the data that served as the final member check. The following section outlines sample recruitment, inclusion, and exclusion criteria.

Procedures

Recruitment of Study Participants

Inclusion criteria. Students were eligible to participate in the study if they:

1. Had been continuously enrolled as a first time senior student in the traditional BSN program at the School of Nursing since August 2006
2. Had been continuously enrolled as a first time student in the Accelerated Option Program at the School of Nursing since August 2007

Exclusion criteria. Students were not eligible to participate in the study if they:

1. Had repeated a nursing course
2. Were enrolled in the RN-BSN program

Students who repeated nursing courses may have been enrolled in a different curriculum from previous programs that followed a different HPS protocol and framework. Students obtaining a baccalaureate degree in nursing through the RN-BSN program have different entry points, curricular design, and fewer simulation experiences compared to the traditional nursing students.

Once approvals were received from the IRB, recruitment of participants began. Individual emails (Appendix D) were sent to all nursing students who were enrolled at School of Nursing who met the study inclusion criteria. If students were interested in volunteering for the study, they emailed the researcher to sign up for one of the scheduled focus group meetings. A confirmation email was sent to each participant by the researcher to provide a brief written description of the purpose of the study (Appendix E). Written informed consent was obtained on the scheduled date before a focus group convened. See Appendix F for the consent form, Appendix G for consent form for audio taping, and Appendix H for the sample recruitment flyer. The researcher attempted to schedule participants to attend a focus group that met their schedule

and met the need for diversity. Based on the number of currently enrolled BSN students and their participation in HPS experiences, a sufficient number of students volunteered to saturate the data. Figure 2 displays the procedures that were followed in the study.

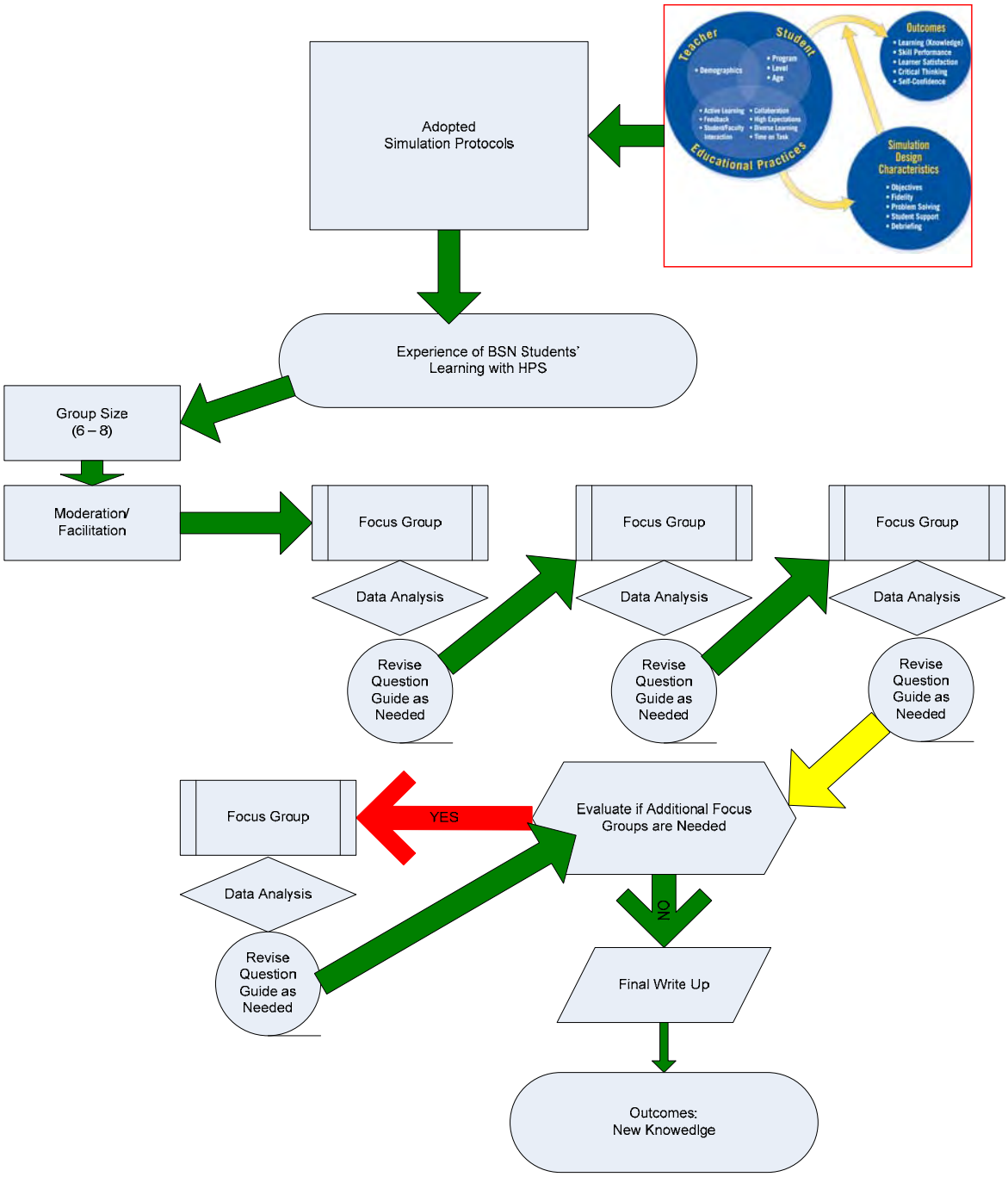

Figure 2. Procedure for exploring BSN nursing students' experience of using HPS in their nursing education.

Figure 3 outlines the proposed timelines for the study.

Week:	**1**		**2**		**3**		**4**		**5**		**6**		**7**	
Planning														
Recruiting														
Moderating (Tentative)														
Analysis														
Final write up														

Figure 3. Timeline for exploring BSN nursing students' experience of using HPS in their nursing education.

Data Collection and Management

The first step of the data collection process was to define the purpose of the study clearly and to remind the participants that they were free to provide honest feedback and open discussion during the focus group. The moderator reviewed his role as the researcher and expressed how important it was for each participant to provide as much honest and constructive feedback as possible. In addition, the moderator explained to the participants how the audiotapes, transcripts, and data were to be managed, secured, and destroyed at the completion of the study.

To introduce the participants to the focus group process, the researcher described the scope of the focus group with regard to HPS, and noted that the HPS experience included factors beyond the actual simulator itself, such as experiences before and after simulation. The types of questions were briefly explained to participants before engaging the discussion of the focus group, which proceeded in an orderly and through fashion.

Focus Groups

Focus groups are considered socially oriented and more relaxed when compared to other methods of inquiry and are ideal for conducting exploratory research (Krueger & Casey, 2000). Focus groups are particularly useful when the researcher is interested in understanding the perceptions of a group related to a specific topic (Krueger & Casey). According to Krueger and Casey, focus group interviews can be used to assess the needs of a population and focus groups may be appropriate before, during or after a program has been implemented for evaluation purposes. Data gathered from focus group discussions can guide program development, improve knowledge about population needs, evaluate new programs, improve existing programs, and contribute to the development of questionnaires (Krueger & Casey).

Because focus groups have been used in educational research for many years as a means to gather information and better understand the attitudes, beliefs, and perceptions about a specific educational method (Charleston & Happell, 2005; Curtis & Redmond, 2007; Happell, 2007; Morgan & Krueger, 1998; Rabiee, 2004), this study used focus groups to explore the experiences of BSN nursing students who used HPS during their nursing education.

Focus groups are typically conducted in a series allowing the researcher to explore perceptions, experiences, or ideas of a practical sample of the population. The number of focus groups needed to collect enough information to best reflect the population being studied is based on the concept of theoretical saturation. Once the interviewer (moderator) has noted reoccurring themes from multiple groups, saturation has been reached (Krueger & Casey, 2000; Rabiee, 2004; Sim, 1998).

Focus groups have been used successfully by faculty members in research studies of nursing students' perceptions and experiences of various issues. In four studies reviewed, data collected

from focus groups identified common themes that contributed to enhancement of learning and teaching experiences (Charleston & Happel, 2005; Coetzee, 2004; Kenny, 2002). Research findings allowed educators the opportunity to improve curricula (Charleston & Happel; Coetzee; Kenny) and offer new programs for students (Yearwood, Brown, & Karlik, 2002). Three of the four studies did not present any barriers, conflicts, or limitations related to the researcher being the faculty member of the students (Charleston & Happel; Kenny; Yearwood et al.). One study suggested that being the teacher of the students and the researcher may have prevented the exploration of how the power differentiated between the teacher and the student influence to learning (Coetzee, 2004).

Using focus groups with nursing students has provided rich and important data that identified strengths and weaknesses of existing curricula, utilization of technology in education, characteristics of nursing preceptors that maximize student learning, and student suggested methods to improve diversity integration in learning (Charleston & Happel, 2005; Coetzee, 2004; Kenny, 2002). The researchers were also faculty members of the students who participated in the focus groups. The data collected in each of the studies contributed to the identification of themes that allow development and refinement of teaching strategies to improve learning outcomes. Potential limitations or conflicts related to the researcher being a faculty member were identified by only one researcher (Coetzee, 2004). The researcher of this study was not in a formal teaching role for the participants in the study. Furthermore, students did not receive a grade for their participation in HPS experiences while enrolled in the BSN nursing program at the School of Nursing. Because the researcher was not in a supervisory role, assigning grades nor teaching any of the HPS sessions with students, the power balance or risk to the student participant was reduced.

Moderator

To assure the data collected from the focus group discussions addressed the study aims, the focus groups were facilitated by a moderator (Curtis & Redmond, 2007; Morgan & Krueger, 1998). The moderator encouraged open discussion and exchange of ideas from group participants. The moderator asked open ended questions to fully explore the perception and ideas of participants. The moderator also posed additional questions to probe for details, but not to suggest answers. Moderators help maintain focus and direction, and seek clarification when needed throughout the interview. This is accomplished with a method that is not obvious to focus group participants and does not introduce bias (Curtis & Redmond; Krueger & Casey). For the purpose of this study, the researcher acted as the moderator. At the time of this study, the researcher was a member of the faculty at the School of Nursing. Over the past three years the researcher had developed, implemented, and evaluated the HPS program for undergraduate and graduate students. In addition, the researcher had lectured for the BSN and MSN Health Assessment course. The researcher was known to the potential volunteers, but had no supervisory or grading influence; as such, there was no conflict of interest, coercion or abuse of power.

