Effects of High-Fidelity Human Patient Simulation Experience on
Self-Efficacy, Motivation and Learning of First Semester
Associate Degree Nursing Students

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Abstract

One of the newest methodologies in nursing education is high-fidelity human patient simulation (HPS). Many nursing educators have embraced the method as it offers a strategy to facilitate cognitive, affective, and psychomotor outcomes. Despite their popularity, however, HPS systems are costly and, in an era of cost containment and tuition increases, research must be employed to determine its effectiveness and guide its utilization. The purpose of this study is to determine how associate degree nursing students’ self-efficacy, motivation, and learning in the simulated environment compare to nursing educational experiences without simulation.

The mixed-method, quasi-experimental design was chosen for the study with a sample of first-semester associate degree nursing students at 2 technical colleges, 54 in the experimental group and 30 in the comparison group. Results indicated measures of self-efficacy and motivation increased throughout the semester for both groups. The simulation group had a statistically significant increase in general self-efficacy but no significant increase in nursing-specific academic and clinical self-efficacy. In contrast, the comparison groups had a significant increase in nursing academic self-efficacy but not in clinical or more general self-efficacy. Motivation measures were relatively consistent between the groups with only the measure of extrinsic motivation declining for the experimental group. When comparing the two groups on differences between pretest and posttest measures of self-efficacy and motivation, there were no significant differences. The experimental group scored significantly higher on the posttest knowledge examination.
Results of interviews (n = 16) revealed specific themes, some unique to the simulation group and some common to members of both groups. The simulation students reported the importance of comprehensive skill practice, risk-free practice, group participation, and debriefing and instructor feedback. They were often able to identify a specific learning experience in the simulation lab that had impact on their practice. Technical skill knowledge was highly important for both groups. Students in both groups related the importance of a variety of courses in the first semester curriculum as increasing their nursing knowledge, self-efficacy and motivation. Simulation was found to be an acceptable learning strategy for novice associate degree nursing students.
Table of Contents

ABSTRACT .......................................................................................................................... III

LIST OF TABLES ................................................................................................................. X

LIST OF FIGURES .............................................................................................................. XI

CHAPTER 1: INTRODUCTION ........................................................................................ 1

Statement of the Problem ............................................................................................... 3

Justification for the Study ............................................................................................... 4

Research Questions ........................................................................................................... 7

Research Approach .......................................................................................................... 8

Assumptions ...................................................................................................................... 9

Conceptual and Operational Definitions ......................................................................... 12

Summary .......................................................................................................................... 16

CHAPTER 2: REVIEW OF LITERATURE ................................................................ 17

Introduction ..................................................................................................................... 17

Theoretical Framework: Social Cognitive Theory .......................................................... 17

Self-efficacy and Learning ............................................................................................... 22
CHAPTER IV: DATA ANALYSIS

Introduction ........................................................................................................................................ 109

Statement of the Problem ............................................................................................................... 109

Research Questions ......................................................................................................................... 109

Data Analysis .................................................................................................................................. 110

Research Question 1. Is there an increase in self-efficacy with exposure to human patient simulation training? ........................................................................................................................................... 110

Research Question 2. Does student motivation increase with exposure to human patient simulation training? ........................................................................................................................................ 111

Research Question 3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-fidelity human patient simulation experiences and those who have not had this type of experience? .......... 113

Research Question 4. What are the experiences of first semester associate degree nursing students both with and without simulation? .......................................................................................................................... 119

Summary ........................................................................................................................................... 127

CHAPTER V: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ....... 129

Introduction ....................................................................................................................................... 129
APPENDIX F – FUNDAMENTAL NURSING KNOWLEDGE EXAMINATION.. 204

APPENDIX G -- CONSENT FORM................................................................. 210

Background Information.................................................................................. 210

Risks and Benefits of being in the Study......................................................... 210
List of Tables