Note Taker

A note taker was also present during focus group interviews. The note taker served primarily as an observer and data collector. The note taker watched for nonverbal behaviors and reactions during the focus group sessions. The note taker also provided a written summary of the discussion at the completion of the session (Morgan & Krueger, 1998). For the purpose of this study, an individual with experience in focus group note taking and a basic understanding of HPS was present. The researcher's committee was provided with a bio sketch of the proposed

note taker, and approval from the dissertation chair was received prior to the use of the proposed note taker. The note taker was the Associate Dean for the PhD program, only taught graduate students, and was not known to the undergraduate students. She was a senior researcher with experience in conducting clinical trials and qualitative interviews.

Discussion topics were carefully selected to ensure data collected from the focus groups were consistent with the purpose of the research. The purpose of the study was carefully defined so the discussion topics could be identified and prioritized (Curtis & Redmond, 2007; Morgan & Krueger, 1998). A question guide helped facilitate responses from the focus group participants.

Question Guide

A question guide was used to provide the moderator with direction during the focus group sessions. In order to ensure questions were understood by focus group participants, specific topics and questions were clear and understandable to each participant. Jargon was avoided unless specific to the participants being studied (Morgan & Krueger, 1998). Table 9 displays the guiding questions for the focus group interviews.

Table 9

Question Guide for Focus Group Interviews

Specific Aim	Educational Area	Main Question	Probes
	Introduction (5 min)	Please introduce yourself to the group	
Aim 1	Introductory question (10 min)	When you think about your HPS experience in general what was it like for you?	Did you feel it enhanced your learning, how so?
Aim 1	Key question Educational practices (24 min)	What components of HPS promote learning? (Active learning)	Pre-simulation Preparation? Interaction with the environment? Audio report? Electronic Medical Record? How important is feedback after HPS? (Feedback) Can you describe how you learn during HPS? (Diverse learning) How do the students and faculty interact during HPS? (Student-Faculty Interaction) Describe how collaboration occurs during HPS? (Collaboration) (High Expectations) What are the expectations of the student during HPS? How students are held accountable for their learning in HPS? (Time on Task)

Table 9 *(continued)*

Question Guide for Focus Group Interviews

Specific Aim	Educational Area	Main Question	Probes
Aim 2	Key question Simulation design characteristics (24 min)	How does HPS allow students to problem solve?(Problem Solving)	How are learning objectives tied into HPS? (Objectives) Describe your perception of the reality of HPS? (Fidelity) How are students supported during the HPS experience? (Student Support) Describe the debriefing period? (Debriefing)
Aim 3	Key question Outcomes (24 min)	So how was HPS helpful with gaining knowledge?	Practice Hands on Watching others Performing tasks, skills? Interdisciplinary Other students Instructors

Table 9 *(continued)*

Question Guide for Focus Group Interviews

Specific Aim	Educational Area	Main Question	Probes
Aim 1-3	Ending Question (8 min)	If you were assigned as the manager of the HPS program, what is the first thing you would change?	
	Moderator summary (10 min)		
	Summary Question (5 min)	Did I correctly describe what was said?	
	Final Question (10 min)	Have I missed anything? Is there anything else you want to share?	

Conducting the Focus Group

The focus group sessions started with a basic introduction to welcome the participants, review the purpose of the research, and describe the guidelines for participation and conduct (Appendix B) during the discussion (Morgan & Krueger, 1998). The framework outlined in the Focus Group Kit (Morgan & Krueger) was used in developing the question guide for the purpose of this study. The initial question guide facilitated discussion during the first focus group. The emerging findings informed future questions which were used in the subsequent focus groups. As more data was collected, the findings continued to be analyzed and compared to earlier data, prompting additional revisions of the question guide for collection of further data.

All students were encouraged to respond and participate in the discussion. The moderator facilitated the opportunity for each member to express his/her views, opinions, and attitudes during the focus groups. Each session was audio taped, and the tapes as well as the written notes were secured in a safe, locked file to which only the researcher had access.

Demographic Data Collection

Each participant was asked to complete the Demographic Questionnaire for Focus Group Participants (See Appendix I) prior to the start of the focus group interviews. The demographic data provided general information such as age, gender, and ethnicity. These data were used to describe the participants in the study. Descriptive statistics were used to summarize these data. Questionnaires did not include participant names. They were maintained in a secure location as described previously.

Opening Questions

After the introduction, the focus group interview began with an opening question. Opening questions identified characteristics that the participants may have had in common and provided opportunity for the participants to experience talking in a group. Typically, these questions were usually answered in about 30 seconds (Morgan & Krueger, 1998). Following the opening question, introductory questions were introduced to the group.

Introductory Questions

Introductory questions introduced the topic of interest and allowed participants the opportunity to begin conversation and interact with others in the group. Introduction questions are typically open ended questions to allow the participants to explain how they understand the phenomenon of interest (Morgan & Krueger, 1998). During this phase, participants discussed

their past experience as they related and began to focus on the topic being researched. Once the introductory questions were answered, the moderator proceeded to key questions.

Key Questions

Key questions are typically the questions that require the most attention during analysis, because key questions are usually the driving force of the study. The moderator allowed enough time, typically 10 to 15 minutes per question, to allow response and interaction among the participants. The moderator also used probes or pauses to extract additional responses and information from participants (Morgan & Krueger, 1998).

Ending Question

Following the key questions, participants were asked an ending question. Ending questions bring closure to the group discussion and allow participants to reflect on their experience. During the ending questions, participants had the opportunity to clarify their position or previous statements made during the interview (Morgan & Krueger, 1998). Each participant also had the opportunity to respond to the moderator's summary of the discussion during the focus group session.

Summary Question

At the conclusion of the focus group, the moderator provided the participants with a short summary of the key questions and ideas that emerged from the discussion (Morgan & Krueger, 1998). The participants were asked if the summary was adequate prior to moving to the final question.

Final Question

In the last 10 minutes of the focus group, the moderator asked a final question to ensure the critical aspects specific to the purpose of the study were not overlooked (Morgan & Krueger,

1998). The moderator provided an overview of the study, typically more in depth than the letter sent to the participants describing the study, allowing the participants the opportunity to offer additional information that may have been missed or should have been discussed (See the question guide in Table 6).

Recording Data

Each focus group session was audio recorded, and session data was recorded by handwritten notes from the note taker.

Debriefing

Immediately following each focus group, the moderator and the note taker debriefed to discuss the data and observations noted during the session. The debriefing session was audio taped for future reference. The moderator reviewed the data collected by the note taker and added additional notations as appropriate. All nonverbal communication observed during the focus group interviews was added to the notes. Any entry that required clarification was done prior to the departure of the note taker.

Data Management and Analysis

Data management

For the purpose of the study, each focus group was audio recorded and transcribed verbatim following each session. The transcribed audio-recorded notes were the primary sources for data analysis. Handwritten notes were used to provide backup should the tape recorder fail. In addition, the handwritten notes enriched the transcribed notes by adding data regarding context and non-verbal communication. The handwritten notes were typed following each focus group. Each page of the transcripts and handwritten notes contained the date, time, location, and number of focus group participants. Large margins were set for each side of the handwritten note paper

to allow for written comments, categories, and codes. Each line of the transcript was numbered to allow quick location of quotes within a transcript. A hard copy of all transcripts and handwritten notes remained intact and was kept in the researchers locked and secured office file.

The transcripts and typed handwritten notes were entered into NVIVO, a qualitative analysis software package (QSR International Pty Ltd., Doncaster, Australia), to classify, sort, and organize the data. Emerging themes and categories were placed in separate electronic folders that matched the specific aims and their associated focus group questions. If same phrases supported more than one category, parts of the transcribed notes were placed in the appropriate electronic folder. Three additional electronic folders were created to store notes regarding emerging theoretical ideas, notes about emerging methodological problems, and a personal journal, which recorded the impact of the researcher's background as an expert in the area and what steps were taken to minimize bias. Demographic data from all focus groups was combined to describe the sample. All electronic folders were backed up on a separate external hard drive that was stored in a safe and secured area.

Data Analysis

Data analysis reduced and organized the data to make it meaningful to the researcher and others (Morgan & Krueger, 1998). Using constant comparison, the analysis identified common themes and patterns that appeared within the focus groups. The transcripts and typed handwritten notes from each focus group were imported into NVIVO. The first part of the content analysis compared phrases used by the participants during their answers. Special attention will be paid towards emphasis on how the participants responded (facial expression, body mechanics, and gestures). The transcripts and handwritten notes were analyzed line by line for descriptive content and codes, which addressed the focus group questions and specific aims

using constant comparison. Data analysis began with the transcript from the first focus group. Emerging findings were used to refine the focus group questions prior to each focus group session.

The transcripts were read and reread multiple times until the researcher identified focused items emerging from the data. Codes were created in NVIVO for sections of the transcripts. Codes and categories were labeled and defined to maintain consistency with coding and categorizing. A codebook was used to maintain a list of codes, categories, and their definitions. Copies of the appropriate sections of the transcripts were placed in electronic folders for sorting. As data analysis continued, the focus group transcripts were reviewed again. Participant phrases were assigned codes and then linked to an existing category. If a code did not fit an existing category, a new category was created. Each time a code was placed into a category, definitions were reviewed to evaluate if they were still appropriate. Modifications to the definitions were made as needed until they were stable. Once general categories were established, they were reviewed to assess for more abstract themes. Throughout the analysis, codes or categories were merged together or additional codes or categories created depending on the data.

Upon the completion of focus group 1, codes and categories that were specific to the study aims were identified. Data analysis from focus group 1 informed questions for focus group 2. Questions were modified to meet the study aims. Data from focus group 2 followed the same analysis steps as focus group 1. For each subsequent focus group, data was compared to earlier findings. Higher-level themes began to emerge, allowing categories to fit.

Data were first analyzed within each focus group to identify common themes and important data. Data were further analyzed across focus groups identifying common themes and additional data. Data analysis was linked to the specific aims of the study during each focus group and

during final data analysis. Content analysis is a method for determining inferences from qualitative data to their context (Denzin & Lincoln, 2000; Sandelowski, 2000). Focus groups included questions related to HPS experiences. For each focus group data set, step one in content analysis was to identify codes that address the focus group questions and specific aims. In step two, the researcher developed categories that defined like codes of responses. In step three, the researcher developed definitions for the categories in order to guide coding of data into distinct categories. To summarize the categories, the number of responses within each category was tabulated and frequencies were reported for the total sample. To insure validity in category definitions, the researcher had an auditor confirm that the category definitions were clear, understandable, and inclusive for all units of responses. Reliability was attained by requesting the dissertation chair and members of the committee to review selected student transcripts for agreement. Review and discussion occurred until agreement was reached on coding of categories.

During the analysis of the data, four specific factors were considered to assist in organizing the data: frequency, specificity, emotion, and extensiveness.

Frequency

During data analysis, attention was paid to items that were frequently mentioned, but some things mentioned only one time or a few times were also relevant for the purpose of the research (Krueger & Casey, 2000). Frequency was tracked by reviewing transcripts, handwritten notes, and listening to audiotapes. The researcher evaluated the frequency of items and considered their relevance during analysis.

Specificity

Attention to the specific responses of individuals and the group was noted. Answers that specifically describe their experience during a HPS experience versus comments made about topics that are not related to simulation, learning in nursing, or clinical experiences were recorded. These comments were discussed by the moderator and note taker during the debriefing session following each focus group for consideration on importance and relevance for inclusion in the analysis. In addition, such comments also provided insightful information that was used in questions for the following focus groups.

Emotion

When participants showed enthusiasm, passion, emotion or intensity in their answers, this data was documented by the note taker and was marked with a highlighter in the final typed transcript. These data were added to the typed transcripts and entered into NVIVO for further analysis.

Extensiveness

There was a relationship between frequency and extensiveness, yet these two concepts are different by definition. During a focus group interviews, some things were said frequently by one person, but not by others. In this event, the comments made were considered 'extensive' and were noted only one time when determining item frequency.

Trustworthiness

For the purpose of the study, the researcher took steps to demonstrate that the findings of the study were worthwhile, i.e., trustworthy. Trustworthiness was assured by following the rigors of conducting the focus group interviews, analyzing, and reporting data by ensuring credibility, transferability, dependability, and confirmability were met. According to Guba and Lincoln

(1985), trustworthiness is established when the research findings reflect the meanings as described by the participants. Credibility evaluates whether the research findings represent a conceptual interpretation of the data collected from the participants' (Guba & Lincoln). Transferability addresses whether the findings can transfer beyond the initial research (Guba & Lincoln). Dependability assesses the quality of the processes of data collection and data analysis (Guba & Lincoln). Confirmability measures how well the data collected supports the inquiry findings (Guba & Lincoln).

Credibility was established for the purpose of the proposed research, as all participants were BSN nursing students who met the inclusion criteria. Each participant was exposed to HPS experiences. At the conclusion of each focus group, the moderator provided the participants with an oral summary of the discussion and information received during the session. To further maintain credibility, a debriefing session was held after each focus group interview. For the purpose of debriefing, data collected during that focus group were reviewed with the note taker. In order to maintain the integrity of the study and prevent bias, the note taker was a person who was knowledgeable of HPS, but was considered a disinterested person in relation to the final outcome of the research findings. All data and data analysis documents were maintained in a safe secure location.

To further establish credibility, member checks were done at the end of data collection. A member check refers to when data, interpretations, and conclusions are presented to the participants of the focus groups (Guba & Lincoln, 1985). Volunteers from each focus group returned after the data analysis had been completed. Participants had the opportunity to validate or correct the data. During the member check, participants also offered additional information by stimulating thought or recall (Guba & Lincoln).

Reflexivity

Reflexivity reflects upon the values, experiences, interests, and beliefs of the researcher. The researcher developed and implemented the HPS protocol used at the School of Nursing. The researcher knows a great deal about HPS and has influenced others to use HPS in their programs throughout the United States. The researcher demonstrated reflexivity by staying open to the participants' experiences without bias. The researcher was an expert about HPS from the perspective of a faculty member; he was not knowledgeable from the student perspective. The note taker monitored the researcher for bias during each focus group. In addition, the researcher's dissertation committee also monitored for bias by reviewing selections or samples of the transcripts. Addressing reflexivity, the researcher has been intimately involved internationally in the development and implementation of several HPS programs. The HPS case scenarios that nursing students participate in were all developed by content experts and a team of simulation instructors. The researcher served only as a mentor to the development and implementation of each case study. In addition, the researcher set aside (bracketed) what was known about HPS in such a way that belief and knowledge of the phenomenon did not influence the study results. Bracketing was be done by asking open-ended questions, as outlined in the question guide.

During the focus group interviews, the researcher (moderator) assured that all questions were asked in a neutral fashion without attempting to influence responses. In addition, the researcher remained aware of internal and external responses made by the participants (Guba & Lincoln, 1985). The note taker provided feedback related to any perceived biases. These concerns were addressed before the next focus group.

To establish dependability, a competent peer independently audited the research methods used. For this study, the note taker also served as the auditor to review the paper trail of data analysis documents. Confirmability was met by having the participants evaluate the moderator's summary of the focus group's responses by verbalizing their agreement at the end of each focus group.

Protections of Human Subjects

Ethical Considerations

The use of students as research participants required protection to prevent student exploitation. Gaining access to the sample, recruitment, coercion, confidentiality, and informed consent were among the considerations in the protection of human subjects when using students as research participants (Clark & McCann, 2005).

Institutional Review Board

Guidance and permission from the University Institutional Review Board (IRB) was sought prior to recruiting participants. An email was sent to the appropriate authority informing her of the study, approval from the School of Nursing University based IRB, and the names of the researcher’s University of Massachusetts Worcester dissertation chair.

Recruitment

BSN students from the School of Nursing were recruited through email inviting volunteers to participant in the study (Appendix D).

Ethical Concerns of the Participants

Although potential student participants were readily available, several ethical issues were present and had to be considered carefully. For many years, students were expected to participate as subjects in research conducted by their professors (Clark & McCann, 2005;

Garrett, 2005). Unethically gaining access to the population, the absence of meaningful informed consent, abuse of power, lack of confidentiality, and coercion were all concerns that may cause harm to the student subject and, as such, were addressed.

Gaining Access

Accessing participants must follow policies and regulations set by the appropriate IRB (Woods & Roberts, 2003). For the purpose of this study, the University process of sample selection, informed consent, data collection, and reporting was congruent with the IRB and ethics associated with research and human subjects. The researcher of this study asked for IRB approval to recruit nursing students via email.

Informed Consent

Although the typical college student is healthy and of sound mind, students may rightly be considered a vulnerable population (Clark & McCann, 2005). Students may feel pressured to participate in research for fear about retaliation related to obtaining a satisfactory grade, a desirable clinical placement or passing a course. When presented as a learning opportunity, this may also lead the student to believe that participants will learn something new, when, in fact, they may not see the data (Clark & McCann; Redford & Klein, 2003). Each volunteer participant was fully informed by the researcher before the start of each focus group. All elements of the purpose, collection methods, and reporting of data were explained by the researcher. Each participant had the option to withdraw consent at anytime during the study, including the right to leave during the focus group if they so chose.

Coercion

Coercion is defined as “an extreme form of influence by another person that completely controls a person’s decision” (Bentley & Thacker, 2004, p. 293). Coercion may also cause harm

to the student when they are told they will receive a failing grade or that they must complete additional assignments if they do not participate in the study. Providing students with bonus points or special grading options can also be considered coercive in nature and pose serious threats to the student as well as the research integrity (Clark & McCann, 2005; Redford & Klein, 2003; Roberts et al., 2001).

The researcher of this study did not assign any teaching or student supervisory roles at the University during the intervention, data collection, or reporting of data. The researcher was not involved in any processes that had a direct impact on the didactic or clinical grading of a student who was enrolled as a participant in the research study. No participant was granted extra credit or special considerations for participation in the study. As a token of appreciation for participation in the study, each participant received a $10 Starbucks coffee card. Each student participated in only one focus group. Students who volunteer were scheduled to attend only one focus group. Attendance was taken when informed, written consent is obtained. Because recruitment occurred by the students volunteering in response to email, no simulation staff - members were involved with the study.

Confidentiality

When research is conducted by a professor or faculty member who is in a formal teacher-student relationship, confidentiality is of great concern. Disclosure of information may be embarrassing and violate the student's right to privacy and may have a negative effect on the student and be considered harmful in nature (Wilkes & Beale, 2005). As such, all data collected remained confidential and participants were not identified by name.

Abuse of Power

A student may feel helpless, intimidated, and threatened to participate in a study conducted by a professor or faculty member. Over 400 students were enrolled in the University nursing program at the time of this study. By seeking volunteers and fully informing the students of the study purpose, design, data collection techniques, and methods used to report the data, each student was properly informed and able to consent voluntarily to participate in the study. The researcher did not have a direct or indirect position as the student's instructor, and did not serve in a supervisory role that may have influenced their progress as a nursing student at the University.

Conflicts of Interest

A conflict of interest may exist if the researcher serves to benefit from the conduct of the study, is financially rewarded or has a relationship with an interest associated with the variable(s) being investigated (Warner & Weiss-Roberts, 2004). The researcher did not have a relationship with any industrial simulation company and did not receiving any financial support that would influence the outcome of the research.

Conclusion

This study utilized a qualitative descriptive design with focus group interviews to explore BSN nursing students experience using HPS in their nursing education. Findings may be useful to further develop HPS protocols and evidence-based frameworks to guide the implementation of HPS into nursing education curricula. By using a qualitative descriptive research design and student focus groups, the students had the opportunity to verbalize opinions, ideas, emotions, and suggestions based on the lived experiences of participating in HPS sessions. In addition, the

focus group setting encouraged the expression of additional ideas and suggestions for improving the HPS learning experience.

The researcher was guided by Krueger and Casey's (2000) framework for designing and conducting focus group interviews. The IRB provided appropriate approvals of the study prior to the start of recruitment and conducting of focus interviews. Because students are considered a vulnerable population, strict adherence to the protection of human subjects was followed. In addition, the researcher did not have any administrative or grading roles during the period of the data collection.

Data collection during the focus groups was accomplished by the use of audio recordings and memos collected by a note taker. A debriefing session between the note taker and moderator (researcher) was conducted immediately following each focus group to review data collection and ensure accuracy. Trustworthiness was met by establishing credibility, transferability, dependability, and confirmability.

CHAPTER IV

FINDINGS

Introduction

Chapter 4 presents the results of this investigation. The chapter's content is inclusive of the four major themes that emerged from the data analysis. The final section of the chapter summarizes the results.