Table 3-1 Independent and Dependent Variables .......................................................... 68
Table 3-2 MLSQ Subscales and Their Definitions .......................................................... 74
Table 3-3 Self-efficacy and Motivation Instruments and Their Measurement .................. 75
Table 3-4 Semi-structured Interview Guide ................................................................. 78
Table 3-5 Coding Plan for the Demographic Variables .................................................. 89
Table 3-6 Summary of the Number of Subjects in the Quantitative Sample .................... 92
Table 3-7 Age of Participants by Group ....................................................................... 92
Table 3-8 Gender of Participants by Group ................................................................... 93
Table 3-9 Previous Educational Experience ................................................................... 94
Table 3-10 Previous Health Care Experience ............................................................... 95
Table 3-11 Distribution of Expected Grade .................................................................... 96
Table 3-12 Previous Simulation Experience ................................................................. 97
Table 3-13 Summary of the Mean Scores for Familiarity with Technology ........................ 99
Table 3-14 Summary of Instructor Years of Experience ................................................. 100
Table 3-15 Summary of the Mean Scores for Instructor Familiarity with Technology ......... 101
Table 3-16 Comparison of Pretest Mean Scores ........................................................... 102
Table 3-17 Spearman Rho Correlation Coefficients of Dependent Variables and Demographic Variables ................................................................. 104
Table 4-1 Pretest and Posttest Self-Efficacy Means of the Simulation Group ................. 111
Table 4-2 Pretest and Posttest MLSQ Means of the Simulation Group .......................... 112
Table 4-3 Pretest and Posttest Self-Efficacy and MLSQ Means of the Control Group .......... 114
Table 4-4 Mean Posttest Results for Self-Efficacy, Motivation and Knowledge Measures for the Experimental and Control Groups ...................................................... 116
Table 4-5 T-test Results of Differences in Pretest and Posttest Means of the Self-efficacy and MLSQ Scales ......................................................................................... 117
Table 4-6 Results of Knowledge Examination ............................................................ 119
List of Figures

Figure 2-1 Sources of Self-Efficacy Information........................................20

Figure 2-2 Continuation of Self-determination.........................................38

Figure 2-3 Nursing Education Simulation Framework...............................64
Chapter 1: Introduction

Nursing educators use a variety of teaching methods to enhance learning and enable students to become the highly skilled practitioners needed in today’s health care environment. One of the newest methodologies is high-fidelity human patient simulation (HPS), a strategy that combines technology with a human body mannequin. Many nursing educators have embraced the methodology as it offers a strategy to facilitate cognitive, affective, and psychomotor outcomes. Despite their popularity, however, HPS systems are costly and, in an era of cost containment and tuition increases, research must be employed to determine its effectiveness and guide its utilization. In reaching this goal, nurse educators must evaluate several student variables. Two important variables to occupational learning that lead to academic success are self-efficacy and motivation (Bandura, 1997, Pintrich & DeGroot, 1990; Schunk, 1991). The purpose of this study was to determine how HPS experience affects self-efficacy, motivation and learning of first semester associate degree nursing students. Nursing students who have HPS experience were compared to students who received only traditional first semester educational activities.

Safety is a vital concern in health care. To meet the knowledge and skills components required of graduate nurses, a didactic component is combined with practice of psychomotor skills in the school setting and clinical practice in various health care settings. The clinical practice component is designed to allow students to develop a well-rounded knowledge set including psychomotor and problem-solving skills in addition to feelings of competence. Unfortunately, student nurses have limitations in what they are allowed to do in the clinical setting. As one can imagine, skilled practitioners do not feel
comfortable stepping aside and allowing students to independently practice in all situations. However, a graduate of a nursing program is expected to function competently and independently in these areas a very short time after graduation. They must be ready to step in competently to handle varied challenges. Not surprisingly, nursing graduates have reported stressful initial work experiences (Casey, Fink, Krugman, & Propst, 2004; Oermann, & Moffitt-Wolf, 1997). These facts have great consequences on both the quantity and the quality of the clinical practicum offered to students in health care programs such as nursing.