A qualitative descriptive design using four focus groups described the experiences of senior baccalaureate nursing students who experienced human patient simulation during their nursing education program. The data were analyzed within and across the focus groups. Participants provided both positive and negative responses within each group, and feedback varied among groups. The results are organized by the three aims of the study:

2. Describe the baccalaureate nursing students' educational experiences with HPS
4. Describe students' experiences with the specific simulation design characteristics associated with HPS
5. Describe students' experiences with learning outcomes when using HPS

Findings

Content analysis of the data revealed four primary themes that addressed the aims of the study (Table 10). Subthemes emerged for each of the primary themes. The four primary themes were (a) Structure, (b) Environment, (c) Simulation Instructor, and (d) Learning.

Table 10

Primary Aims and Themes of the Study

Study Aim	Primary Theme
1. Describe the baccalaureate nursing students' educational experiences with HPS	Structure Environment Simulation Instructor Learning
2. Describe students' experiences with the specific simulation design characteristics associated with HPS	Structure Environment
3. Describe students' experiences with learning outcomes when using HPS	Structure Learning

The following section presents each of the primary themes along with the subthemes of which they are composed. The subthemes are informed by specific, textual evidence in the form of direct quotes from the participants.

Theme 1: Structure (Specific aim 1, 2, 3)

The first theme to emerge from this study was structure. This theme refers to the teaching approaches taken during the implementation of HPS. The structure of HPS sessions include requirement for student participation, presentation of educational material and organization of learning activities. Participants spoke about the importance of having enough HPS sessions to promote learning while keeping the learning objective tightly tied to the curricula. One student stated "not having it enough I kind of felt not like it was a waste of time but just because we weren't in there enough I didn't see a point where as junior year we had it like every week and I

felt myself learning." In addition, participants spoke candidly about the overall organization of the HPS experience and equipment used during their experience. The importance of the HPS session organization was agreed upon by the majority of participants. One participant summarized by stating "something that's not organized, you're going to put somebody into shock." Further examination of the data from which this theme emerged revealed three subthemes: (a) Required Simulation, which refers to reactions to the mandate that students participate, (b) Curricular Integration, which refers to linking in-class lecture material with HPS, and (c) Organization, which refers to the quality about how the simulation is conducted including use of the equipment.

The subtheme of required simulation reflects the contrasting opinions of students with regard to whether attendance at HPS sessions should be voluntary or mandatory. Many felt the required participation of students was a benefit to the structure of individual HPS sessions. The subtheme of curricular integration details students' perceptions about how the structure of the HPS sessions connected with class content. Last, the subtheme of organization has to do with the structure of the HPS session, particularly the progression of activities aided by the instructor related to the environment including the specialized equipment.

Required simulations. A subtheme associated with structure was required simulation. This reflects frequent comments from respondents about whether HPS should be mandatory for students and the characteristics of mandatory participation. In general, many of the participants described the mandatory simulation labs as helpful, but suggested that there could be a limitation placed on the number of required sessions. Most participants were very positive about their overall experiences with mandatory HPS. One participant stated, "I liked it. I thought it was helpful, I didn't feel like I needed as much as what was required, but I did find it helpful."

Three participants were very negative about their experiences with the mandatory HPS. Early in the focus group, one participant exclaimed, “It was not a fun experience at all. So I hated it, I hated coming.” This participant continued to explain that being forced into a situation where she was being evaluated and watched was "nerve wracking," causing her to come to hate participating in the HPS sessions. The subtheme of fear and anxiety (see theme 4: learning) goes into greater depth with regard to students’ feelings about being forced into participating in different facets of the HPS experience. Most participants, however, were positive about their experiences with HPS, even if they reported some fear or anxiety.

Most participants agreed HPS was an important part of learning and it should be required as part of the nursing school curriculum. One student stated, “It’s all about exposure.” Other participants stated, “It’s more beneficial the more you go. We didn’t do a lot this past semester and I feel like it wasn’t as helpful” and “Because if I'm not going weekly or every other week then the material is not really fresh in my head and it doesn't exactly correlate to class. It would if it was more frequent.” The students frequently noted the value of the simulations increased with the amount of time spent with HPS. One student commented,

> I think it would have helped more if it was a class where you would have had to come in so many times a week. I think people would have been more comfortable to even do it because they know they’re going to be here.

Participants further suggested that HPS be required during each clinical nursing course. The students expressed this would be analogous to courses such as Biology and Chemistry which required laboratory participation. One participant stated,

> The more you’re in here, the more familiar you are; the more experiences you have, the more equipment you touch; the more situation you’re exposed to and it’s visual like he was saying and maybe it would put people at ease a lot quicker if you’re here more.

A few participants offered alternatives to the strict mandatory requirements to participate in HPS. One participant suggested,

> But getting back to the mandatory thing, maybe in my opinion it should be mandatory the first semester and then after that we should be able to gauge whether we want to continue or not because some students didn't get anything from the simulation experience and if they feel that that they're not learning anything why should they be forced to come?

Another participant agreed, and stated, "I don't know how successful this would be but maybe it would be nice to have an open simulation." An open simulation would allow a student to choose to participate or not.

In summary, most participants believed student participation in HPS sessions should be mandatory. Students were for and against mandatory participation for different reasons, and held relatively strong opinions on the matter. While most felt the HPS experience was beneficial, a few thought it was so anxiety provoking they could not benefit from HPS sessions. Students who were in favor of mandatory participation also wanted more frequent HPS sessions. A few expressed a preference for making HPS participation optional after a limited amount of required time.

Curricular integration. The curricular integration subtheme refers to the linking of material learned in class with hands-on HPS experience. Elements of curricular integration included concept reinforcement, utility of hands-on experience in the HPS sessions, and exposure to realistic situations. There were many comments about the beneficial outcomes of implementing learned material in a situation that simulated real life. Participants agreed HPS must be linked to the curriculum and HPS case studies should parallel didactic content to help reinforce lecture, a process known as horizontal integration. Many participants suggested all assignments associated with HPS be consistent with the content from lectures. One participant commented,

> I also found it extremely helpful that the subject of the simulation coincided with what we were learning in class. That strongly reinforced what we were learning because things that we find in a textbook, you know it's difficult to remember, whereas when you are experiencing hands on, you remember it better I think.

Participants expressed opinions about the utility of hands-on experience. They believed the direct integration of material learned in lecture with their hands-on HPS experiences reinforced the concepts learned, and made textual examples applicable to realistic situations.

One participant who felt this way succinctly explained the utility of integration:

> You got the lecture, you got the theory, and then you got the clinical on top of it so it just brought it all into one big old circle and you don't have to worry about trying to find a rare patient to go and listen to a murmur.

Another participant noted, "I think when we had the simulations that corresponded with class in class, you learned the material and then you could apply it to simulation and that was why it was so helpful."

Although some participants were more general and vague in describing their experiences with curricular integration, several spoke about how they would often fail to connect HPS sessions with classroom materials and sometimes there was not sufficient feedback about their performance. Talking about this disconnect in the context of a quiz on a HPS procedure, one student commented, "They never told me if I got it right or wrong so I still don't know if I was right or wrong or what I need to improve on."

Overall, participants felt curricular integration was effective and it helped reinforce knowledge acquired from the class lectures. Participants specifically valued the utility of hands-on experience in the HPS sessions because it reinforced lecture content.

Organization. The organization subtheme refers to comments made by participants about which refer to the quality about how the simulation is conducted including use of the equipment. All participants agreed organization was important for smooth and effective HPS sessions, but

students were split evenly about the organization, or lack thereof, in their HPS sessions. For instance, some students felt there was a significant or serious lack of organization in the HPS sessions. One student spoke about the disorganization of the HPS sessions when instructors were not properly prepared. This student commented, "I'm saying in general they need a lot of training to go back behind it and be the patient because sometimes it seemed unorganized and they didn't really know what was going on." Several other students also noted that an apparent lack of training by some instructors contributed to a lack of organization in the HPS sessions, which negatively influenced their experiences with HPS.

A few participants felt the lack of organization in the HPS sessions represented a major detriment to the experience as a whole. One participant expressed this thought candidly:

> Other times, it got very long winded and tired and it just wasn't necessary to continue the post conference for that long time. Usually that happened when it was one of those simulations that was kind of unrealistic, kind of going very slow, people couldn't find their supplies, people didn't know what to do and then it made the experience drag on too long. By the time you got to post conference, you were like "we need to get out of here".

According to the participants, when knowledgeable instructors were running the HPS sessions, the organization of the HPS benefited significantly. One participant who felt this way stated he/she "loved when they [the instructors] were on board – things got organized then, that's when things started coming together." Many participants expressed that although the organization was sufficient in the HPS sessions, it could be improved. One student commented HPS sessions could have been "a little more organized regarding the medications." This opinion is expanded on under the theme of environment.

Overall, participants felt the organization of the HPS sessions was dependent on the instructors' knowledge level and experience. Organized HPS sessions were viewed as positive learning experiences. Structure was needed to optimize learning opportunities. Students were

split on feelings about voluntary vs mandatory HPS sessions, although most participants seemed to believe attendance should be required. Participants acknowledged that curricular integration was important because the linking of HPS with class lecture content helped them to better learn the material. In particular, organization was necessary for optimal HPS sessions.

Theme 2: Environment (Specific Aim 1, 2)

The next theme to emerge from the data was the HPS environment. This theme is supported by comments made about participants' preconceptions and knowledge regarding what they were expected to recognize and do in their HPS sessions, the physical setup of the room for HPS, and the equipment for HPS. The following subthemes were identified: (a) Orientation (participants' knowledge about what to expect during the HPS sessions), (b) Simulation Room Design (the observation occurring from behind a one-way mirror or direct viewing in the HPS room), (c) Simulators (opinions about the human body simulator and its unrealistic characteristics), and (d) Equipment and Supplies (whether the equipment was helpful in the learning process).

Focus group participants expressed mixed opinions about the physical environment of the HPS sessions. Some students felt ready when they began their HPS sessions, but others noted they were inadequately prepared and oriented to what participating in an HPS session would be like. These students believed additional preparation prior to HPS would have been beneficial to the learning experience. Students expressed a wide variety of opinions about the "plastic" nature of the simulator in their HPS sessions. Students felt different ways about the realistic and unrealistic facets of the simulator. All students thought the HPS environment could be improved with regard to the organization and realism of equipment and supplies, particularly the Pyxis medication distribution system.

Orientation. Many participants stressed the importance and need for a full orientation to the simulation environment, including learning objectives and expectations, before the start of the HPS experiences. Some participants thought they had been "thrown" into the simulation environment without knowing the expectations, how the simulators worked, where equipment and supplies were located, or how to perform certain procedures. One student stated, “I felt that we were just thrown in our first semester, like, ‘Go in there, you’re supposed to know what to do.’ It’s like, we had no idea what we’re doing. It was our first semester, we were part of the accelerated program, we were just like, ‘we don’t know what to do.’” Another student elaborated on the lack of orientation prior to using the simulation lab:

> We didn’t know where the things were, we had the patient there and he just crashed. We were like where is the crash cart? What does the crash cart look like? What do we need to do? What medicines do we give? We had no clue and they just threw that thing at us.

One participant recommended a one-hour “walk around allowing students time to search drawers and cupboards.

> I think on your first simulation, you should have an orientation – every student should have an orientation of the whole room, of where the equipment is, of what every single thing is because – our first simulation we had no clue where things were.

Another participant believed being oriented to the basics would be of immense personal benefit, and stated,

> I would be so much more comfortable if I knew where everything was because I walk into the room and I have a general idea in which direction to head but I want to do things quickly. I don't want to have to look around and search for needles that are the right size and the right drug.

A smaller number of participants believed they were sufficiently oriented to perform competently in the HPS sessions. One participant stated, “I remember being oriented to the room the first time. I just wasn’t thrown in.” Other participants agreed and explained the

information they received during class and in other materials before the HPS sessions prepared them for what it would be like in the actual HPS experience.

Participants across the four focus groups made it clear being oriented to HPS was important to maximize their learning experience. Most participants would have liked more orientation before beginning their work with HPS. This finding supports the need for further development of the simulation instructor.

Simulation room design. Two simulation environments were used during the HPS experiences and were addressed during the focus groups. One simulation environment had the students provide care to a simulator while they were observed by an instructor through a one-way mirror. Simultaneously, student observers watched an audio-visual projection in a conference room. The second room environment had a student providing care to a simulator while observers sat in chairs around the bed watching. Participants were generally more positive about the environment in which the observers were in the same room as the student participating in the HPS session. Across the focus groups, participants were not satisfied with the two types of environmental designs used for the HPS sessions. When the instructor was behind a one-way mirror, the students stated they felt uncomfortable and alone. In comparison, when students were in the same room with the observers, they felt nervous.

One participant who engaged in the one-way mirror HPS environment stated, “I hated going, and I just didn’t enjoy it. Because like when you go to that room by yourself you kind of feel like you’re being judged by everybody who’s in the conference room.” Another participant agreed with this sentiment, stating, “I would just stand there in the room and be like, what am I supposed to do now. I’d like stare at the mirror and be like what do you want me to do?”

One participant described the stress caused by observation through the one-way mirror, and noted,

> It depends on the situation because it's better not to have the people sitting there because they kind of give you hints and you're not going to have five people sitting in the room with you when you're assessing somebody in the hospital. But it's also really nerve wracking.

Another participant disagreed with the previously quoted student, and stated that the environment with observers did not feel realistic: "You don't feel like it's something that you should take so seriously when you have everyone sitting in a chair right in front of you in a semicircle right in front of the patient's bed."

In contrast, a positive comment about the room environment which included observer's follows.

> I find it more comfortable….It's like not so much pressure as when you're being watched and not know what they're saying. At least you're aware that they are watching you. You know what their expressions are – you feel what they're expressing to you.

In summary, none of the participants were completely satisfied with the room environments.

Simulators: Real versus fake. The patient simulator was referred to frequently as a "doll" or "plastic." Patient simulators had limitations related to lack of anatomical correctness and realism: "This thing is a plastic doll and I have to get past that to then act." Focus group participants had differing views about whether the simulators appeared real or fake to them, as well as the positives and negatives of the simulator appearing real or fake. There were differences in participant's perceptions of benefits and drawbacks to viewing of seeing the doll as "plastic." Some participants believed learning with a simulator did not translate well to learning and performing with human patients and stated, "Then I realized when I started dealing

directly with the simulator…I felt as if I had forgotten all the assessment skills that I had learned practicing on other students, human, even though they didn't necessarily have problems."

Some students stated the "plastic" nature of the simulator was a benefit because it allowed for greater concentration without the worry of making a mistake with a human patient. One participant stated,

> It definitely helped out a lot in the beginning of our nursing school career because it was easier at first to go up to something that is not real that if you poke it, the wrong wire and something happens, you're not actually hurting anyone.

One student believed the simulator did approximate realism and commented, "I think it's better because it's more real life, like reflective of what it really will be like." Another participant agreed, and stated, "I liked that it was a plastic doll. I really did."

Many students believed there were unrealistic charcteristics of HPS. One participant expressed a common sentiment, stating, "There was only so much that the mannequin could show us. They had to ask what else would you see because the mannequin can't move." Several other participants commented that the simulator did not always operate properly. One of these students recounted,

> So, in my situation, there were a couple of times when I walked into that simulation lab and I started introduced myself and tried to get information from the patient and the patient was not responding, so I thought it was part of simulation, that the patient was unresponsive and then it turned out the fact that the voice wasn't coming out of it.

Another participant expressed that he/she had similar problems with the simulator, stating, "Sometimes I found myself thinking, 'Ok this is this sound, lung sound,' and it was actually the rubber - the material. So that was kind of like my opinion or my experience." A different student suggested the distinction between the simulator and a human patient was insurmountable in some aspects, and explained,

> You don't know what the skin temperature is, the cap refill, any of those little things you can't do that on a dummy so you have to ask the instructor and that broke that false wall that was there and also, I think anatomically there are certain things that are not going to be the same on a dummy.

Other participants felt the simulators could be improved, or they wanted to have access to superior simulators. One such participant stated, "You do have some of the…simulation women that are pregnant or give birth, there's babies. I think that that could have been incorporated into the simulation and it would have helped a lot, too. We didn't have that." Still other participants believed the unrealistic aspects of the simulator could be compensated for with sound assistance from qualified instructors. A participant who felt this way stated,

> I think it's also helpful for the facilitator to have good, solid, clinical experience so that they can bring in the clinical experience into the simulation and just clarify if this is a realistic setting because with a mannequin it's obviously very different than with a human patient.

In summary, participants found the "plastic" nature of the simulator was a benefit of HPS because they could practice and make errors without injury to a real patient. Even so, some students found the lack of realism was problematic related to physical assessment. Most participants wished to improve the realism of the simulators.

Equipment and supplies. This subtheme refers to the comments students made about being introduced to real world equipment and supplies within the HPS environment. Students expressed the importance of having the same medical equipment and supplies available in the simulation laboratory as they used during their clinical experiences. In addition, participants spoke of the excitement of having access to practice with a Pyxis system, an automated medication and supply dispenser. The Pyxis system promotes realism that is consistent with actual nursing practice. One student succinctly stated, "Pyxis in the end was also a really good

idea." Another student stated, "I want something that is a Pyxis that when I hit this, it's going to produce what I want. I want this to be labeled."

Some participants expressed that they did not have access to the latest equipment. With regard to the best learning resources, one student commented, "I'd like to see the latest stuff here because that's what we're seeing out in the hospitals."

One participant commented on the Pyxis system,

> I remember senior year we got registered in the Pyxis but I never even had the opportunity to use it. It would have been really nice to actually go through and utilize because you have a ton of stuff here but somehow you're not utilizing it in simulation.

Another participant agreed, and stated, "I don't think we got to use the Pyxis enough, actually. I think that it would have been helpful."

Other participants noted they wanted supplies to be properly stocked. One such participant stated, "You need to have a stocked med cart and have stuff where it goes and stuff actually there because that was the biggest problem when I went in there." The participant explained the significance of the presence of equipment and supplies in HPS scenarios:

> Because everybody is like stuff happens when you're in the job, it's not always going to work out right. But at least you're familiar with the area and you know for the most part, stuff is going to be where it's going to be. But when we're in there, it's like I turn and look for something and I don't need to spend five minutes to look through every drawer and then turn around and the patient is crashing.

Another participant wanted a more realistic experience, and stated, "You want to mix the medicine, calculate the medicine." Still another participant commented on the lack of available, up-to-date supplies, stating, "I have one negative thing to say about medications. Sometimes they weren't all there. Sometimes you were told, you're going to use this instead of this, we're out of this. So maybe a little more organized regarding the medications." Participants across the

focus groups expressed that they needed the medications and supplies to be available. One participant stated,

> I want to see things more organized and if they're going to ask us to give this and we're supposed to give that, please let it be available to us. Not having it there puts more pressure on me. Organization will help us a lot.

Overall, participants believed the equipment used in HPS sessions should be up-to-date and similar to the equipment and supplies used in their actual clinical experiences. Students also expressed that supplies and medications need to be readily available. Participants believed the HPS environment was a very important aspect of HPS sessions. Students valued being oriented to HPS in order to maximize their learning. The students were dissatisfied with being alone in the HPS session and with having observers in the same room because both environments were stressful. In general, the lack of realism about simulators did not prevent learning. Students wanted up-to-date equipment that was similar to that used in real clinical settings.

Theme 3: Simulation Instructor (Specific Aim 1)

Another theme to emerge was simulation instructor, which refers to the comments made about an instructor's knowledge and competency, and interactions between instructor and students. Although the simulation instructor's knowledge contributed to the sub-theme of 'organization' within Theme 1, educational practice experiences, the 'simulation instructor' is a unique theme related to knowledge and competency, and interpersonal interactions between instructors and students. The following subthemes were identified: (a) Instructor Knowledge (Instructors knowledge about the content they are teaching) and (b) Competency and Instructor-Student Interaction (How the interaction with simulation instructors affected the outcome of the HPS learning experience).

Focus group participants expressed the importance of the simulation instructor being knowledgeable about the content they were teaching in HPS. The participants discussed the differences in their learning with HPS and overall better satisfaction with the HPS experience when they were instructed by instructors who were well trained in the use of HPS and could provide the participants with an honest and constructive critique of their performance.