Simulators have been used in training for many years and are available in many disciplines, varying from low-fidelity static models to high-fidelity simulators that highly reproduce reality. Pilot training has relied heavily on this methodology since Edward Link introduced the first pilot training simulator in 1930. Students training in disciplines such as aeronautics, nuclear power, engineering and the military often utilize simulators (Helmreich, 2000; Jha, Duncan, & Bates, 2001). Aviation and the military were the first to use computerized simulation and study in the area of aviation has shown that high self-efficacy is correlated with and predictive of competent performance (Prinzell, 2002; Davis, Fedor, Parsons, & Herold, 2000). As in these disciplines, nursing requires quick decision-making and skilled task performance. Similar training methods are likely appropriate (Havoncsek, 2007; Macedonia, Gherman & Satin, 2003). As simulation is being used in nursing education, similar studies are needed to evaluate its effects on nursing student self-efficacy and motivation. In addition, studies are needed to evaluate the best time to incorporate this type of learning activity into the nursing curriculum.
A variety of studies have suggested that self-efficacy and motivation are important variables for academic success (Bandura & Cervone, 1983; Gist, Schwoerer, & Rosen, 1989, Zimmerman & Martinez-Pons, 1990; Bouffard-Bouchard, 1990). Gist (1987) explained that self-efficacy is related to a number of motivational factors that are important to academic and organizational training and vocational counseling including goal setting and intrinsic interest. According to Zimmerman (2000), self-efficacy is an essential component of academic motivation and is a distinctive predictor of learning and motivation. Self-efficacy is felt to influence key aspects of motivation such as choice of activities, level of effort, persistence and emotional reaction. Bandura (1997) suggested that students with high self-efficacy are more willing to participate in academic activities, give an increased amount of effort, persist longer and demonstrate less adverse emotional reactions when faced with difficult situations. Since self-efficacy and motivation play important guiding roles in achievement, they are important variables to assess when determining the effectiveness of a new learning strategy.

Statement of the Problem

Changes in health care, including high patient acuity, increasing complexity, shortened length of hospital stay, and increased emphasis on quality and error prevention have driven implementation of new methods to provide education for health care students (Tanner, 2008). As is the goal in clinical practice, health care educators must strive to provide high quality education using evidence-based methods. New educational technology such as simulation is becoming readily available but, as the National League of Nursing (2005) points out, effective nursing education requires educational strategies grounded on educational theory and evidenced-based teaching strategies. To date, there
has been some research on the uses and effectiveness of simulation. However, few studies have evaluated its effects on students’ self-efficacy and motivation and its use with novice nursing students. The goal of this study is to determine the effects of self-efficacy, motivation and learning in early nursing education using high-fidelity human patient simulation.

Justification for the Study

Nurses are the largest group of health care providers in the United States, numbering approximately 2.9 million (American Nurses’ Association, 2008). As the population in the country ages and health care needs correspondingly rise, more and more nurses will be needed. The U.S. Bureau of Labor Statistics (2008) lists nursing as the occupation with the largest expected job growth from 2006-2016. However, a significant shortage of nurses exists today and is predicted to worsen over the next few decades (Nevidjon & Erickson, 2001; American Association of Colleges of Nursing, 2008). The average age of currently practicing nurses has been estimated at 45-49 years of age (U.S. Bureau of Labor Statistics, 2004) and these nurses will be retiring in the next 20 years. A national public opinion poll funded by Johnson and Johnson (Penn, Shoen, & Berland, 2001) found 93% of Americans already feel that the nursing shortage jeopardizes the quality of health care. Analysis of methods to effectively and proficiently educate nurses is critical in this era of shortage.