Instructor Knowledge and Competency. Participants stressed the importance of the simulation instructors being knowledgeable about the content they were teaching. One participant stated, "I think it's helpful that they are either a graduate student or someone with a graduate degree because you feel confident that they know a lot more than you do." Participants stated simulation instructors must be able to explain the pathophysiology, pharmacology, diagnostics, interventions, and evaluation pertinent to the HPS case study. The students expected that instructors be actively practicing in nursing and should be master's prepared. One participant was very positive about the knowledge of the instructor, and commented, "We could ask them anything and they knew about it and was great." One participant went into detail in describing instructor competency:

> I think that somebody who is going to be an instructor for simulation should not only give you some background information on the case that you have that day, but also elaborate afterwards in depth of reviewing some of the things that you have already covered in class but just to apply what you have learned in class into this particular case and go over it more in depth than just ok well this is what happened in there. Just verbally talking about it as opposed to elaborating a lot more to what could have been done or the disease process of that particular case.

In another example, one participant stated, "He knows what he's talking about and I feel that when you know your instructor knows what they're talking about and…you're going to get a lot more." Overall, participant responses were very similar with regard to the knowledge levels of their instructors. Students felt their education suffered when instructors were not well prepared

for the HPS session or lacked sufficient knowledge or ability to maintain a realistic simulation scenario and environment.

Instructor-student interaction. This subtheme reflects participant comments about how the interaction with simulation instructors affected the outcome of the HPS learning experience. Some students believed positive interaction dynamics between student and instructor were very important for the success of the HPS sessions. One participant listed some of the interpersonal qualities they desired in an ideal instructor: "patient, great interpersonal skills, sense of humor." Another participant felt the same, and desired "A relaxed personality." Another participant discussed the importance of the enthusiasm of the instructor, stating, "Enthusiasm was important because it made me want to go home and research." One participant expressed the sentiment of several students and stated they wanted an instructor "who is really positive and nurturing and acknowledged your strengths. And make you feel confident, even though you are going to make mistakes. They empower you to want to keep on learning and want to keep on doing better."

Participants often discussed the interactions they had with instructors in terms of negative past experiences. One participant expressed the sentiment of many students, and stated, "With some of the other instructors I'm like I'm not going to ask him anything because he's going to make me feel stupid." Other participants agreed negative attitudes of instructors negatively affected the HPS experience. On such student stated, "Whereas a few of the other grad students I didn't like at all because they were sarcastic, they were like not rude, but made you feel like you were just plain stupid, didn't know what you were doing."

Participants indicated the simulation instructor must be able to articulate both positive and negative aspects of the students' performance clearly during a HPS experience. "I feel like we were always just talking about what you did right." Another participant

commented in detail that instructors need to act as if they are in real-life health situations, and should not pamper the students so much:

> This may be a little strange but I thought they were too nice because in the real world they aren't going to be like, “Oh that was a good effort.” You either took care of the patient or you didn't. Some of the things people did were not good. You just don't do it. It would be like illegal. I don't think they should be mean, but it was too all accepting. I think we do need to be critiqued.

Participants felt the simulation instructor should provide honest critique and feedback to the student based on performance during the HPS experience. One participant noted, “It's supposed to be constructive critique.” Overall, students felt strongly about how they interacted with their instructors. They felt that positive qualities of interpersonal communication and interaction benefited the HPS experience significantly. Conversely, participants generally felt that instructors with poor interaction skills were a detriment to the HPS sessions. Specific characteristics of the instructor were critical for successful HPS experiences and for promoting learning during a HPS experience. Specifically, students wanted knowledgeable and competent instructors. Students also wanted instructors who had good interpersonal communication and interaction skills.

Theme 4: Learning (Specific Aim 1, 3)

Participants overwhelmingly agreed learning occurs during HPS experiences. The theme refers to the perceptions expressed by participants about the learning outcome experiences of the HPS environment. The subthemes were: (a) Student Preparation, (b) Fear and Anxiety, (c) Individual versus Team Approach, (d) Being the Nurse vs. Being the Observer, (e) Making Mistakes (f) Nurse-to-Nurse Report, (g) Repeating the Case, and (h) Critical Thinking. The theme of learning encompasses students’ perceptions of what was needed to learn effectively,

what particular aspects of their HPS experiences aided in learning, and how particular aspects of their HPS experiences negatively affected learning.

Participants felt students needed to be prepared to maximize their learning during the HPS sessions. A common sentiment among the students was the fear and anxiety that they felt with regard to their HPS experiences. With regard to working in teams, some students preferred individual work because they felt it was more realistic and better prepared them for real life situations. Other participants believed teamwork improved the educational effectiveness of HPS sessions. Students were split evenly about whether it was better to be the observer or the nurse during the HPS sessions, and they elaborated on the positive and negative attributes of each role. Across all focus groups, students felt HPS aided their learning experience by allowing them to make mistakes, learn from their errors, and think critically.

Student preparation. This subtheme addresses the comments participants made about how being prepared through the use of pre-simulation assignments affected the learning experience outcome. Participants were generally positive about how preparation enhanced their HPS learning experiences. One such student stated, "We were given a printed out sheet of like different steps to do," and another student agreed, "I liked how we first started - maybe it was <name and name> but we would get like little cheat sheets." Some participants consistently planned and prepared for their HPS sessions with the help of curricular aids. One participant explained,

> As long as you see what's done or how it needs to be done then you can in time do it yourself. So let's say I have sim on Monday and then I watch the video or how to do it on Sunday and then I watch the video now I know beforehand and once I'm inside I can then apply.

The use of pre-simulation exercises such as reading assignments, listening to audio reports, reviewing the simulated medical records and having access to other resources such as skills

videos were used to prepare for HPS sessions. Speaking about audio reports, one participant noted, "I liked it, because I always like doing anything on the computer that helps to reinforce what I learned in class. It helps me cut down on my study time."

Most participants suggested reviewing the simulated medical record was realistic and allowed the student the opportunity to find information, link data to a plan of care, and help them prepare questions to ask the simulation instructor prior to their performance. A participant explained, "When I go to a chart, I know exactly what to flip to, the medication, doctor's order, check my doctor's order against the MAR." However, others felt the medical record was not useful and did not reflect how one (a medical record) would appear in a real hospital setting. One participant stated,

> A real chart is really long but a real chart is also separated into nurses and nurses' training and doctor's orders, stuff like that. This one was kind of thrown together and you end up reading a lot of pages that are just blank.

Another participant added, "There's a step to follow and the chart is organized a certain way so I could follow it but I didn't feel the simulated medical chart was the same as the hospital's."

Participants described the wide variety of strategies they used to prepare themselves for HPS sessions. The overarching sentiment expressed by the students was that preparation was a generally a personal initiative, and preparation resources were made available by the school. As students became more experienced with HPS sessions, they were expected to prepare themselves more and they received less direct preparation from their instructors.

Fear and anxiety. This subtheme refers to participant comments about how feelings of fear and anxiety affected the learning experience outcome. Participants identified that fear and anxiety were commonly shared feelings prior to and during HPS experiences. It was suggested fear and anxiety were related to being watched by peers. One participant stated, "It was very

nerve racking, there's people watching you all the time." Another like-minded participant noted, "Number one, I was one of the first ones to go actually and the doors were kind of like opened and I knew that people were laughing here and I was nervous in there. That didn't help." A different student believed that speaking with the simulation physicians or nurse practitioners was a cause of much anxiety, and stated, "Talking to doctors. That's like the most nerve-wracking thing for me, having to pick up the phone and ask the doctor a question or whatever and I'm just like, uhh." Other participants noted their fear when performing as nurses in HPS sessions limited their ability to learn from the experience. One such participant explained, "I think I learned more watching than actually doing it. I was too nervous when I was in there because people are staring at you from another room."

However, some students believed the simulator assisted in managing their fear and anxiety. Another student believed the simulator helped to dispel fear, and stated, "I think it helped mostly to take away the fear that it's ok if we screw up here." Overall, participants generally believed the HPS sessions both caused and relieved anxiety and fear. Participants were comforted by knowing that it was okay to make mistakes.

Individual versus team approach. This subtheme refers to the participants' opinions about how the two different approaches affect the learning experience outcome. Participants suggested that, in the first year of HPS experiences, students be allowed to care for a patient simulator in pairs or teams. This approach may allow students the opportunity to work together to solve the case while reducing fear and anxiety. One participant noted, "It's better when you work in pairs. So I just think maybe it would be more beneficial for the people who get more nervous like I did, to work in pairs from the beginning." Another student agreed, and stated, "If you're working with a team, then you know, "you do this, you do this," and it just sort of concretes everything.

For me, it brings everything together and forces it into a situation and that I don't forget." Another participant disagreed, and stated, "I think when you are in this room; it is a lot more realistic. But when you are in the room with the group around, it makes it more low key and not taken quite as seriously."

Participants suggested that during the senior year, students should be expected to perform the HPS experience alone, but with the ability to call in resources or assistants as needed. For example, one student commented, "I like going in by myself. I want access to others." The participants stated this would allow independence and parallel a real hospital situation where there would be resources to call on if needed. One student who felt this way stated,

> I think it's frustrating. Because I always, I'm kind of an uppity person and I want to go in there and start doing things so I have to sort of restrain myself and I'll sit here and be like "I want to do this, I want to do this," and then one time actually in simulation, I stood up and I said could we call a code rescue here please and it was ok'd by the instructor but that's how I get sometimes.

Overall, participants were split in their opinions about individual versus team approaches. Some students preferred the realism of individual work, while other participants believed the educational effectiveness of HPS sessions improved with teamwork.

Being the nurse versus being the observer. This subtheme reflects the different comments from participants about being the nurse versus being the observer. In the role of the nurse, the participant completes the HPS experience while be watched by their peers. The observer watches the nurse and prepares comments to provide feedback to the nurse at the completion of the HPS experience. Participants identified that learning occurred both when they were the nurse caring for the patient simulator and when they were observers of another student performing as the nurse. Common perceptions revolved around the pressure of being the nurse under scrutiny

and the benefits from observing others and learning through their mistakes. One participant described two distinct ways of learning to be a nurse:

> There are two very different ways of learning: the observer and the practitioner. As the observer you get to step back, look at the whole picture, see the scenario in a different way whereas while you're practicing it's also helpful but it's very different so playing the two roles complement each other very well.

Most of the participants suggested they learned by doing, critically thinking through the situation, and interacting with the environment. One participant felt the responsibility of being the nurse in the HPS sessions was positive, and stated,

> You feel like you're on the spot and you feel all the pressure on you, but I think it's good because that's how it really is. If you are the RN for the patient, you are the one who needs to prioritize and delegate and get things done for that patient. I thought it was good.

Participants generally felt being the nurse in the HPS sessions was a beneficial experience. One participant noted, "I always felt really anxious, especially before. I would be dreading it, but then I felt like after it was over I was like "Oh that wasn't that bad," or I learned from it." Other participants agreed it was a positive experience, and stated, "Yeah, you never got critiqued" and "Everybody was really positive."

Participants identified they learned through observing the HPS experience by trying to solve the case study before the student nurse acted.

> For me, observing is when I got more out of it. Because when I would go in there, I was so nervous and I was so dying to get out of there that I didn't really pay attention to what I was doing, I didn't care about what I was doing. When I got out of there, I was so happy that I was out of there. So honestly, I learned more from observing.

Participants spoke of discussing the case while the simulation was occurring and researching the correct methods to care for the patient. One participant felt this was very useful, and stated, "I think everybody has a different perspective on something that went wrong and I think that might help also."

Participants noted that discussing and trying to solve the case allowed verbalization of decisions they would make if they were the nurse caring for the patient simulator. One such participant stated, “I learned something from watching it because I would have totally not thought to do it like that.” Participants commented that not having the pressure while performing allowed the opportunity to think without stress and formulate a plan of care. On the other hand, one participant explained the importance of pressure in the HPS environment:

> I thought that was helpful, too, to watch other people because you’re like “oh, crap, you’re not supposed to do that.” And then you’ll see that’s a bad habit that somebody is doing and you say “oh, I’ve gotten into that bad habit, too” and you’re watching them and you say “oh you’re not supposed to do that.” I think that helps with other people’s mistakes.

However, most participants felt feedback from the student observers was not useful. Students expressed that it was uncomfortable to give each other critique. One participant stated, “It's just weird sitting there critiquing your friend when you're pretty much at the same level they are.” Participants discussed students would generally provide a positive critique because they would not want another student to give them negative feedback.

Overall, participants were positive about being the nurse in the HPS sessions, and stated it was a necessary and useful experience. Although many participants recalled feeling pressure or stress about the experience, most stated they were able to get over their stress and felt they gained a valuable experience. Additionally, participants believed the observer experience was a benefit of HPS. Most participants agreed the observer experience was not passive, but was instead a dynamic interaction in HPS sessions that promoted learning.

Making mistakes. Participants viewed making errors and talking about what went wrong during HPS as an opportunity to learn and change behaviors to reduce the possibility of making the same or similar error in a real clinical environment. One participant noted making mistakes

was one of several tools for learning, and stated, “I learned through my experience and through watching some of my classmates make a medication error.” Participants suggested they learned by making mistakes and that simulation instructors should allow errors to occur during a HPS experience. “I made a medication error that was so bad during one of my simulations that I will never make a medication error like that again.” Another participant expressed that mistakes were one of their most valuable learning resources, and stated, “I think simulation is where I should be able to make my mistake and for you to tell me what I should be doing right, what I did wrong.” A simulation comment was offered, “I think when you talk about the case and you talk about what happened, what was good, what was bad, how you can improve next time. For me, that would be the most beneficial.”

Overall, participants felt instructors should provide feedback to the students during the debriefing session related to errors that were made and how to improve performance in the future. Most participants believed making mistakes presented valuable learning opportunities.

Nurse-to-nurse report. One of the subthemes within learning expressed the variety of student perceptions of three types of nurse-to-nurse reports utilized during the HPS sessions (i.e. verbal, audio-recorded and hand written report). Some students believed all of the report types were generally helpful. For example, one student stated, “You get the idea of how to take a report from somebody and you learn how to pick and choose what's important, what's not important, and you get to listen to all the medical jargon guide that they use.”

Different participants appreciated different types of reports for varying reasons. Some participants preferred the verbal report. One such student stated, “You look into the chart. I didn't think that was helpful. I thought the report was better - the verbal report.” Similarly, another student agreed, “I liked the verbal report as well.” However, other students preferred the

training imparted by the audio report. One participant commented, “So having the audio recording I think is better. I mean, the verbal is better but the audio recordings are going to prepare you better because it's not going to be - the verbal reports are not going to happen in hospitals.” Another participant also liked the audio report but preferred the verbal report. This participant stated,

> People's accents may differ. You know you may understand something differently or mistake it in the wrong way. I think that the speech is very quick so you have to go back and listen again, “Did I hear it right?” and then you have to go back and check the chart. So it's kind of like an increased time as opposed to a face to face report.

Overall, most participants appeared to prefer the directness and clarity of the verbal report. On the other hand, several students commented on the effectiveness of being exposed to all three types of reports because that approach better reflected what clinical experience would be like. One participant succinctly expressed the sentiment of many students: “Yeah, because in the real hospitals, there's not going to be enough time for a nurse to sit down and explain all six patients with you for an hour.”

Repeating the case. This subtheme refers to comments made by participants about how being able to repeat an HPS case over and over can help in the overall learning experience outcome. Participants suggested that once a student completes the HPS that he/she be provided the opportunity to do the case again and implement new lessons learned during the first experiences. One participant noted, “It helps me cut down on my study time. Because I’m going over it again and I’m forced to do it.” Participants recommended that doing it again would reinforce the correct way and improve future performance. One student commented on the difference between a simulation and clinical experience, and noted, “A lot of times in clinical you have the same patient over and over and over again and you don't have these bizarre cases where you have to check for Cullen’s sign.” Overall, participants felt they would benefit from repeating cases more

frequently. Students also commented about their preference for having a visual example of how a specific HPS session should be properly done. Participants suggested students have access to a video of a master teacher performing the HPS case the correct way following each simulation. One student said, “I think that would have been beneficial after you have the student do it. Have them do it and then watch them because then you know what you did and you can see what they did.” Another student added,

> That's just like watching discovery health. For real, turn on any of the medical programs and I want to see blank and blank looking really, really nice in their scrubs running around and letting the patient with the HHNS and the DKA and come and smell the fruity breath and stuff like that. I want to see what professionals, what they're doing, are going to do.

Critical thinking. Participants believed one of the major benefits of learning with HPS sessions was that it promoted critical thinking. Critical thinking refers to thinking that requires a nurse to evaluate data, make decisions, and intervene. Some participants believed the problem solving activities required during the HPS sessions helped them to develop critical thinking. One participant stated, “I think things happen very quickly in simulation so we were required to make decisions fast and think on our toes whereas in a real setting things are more gradual.” Another participant agreed, and commented, “I think that is something that develops over time.”

On the other hand, a few participants believed the critical thinking required in their HPS experiences was excessive and could be overwhelming. For example, one student stated, “I think that is very difficult to ask a student who is learning so many new things at once to put them in a simulation experience and say, ‘Think critically.’” Overall, most students could express satisfaction with being able to grow in their critical thinking abilities.

Students valued preparation for HPS including audio reports, simulated medical records, and skills videos. Fear and anxiety occurred with HPS, but most students thought the benefits of HPS out-weighed the stress. There were advantages related to performing solo and in teams

during HPS. Students expressed that there were benefits from acting as both the nurse and the observer during HPS. The opportunity to make mistakes without harming a patient and to experience different types of nurse-to-nurse reports were viewed as positive. Students expressed a need to repeat, or view a simulation situation performed correctly, to reinforce learning, and verbalized that HPS helped them to develop critical thinking.

Chapter Summary

Chapter 4 discussed findings generated by analysis of the qualitative data collected from focus group interviews in a descriptive study exploring student nurses' learning experiences with HPS. Participants agreed HPS was beneficial to their education. The findings showed that participants felt that structure was critical to optimize learning opportunities. Participants acknowledged that curricular integration was important because the linking of HPS with class lecture content helped them to learn the material better. Participants believed the HPS environment was a very important aspect of HPS sessions. Students valued being oriented to HPS in order to maximize their learning. In general, the lack of realism about simulators did not prevent learning. Students wanted up-to-date equipment that was similar to that used in real clinical settings.

Specific characteristics of the instructor were critical for successful HPS experiences and for promoting learning during a HPS experience. Specifically, students wanted knowledgeable and competent instructors who had good interpersonal communication and interaction skills. Fear and anxiety occurred with HPS, but most students thought the benefits of HPS out-weighed the stress. There were advantages related to performing solo and in teams during HPS. Students expressed that there were benefits from acting as both the nurse and the observer during HPS. The opportunity to make mistakes without harming a patient and to experience different types of nurse-to-nurse reports were viewed as positive. Students expressed a need to repeat, or view a

simulation situation performed correctly, to reinforce learning, and verbalized that HPS helped them to develop critical thinking.

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Appendix A

Sample Debriefing Guidelines

Instructions to simulation instructor

1. All students will attend the debriefing following each HPS session.
2. Please spend approximately 20 minutes debriefing the HPS session.
3. Start the debriefing session by asking the primary nurse to discuss how s/he felt the simulation went and how s/he feels s/he performed.
4. Ask the primary nurse if s/he could do anything differently if s/he were to do the HPS experience over again, what would that be.
5. Ask the other students who participated in the HPS experience how they thought the simulation went and if they feel that performance would be different if they were to do the HPS experience over again.
6. Ask the observers how they thought the HPS experience went. Ask what suggestions they have to improve for future encounters.
7. Review pathophysiology, pharmacology, nursing management considerations specific for the HPS experience
8. End the session by asking the students if they have any questions or if they need any resources for review.

Appendix B

Guidelines for Participation and Conduct during the Discussion

This will be read prior to the start of each focus group

1. Thank you for volunteering to be part of the focus group
2. I want to remind you that you may withdraw consent to participate and leave at anytime during the focus group
3. The focus group conversation will be audio recorded for the purpose of transcription
4. I will serve as the moderator for the focus group. I will ask a question and you will have the opportunity to respond.
5. Dr. [redacted] will serve as the note taker and will write notes based on comments made during the focus group
6. Please allow others in the focus group the opportunity to finish their responses before you respond
7. At the end of the focus group I will summarize the comments made and allow each of you the opportunity to make corrections, additions or further explain comments made

Appendix C

Dean's Letter of Support

April 8, 2008

Elaine Parker, PhD
Assistant Professor
University of Massachusetts Worcester
Graduate School of Nursing
55 Lake Avenue North
Worcester, MA 01655

Dear Dr. Parker:

It is my understanding that Jay Kyle Ober will be conducting focus group sessions to research nursing students' experience of using human patient simulation in their education in order to complete his dissertation requirements.