Barriers to increasing the number of nurses have been recognized. A decline in enrollment to nursing programs has been reported (AACN, 2007). In addition, many nursing programs have limited student capacity, at times turning away qualified applicants. Another barrier to increasing the number of nurses is high student attrition
rates noted over the years (Pringle, 2004). Self-doubt and lack of confidence, particularly seen in nontraditional, associate degree nursing students, may limit learning and development of vital nursing competencies (O’Connor, 2001; Lundberg, 2008). With the demand for nurses growing, interventions to assist at-risk students and increase retention are of high importance.

Nursing faculty shortages have been identified as another concern related to the nursing shortage (Yordy, 2006; AACN, 2005). As the average age of all nurses has increased, so has the age of nursing faculty. Despite limited numbers, nurse educators are charged with increasing the supply of nurses to meet the society’s current and future health care demands. In addition, they are challenged to do so in a way that provides professionals who are able to competently meet the challenges prevalent in the current health care system. Graduate nurses must be both theoretically and technically educated, with the ability to think critically and solve complex problems. Classroom instruction alone is not enough. Skills laboratory training and clinical practicum continue to be crucial elements of nursing education.

Creative teaching strategies to increase enrollment and retention in nursing programs such as online instruction, simulated patients, and HPS are being implemented. While many educators agree that HPS will never replace clinical practice, it may prove an effective method to provide hands-on training in an environment that closely resembles the health care setting. Methods to enhance the learning of nursing students and ensuring the achievement of learning outcomes while not requiring more faculty time is a favorable goal and simulation may be an appropriate method to achieve this goal.
Jeffries (2007, pp XII) noted that incorporation of simulation may allow nurse educators to “work smarter and more efficiently.”

The advantages and disadvantages of this strategy have been discussed in the literature (Alspach, 1995; Rauen, 2001, Medley & Horne, 2005). HPS offers students the ability to combine many of the competencies used in the clinical environment—physical assessment, communication, pharmacology, technical skills, and critical thinking, to name a few—in a risk-free setting. Students can independently care for patients and if errors occur, the simulation can be redone without consequence, a practice situation that could never take place in the real clinical environment. Events can be paused for reflection and problem-solving. Comparable experiences can occur for all students. The disadvantages include cost of the simulation system, maintenance, and ongoing upgrades. Faculty preparation time must be considered. Once a simulator is available, faculty training and scenario/lesson planning must occur which are often both quite time-consuming and costly (Issenberg & Scalese, 2008). Student performance anxiety may also be a problem. The HPS experience is most beneficial if a small number of learners are present per session and this may limit access to the simulator.

Nehring and Lashley (2004) in an international survey of nursing schools found that a majority of responding schools purchased high-fidelity simulators after 2002 and many of these schools were using them to provide up to 10% of the time in their curriculum (community college 18.8% of responding schools and undergraduate 31.3% of schools). At this time, sixteen states have given permission for simulation to replace a clinical practicum, five states and Puerto Rico have regulations about substituting simulation for clinical practice in nursing education. To date, Florida has been the only...
state to determine the specific amount of clinical practicum that can be substituted with simulation (up to 10% of clinical time) (Nehring, 2008).

As previously discussed, few studies have evaluated the effects of self-efficacy and motivation on student learning in a simulation laboratory and the studies in this area have focused on baccalaureate nursing students. Many questions are yet unanswered. Do certain students benefit more than others in the simulated environment and, if so, what role does self-efficacy and motivation play? Associate degree nursing education often serves nontraditional students and those who may have both personal and academic stressors when seeking education. Studies have indicated that these students may have lower levels of self-efficacy and persistence level is lower in those with lower self-efficacy (Lent, Brown & Larkin, 1984; Chartrand, 1990; Rosen, 2000, Shelton, 2000; Quimby & O’Brien, 2006). Can HPS experience increase this important variable? This study will also evaluate this question within the context of the nursing education environment, comparing pre and post self-efficacy and motivation measures in both students who receive HPS experience and those who did not receive HPS learning.

Research Questions

The research questions for the study are:

1. Is there an increase in self-efficacy with exposure to human patient simulation training?

2. Does student motivation increase with exposure to human patient simulation training?

3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-
fidelity human patient simulation experiences and those who have not had this type of experience?

4. What are the experiences of first semester associate degree nursing students both with and without simulation?

Research Approach

A quasi-experimental pretest/posttest design was chosen for this study along with qualitative interviews. The study was completed during the fall semester at two moderately-sized technical colleges in western Wisconsin that are part of a technical college system that has implemented a statewide curriculum. Students in the sample were in the beginning clinical course of an associate degree nursing program at the college. Demographic data was collected to describe the sample. Instruments to assess self-efficacy and motivation were administered at mid and end points in the semester. Knowledge acquisition was also evaluated at the end of the semester. Statistical analysis was done to determine if there were differences in pre and post-testing in relation to self-efficacy and motivation scores. Differences between the treatment group receiving HPS experiences and the comparison group, those not receiving HPS experience, were determined. Also, analysis was done to determine correlation between these measures, end-of-semester knowledge, and selected demographic variables. Lastly, to determine further insight into the experience of first-semester associate degree nursing students both with and without HPS practicum, individual interviews were conducted with a small sample of students from both the treatment and comparison groups and analyzed for thematic commonalities and differences.
Assumptions

Since the early twentieth century, scholars such as John Dewey have stressed the importance of self reflection, critical thinking and learning through action (Dewey, 1910, 1916). In his book “Democracy and Education” (1916, p. 358), Dewey recognized that a dualism existed in vocational and educational philosophy. He defined vocation as the direction given a person’s life and felt that an occupation or vocation included many things, including artistry, scientific ability, and citizenship in addition to labor and “engagement in gainful pursuits.” While many of the time felt vocational or industrial education was different than traditional academia, Dewey felt differently. He believed that both aspects of education should be included in all students’ educational experience.

A commonly used quote of Dewey represents his philosophy, “Education is a social process. Education is growth. Education is not preparation for life; education is life itself.” Over the past few decades, more attention has again been placed on Dewey’s philosophy, called the “new vocationalism” (Grubb, 1996; Lewis, 1998). Associate degree nursing education in the 21st century represents a blend of academic and vocational education befitting the description of the new vocationalism. HPS learning within health care education, an active learning process that includes experience, interaction and reflection, fits well into this paradigm.

Effective learning includes experiences that build self-efficacy and intrinsically motivates students. Bandura’s social cognitive theory applied to education supports Dewey’s beliefs. Both explain that self-regulation and cognitive efficacy not only enhance learning but extend beyond the educational setting and into the social arena (Dewey, 1916; Bandura, 1997). Early experiences of success in education build self-
efficacy (Bandura, 1986, Schunk, 1991). In addition, an assumption is made that individuals are inherently motivated. This study evaluates the self-efficacy and motivation level of nursing students over time in their first semester as this early period is a crucial time in their vocational education.

Although sources of self-satisfaction vary from person to person (Bandura, 1997), this study assumes that nursing students will find the HPS experiences satisfying. In previous studies (Feingold, Kalaluce, & Kallen, 2004, Kuznar, 2007), both nursing students and faculty have rated HPS activities as productive and satisfying experiences. An assumption is made that learner satisfaction produces students that are intrinsically motivated.

Although the most appropriate site for the training of professional nurses has been argued of late, the community/technical college level remains a mainstay for this type of education. Since the post-World War II nursing shortage, the associate degree for registered nurse education has been available and there are now over 600 programs in the United States. As Bragg (2001) points out, training in health care and technological fields requires the acquisition of technical skills and knowledge and “preparation for these fields occurs largely in subbaccalaureate vocational programs” (p. 7). This study assumes that registered nurses can be appropriately trained at the associate degree level using evidence-based technological methodologies.