Mr. Ober has informed me that his target population will be accelerated and senior baccalaureate nursing students currently enrolled at the [redacted] School of Nursing and Health Studies.

I support this effort and will provide any assistance necessary for the successful implementation of this study and prompt completion of his dissertation.

If you require any additional information, or if you have any questions, please do not hesitate to call my office at [redacted].

Sincerely,

[redacted]
Dean and Professor
School of Nursing and Health Studies
[redacted]

Appendix D

Individual Email to Participants

Date [Insert date]

Title of Project: **Nursing Student's Experience using Human Patient Simulation in their Education**

Principal Investigator: **Jay Kyle Ober**
School of Nursing and Health Studies
[redacted]

Email: jober@[redacted]

You are invited to participate in a research study to explore BSN nursing student experiences using human patient simulation in nursing education.

As a participant in this study, you will be asked to participate in one focus group discussion with approximately 5 to 7 other BSN students. Each focus group will be moderated by the researcher (Jay Kyle Ober) to fulfill his requirements for his dissertation to obtain the degree of Doctor of Philosophy in Nursing. Questions asked during the discussion will focus on the experiences as perceived by the group related to human patient simulation. In addition, you will be asked to provide some background information about yourself such as age, gender and ethnicity. The focus group session will be audio-taped to allow transcription of the discussion. Another researcher will also be present during the focus group to serve as a note taker. The note taker will take notes that may be pertinent during data analysis.

Participation in this study is voluntary, and will take approximately two hours of your time. By volunteering for this study, you will assist the researcher to better integrate human patient simulation into the nursing curricula. In addition, you will receive a detailed feedback sheet about the study. There are no personal benefits to participation. You may decline to answer any questions presented during the study if you so wish. Further, you may decide to withdraw from this study at any time by advising the researcher, and may do so without any penalty or loss of course credits. All information you provide is considered completely confidential; your name will not be included or in any other way associated, with the data collected in the study. Furthermore, because the interest of this study is in the average responses of the entire group of participants, you will not be identified individually in any way in any written reports of this research. All data will be stored in a locked office to which only researcher has access. Data collected during this study will be destroyed at the end of the study. There are no known or anticipated risks associated to participation in this study. You may feel uncomfortable during the audio-taping of the session. If you feel uncomfortable you may withdraw from participating in the study. Participation in the study or refusal to/withdrawal from participating will not affect your grades at the [redacted]. You will be compensated for your time at the end of the focus group discussion.

At the end of the study, participants will be invited back to review the final data and discuss the findings. This review is optional and not required as part of your participation in the initial focus groups.

I would like to assure you that this study has been reviewed and received ethics clearance through the Human Subjects Research Office at the [redacted]. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Jay Kyle Ober at [redacted] or email jober@[redacted]

Please email Jay Kyle Ober at jober@[redacted] or call his office at [redacted] to sign-up for a focus group.

Thank you for your interest in my research and for your assistance with this project.

Appendix E

Confirmation Email to Participants

[Participant's Name and Address]

Thank you for agreeing to participate in the focus group that Jay Kyle Ober is holding at the [redacted] School of Nursing and Health Studies on [insert date] at [insert time] at the [redacted] conference room located on the [redacted] of the School of Nursing and Health Studies building. The Researcher, Jay Kyle Ober, will be conducting this research to fulfill his requirements for his dissertation to obtain the degree of Doctor of Philosophy in Nursing. Enclosed with this letter is a map and directions that show you how to get to the [redacted]. We will be meeting in the conference room, and the staff at the front desk will be happy to show you where the room is.

As we explained in our earlier email, the purpose of this focus group interview is explore the experience of BSN nursing students who use human patient simulation in their nursing education. You will be part of a group of six to eight other BSN students who are currently enrolled in the nursing program. We know that students have a great many different experiences and ideas about human patient simulation, and we are very interested in hearing your thoughts on this subject.

The session will begin at [insert time] and will end at [insert time]. We know how valuable your time is, and we respect everyone's schedules by both starting and ending on time. So, please allow yourself enough time to reach the [redacted]

[redacted] by [insert time]; if you arrive after the discussion has started, we may not be able to include you.

We will provide pizza, salad and beverages at that start of the meeting. In addition, you will receive a $10.00 Star Bucks card for your participation. We will be audio-recording the group discussion and taking hand-written notes so that we will have a complete record of the things that we hear from you and the others. We will, as we promised, maintain strict confidentiality of these recordings.

Once again, we are glad you have accepted our invitation to participate in this group. Of course, the success of any group depends on each of its members, so we are counting on you. Remember that your participation is entirely voluntary; however, if you find you cannot attend or change your mind we would appreciate a phone call at [redacted] as soon as possible so we may locate a replacement.

We look forward to meeting with you on [insert date] at [insert time].

Sincerely yours,

Jay Kyle Ober

Principal Investigator

[redacted]

Email: jober@[redacted]

Appendix F

Informed Consent Form

BSN Nursing Student's Experience using Human Patient Simulation in their Nursing Education

PURPOSE:
You are being asked to volunteer for an audio-taped and hand-recorded focus group discussion for a research study of BSN Nursing Student's Experience using Human Patient Simulation (HPS) in their nursing Education conducted by Jay Kyle Ober at the [redacted]. The purpose of this study is to learn more about the experiences of BSN students who used HPS in their undergraduate nursing education. The results of the study may aid in the development of new simulation procedures and frameworks that allow successful integration of HPS into nursing school curricula.

PROCEDURES:
You will self schedule for one of the focus group sessions by emailing the researcher directly. Each focus group will have approximately 6-8 participants. The researcher will ask the group questions and individuals will have the opportunity to answer the questions and describe their simulation learning experiences. In addition, you will be asked to provide some background information about yourself such as age, gender and ethnicity. The focus group will be audio taped. The audio tapes will be sent to an outside company ([redacted].) to transcribe your answers but will not transcribe your name or any identifiable information. The focus group discussion will last a maximum of two hours. Another researcher will also be present during the focus group to serve as a note taker. The note taker will take notes that may be pertinent during data analysis. At the conclusion of the study, some participants may be invited back for a summary of the findings. Volunteers will be sought during the initial focus group session. This review is optional and not required as part of your participation in the initial focus groups.

RISKS:
We do not anticipate any risks to you as a result of participating in this research. You may feel uncomfortable because you are being audio taped. If you feel uncomfortable being audio taped please alert the investigator and you will be free to leave the focus group session.

BENEFITS:
No benefit is promised to you from your participation in this research.

ALTERNATIVES:
You have the alternative not to participate in this research. If you choose not to participate in this research, your grade or academic standing will not be affected. You may stop participation before or while you are participating in the focus group at any time without consequence.

COSTS:

There are no costs to you to volunteer for this research.

PAYMENT TO PARTICIPANT:
You will be provided a $10.00 Star Bucks gift card for your participation in the focus group discussion.

CONFIDENTIALITY:
The researcher and his assistant will consider your research records confidential to the extent permitted by law. The audio tapes will be secured in the researches locked office. All audio tapes/recordings will be destroyed as the end of the study once the data is analyzed and confirmed. Your records may be reviewed for audit purposes by authorized University employees or other agents who will be bound by the same provisions of confidentiality. Participants will not be identified by name during the focus group discussions. Each participant will be asked to not share any information discussed during the focus group sessions with others.

RIGHT TO WITHDRAW:
Your participation is entirely voluntary; you have the right to withdraw or to skip any questions during the focus group discussion.

Your desire not to participate in this study or request to withdraw will not adversely affect your grades at the [redacted].

OTHER PERTINENT INFORMATION:
The researcher will answer any questions you may have about the study. The researcher will give you a copy this consent form. If you have questions about your rights as a research participant you should contact The Human Subjects Research Office at [redacted].

PARTICIPANT AGREEMENT:
I have read the information in this consent form and agree to participate in this study. I have had the chance to ask any questions I have about this study, and they have been answered for me. I am entitled to a copy of this form after it has been read and signed.

_____ _____
Signature of Participant Date

_____ _____
Signature of person obtaining informed consent Date

Principal Investigator's Name:

Jay Kyle Ober
School of Nursing and Health Studies
[redacted]
Email: jober@[redacted]

Appendix G

Consent to Audio-Record Participants

LOGO REMOVED

Authorization for Audio/Video/Photography Recording in a Research Study

I hereby authorize Jay Kyle Ober at the [redacted], School of Nursing and Health Studies, to videotape and/or record sound recordings of me_____.

I authorize Jay Kyle Ober and the University to use in any manner said tape recordings, in whole or in part as follows***:***

For research purposes only.

I agree that Jay Kyle Ober, the [redacted], its Trustees, officers, employees, faculty and agents will not be responsible for any claims arising in any way out of the taking and use as described above of such photographs and/or recordings. I understand that I will not have an opportunity to inspect and approve such photographs or recordings prior to their use.

Signature of Participant:	**Printed Name of Participant:**	**Date:**

Signature of Witness:	**Printed Name of Witness:**	**Date:**

Appendix H

Sample Recruitment Flyer

[redacted]
School of Nursing and Health Studies

Nursing Student's Experience using Human Patient Simulation in their Education

We are looking for nursing students to participate in an audio-taped and hand-recorded focus group discussion for a research study of the BSN Nursing Student's Experience using Human Patient Simulation (HPS) in their nursing education at the [redacted].

Each focus group will have approximately 6-8 participants. Focus group sessions will be held at the [redacted] in the School of Nursing and Health Studies building, [redacted]. The focus group discussion will last a maximum of two hours where you will describe your simulation learning experiences.

The results of the study may aid in the development of new nursing school curricula.

Only students that have been continuously enrolled as a first time senior student in the traditional or accelerated BSN program at the [redacted] School of Nursing and Health Studies since August 2006 and 2007 are eligible to participate.

Compensation will be provided for participation

<u>If interested, please call or e-mail:</u>

Jay Kyle Ober
School of Nursing and Health Studies
[redacted]
Email: jober@[redacted]

Appendix I

Student Nurses' Experiences of Learning with Human Patient Simulation

Jay Kyle Ober

Demographic Questionnaire for Focus Group Participants

DATE:

The following information will be used to develop a demographic profile of our focus group participants. Thank you for your participation in the focus group and for completing this survey as accurately and completely as possible.

AGE: _____

GENDER: Male Female

RACE/ETHNICITY: White Black Asian Pacific Islander
American Indian Latin Haitian
Other:_____

ACADEMIC YEAR: Junior Traditional Senior Accelerated Senior