In a world of constantly changing technology and medical advances, teaching methods implemented for teaching health care students must be augmented and updated. These methods must allow students to function at the application, analysis, synthesis, and evaluation levels of learning (Bloom, 1956). Certainly, this involves various methods to
provide both the theoretical and hands-on learning required by nursing students. As Bandura (1986) pointed out, high levels of self-efficacy will not create competent professionals without the development of requisite skills. By the end of their training period, nursing graduates must know how to safely care for patients suffering life-threatening illnesses while managing the ever-changing technological aspects of this care. The importance of skill acquisition is another assumption of the study.

In addition, an assumption is made that clinical practice must be incorporated into education of health care providers. The consumers of health care require health care professionals that are able to provide care that is accessible, high quality, free of errors and affordable (Morton & Rauen, 2004). Professional leaders and organizations also demand excellence in health care professionals’ practice (American Nurses Association, 2008, Nehring & Lashley, 2004b). In order to satisfy society’s expectations, health care programs must incorporate client experiences into the curriculum. Since the Flexner Report to the Carnegie Foundation in 1910 established the model for health care education with two components, a post-secondary-based scientific curriculum and a clinical practicum, instructors have searched for effective means to actively involve students in learning in both realms (Flexner, 1910; Hiatt & Stockton, 2003; Lupien & George-Gay, 2001). Balancing the two components has been a challenge. Simulation may be an acceptable alternative to achieve this balance. The human patient simulation experience may prove to be a student and instructor-friendly method to achieve this balance, teaching theoretical concepts and allowing students to actively apply them to various simulated clinical situations. In addition to personal experience in the simulation laboratory, modeling of effective nursing behavior and verbal persuasion can also be
included in the learning. Within the framework of Albert Bandura’s Social Cognitive Theory (1986), these experiences should have positive effects of motivating students and increasing their feelings of self-efficacy.

Today’s nursing educators face unparalleled challenges that include an increasingly diverse student population, many whom are well-versed in technology and frustrated with the overuse of traditional lecture methods of instruction (Morton & Rauen, 2004). Not only are traditional didactic methods of instruction not preferred by students but they also may fail to develop the critical thinking skills necessary to deal with acute crisis situations in the clinical setting (Murray, Boulet, Ziv, Woodhouse, Kras, & McAllister, 2002). An assumption is made that varied teaching methods are advantageous in meeting the needs of the students and ensuring clinical competency.

Conceptual and Operational Definitions

The important variables and concepts used for the study are conceptually and operationally defined as:

Associate Degree Nursing Student: The current technical nursing programs, patterned after Mildred Montag’s (1959) original curriculum plan, offer intensive nursing training combined with the liberal education needed to create a nurse who can use critical thinking and problem-solving skills to serve the health care needs of the public. Technical nursing education provides the training needed for graduates to communicate clearly, use technology, and work with diverse populations. The graduate of this type of nursing program receives an associate of arts and sciences degree and is eligible to take the licensure examination for employment as a registered nurse. Students in this study are in
beginning semester of an associate degree nursing programs at two Midwestern technical colleges.

*High-fidelity Human Patient Simulation (HPS):* High-fidelity simulators are designed to incorporate computerization so that they greatly replicate reality (Riley, 2000). In health care, HPS refers to a computer-driven, life-sized mannequin that is programmed to respond physiologically as a human would to disease processes and pharmacologic and medical intervention. In this study, a simulator system developed by Medical Education Technologies, Inc. (METI, 2009) is used. The life-size mannequin breathes, has palpable pulses, heart and lung sounds, pupils that react to light, and the ability to produce urine. It may be altered to be either male or female. The simulator is programmed to respond authentically to medications and other treatments. A variety of health condition settings are programmed into the simulator and the instructor conducting the simulation can develop health condition scenarios and alter the simulator’s responses accordingly. Three case study experiences in the HPS setting for this study will allow students to develop basic and intermediate nursing skills including basic physical care and safety, psychomotor skills, physical assessment, communication, and pharmacology.

*Self-Efficacy:* Self-efficacy is defined as “judgment of one’s capability to accomplish a certain level of performance” (Bandura, 1986, pg 391). Two levels of self-efficacy have been identified that are germane to this study: general self-efficacy and task-specific self-efficacy. Bandura’s (1986, 1997) concept of self-efficacy has primarily focused on task-specific behavior. However, he did note that self-efficacy beliefs varied in three ways: magnitude, strength and generality (Bandura, 1977). He acknowledged that some experiences may develop “circumscribed mastery expectations” (p. 194). Others (Chen,
Gully, Whiteman, & Kilcullen, 2000; Sherbaum, Cohen-Carash, & Kern, 2006) have further explored at the concept in terms of generality and a more globalized aspect of the concept than Bandura often referred. General self-efficacy has been described as a motivational trait and task-specific self-efficacy is a motivational state (Chen, Gully & Eden, 2001; Judge, Locke, Durham & Kluger, 1998). General self-efficacy is defined as “individuals’ perception of their ability to perform across a variety of different situations” (Judge, Erez, & Bono, 1998, p. 170).

Task specific self-efficacy is conceptually defined as an individual’s beliefs in his/her capabilities to organize and execute the course of action required to produce given attainments or tasks (Bandura, 1997, p. 3). The concept will be operationally defined as scores obtained from nursing students on the Nursing Clinical Self-Efficacy Scale (NCSES) and selected sections of the Nursing Academic Self-Efficacy Scale (Harvey & McMurray, 1994). The instrument rates self-efficacy of nurses on several specific academic and nursing tasks necessary for competent nursing practice. The Motivated Strategies for Learning Questionnaire (MLSQ) (Pintrich, Smith, Garcia & McKeachie, 1991), also used in this study, includes a self-efficacy subscale which was also completed and represents more general academic self-efficacy.

*Fundamental Nursing Knowledge:* Fundamental nursing knowledge is the underlying principles that are the foundation of nursing practice. These basic principles are introduced in the early semesters of nursing curricula. Fundamental topics of study include anatomy and physiology, the nursing process, health promotion, physical assessment, safety and patient care skills, therapeutic communication skills, and pharmacology. Core themes include interaction between the client, nurse, health and the
environment. In this study, a 30-item multiple choice examination was used to measure various aspects of learning of the first semester of the statewide curriculum. Items were based on the learning outcomes of the first semester of the curriculum.

**Motivation:** In this study, motivation of novice associate degree nursing students will be explored. Deci and Ryan (2000) state “to be motivated is to be moved to do something” (p. 54). Motivation to “do something” can be determined by various influences, including the concepts of intrinsic and extrinsic motivation. The conceptual definition of intrinsic motivation is “the inherent tendency to seek out novelty and challenges, to extend and exercise one’ capacities, to explore and to learn” (Deci & Ryan, 2000, p.70). Extrinsic motivation is defined as “an activity done to attain some separable outcome” (Deci & Ryan, 2000b, p. 60). The concept of motivation will be operationally defined by selected subscales of the Motivated Strategies for Learning Questionnaire (MLSQ), an instrument designed to assess orientations to motivation (Pintrich, Smith, Garcia & McKeachie, 1991). The scales used for this study include intrinsic and extrinsic goal orientaton but also include task value, control of learning beliefs, critical thinking, and self-efficacy for learning. These scales, ranging from 4-8 items each, have been developed to assess subjective experience related to target activities and determine subjects’ interest, enjoyment, perceived competence, effort, value, and perceived choice in a given activity (Pintrich, et al, 1991). The MLSQ includes other scales including test anxiety and learning strategies such as rehearsal, organization, and time/study environment that were not felt to be necessary for this study and were not included.
Summary

Self-efficacy, first described by Bandura (1977, 1977b), is an individual’s belief in one’s ability to succeed. Motivation is “the manifestation of human tendency toward learning and creativity” (Deci & Ryan, 2000b, p. 69). The works of many have shown that both concepts significantly impact achievement in the learning environment (Lent, Brown, & Larkin, 1987; Robbins, Lauver, Davis, Davis, Langley, & Carlstrom, 2004, Semmar, 2006). This quasi-experimental study compared pre and post-test ratings self-efficacy, motivation and knowledge of two groups of associate degree nursing students—those receiving simulation training and a control group who do not receive simulation experience. Simulation is hypothesized to enhance nursing student self-efficacy, motivation, and first-semester learning nursing students. HPS may be a teaching method that will enhance these personal factors to improve the learning experiences of nursing students, increase competence of new graduates, and ultimately increase safety and quality in health care. This study will help to provide answers to questions on the effects of HPS on nursing education.
Chapter 2: Review of Literature

Introduction

This study evaluates the role human patient simulation (HPS) plays on the self-efficacy, motivation and learning of novice associate degree nursing students. This chapter provides an overview of the theoretical framework and literature reflecting the major constructs of the study including self-efficacy, motivation and their application to learning and nursing education. Research in various disciplines has supported the social cognitive theory (SCT). This theory and, specifically, self-efficacy will be outlined in the first section of this chapter along with its application to education. Although research on self-efficacy is vast, selected studies deemed important in advancing the theory will be explored. The following section of the chapter will address research related to motivation, another concept widely studied in academic, business, and health care realms.

Both concepts will then be reviewed in relation to nursing education. Literature related to self-efficacy and motivation in nursing will be explored. The next section of the chapter will outline the development of health care simulation and research published on use of human patient simulation. This research emphasizes both effectiveness of simulation training on performance and satisfaction with the methodology. The use of high-fidelity human patient simulation is relatively new in nursing education and studies are limited. A majority of the simulation studies in all areas of health care have significant limitations due to small sample size.

Theoretical Framework: Social Cognitive Theory

Kerlinger (1986, pp 11) defined theory as “a systematic account of the relations among a set of variables.” Warmbrod (1986) explained that a theoretical/conceptual
framework guides research and increases scholarship in research related to vocational education. For this study, Albert Bandura’s social cognitive theory (SCT) has been chosen as the primary theoretical framework (Bandura, 1997). The theory helps to explain the theoretical foundations for learning, motivation, and one’s feelings of competency and is appropriate as the guiding framework for this study of nursing student learning in relation to self-efficacy and motivation. SCT explains human behavior in terms of a triad of reciprocal determinants. These include behavior, cognitive and personal factors, and the environment.

Bandura proposes that throughout an individual’s life, personal experiences and self-reflection influence the self-belief and behavior. The person may then alter the environment. Subsequent behavior is altered by previous performance and self-reflection (Bandura, 1986; Pajares, 1996). As Bandura explains, behavior is “a product of both self-generated and external sources of influence” (1986, p. 454).

SCT describes how individuals learn, develop values, and motivate and regulate their behavior (Bandura, 1986; 1993). As opposed to those who attribute learning to operant conditioning, Bandura’s theory stresses the person as agent for his/her own behavior (Bandura, 1999). Personal agency, a main tenet of Bandura’s theory, may include one as agent for self, selection of a proxy for one’s agency, and through choice of collective agency. Mechanisms for personal agency include self-regulatory and self-reflective capabilities. Major constructs include outcome expectancy and self-efficacy. The most influential of these mechanisms for personal agency, according to Bandura, is self-efficacy. Personal goal setting and motivation are influenced by one’s level of self-efficacy. Pajares (2003) points out that one’s perceptions of self may be more influential
in what one accomplishes than a person’s actual capabilities. As opposed to self-concept, self-efficacy focuses on actions and goal attainment and can vary from task to task or day to day depending on the difficulty of the tasks asked of the individual (Pintrich & Schunk, 1996).

Bandura proposed that self-efficacy beliefs are formed from four informational sources. These are one’s personal accomplishments (or enactive attainment or mastery), vicarious experience, verbal persuasion, and physiological state (Bandura, 1986).

Personal accomplishments--previous experiences that result in success and mastery—are the most powerful source of self-efficacy. Early failures are suggested to decrease feelings of self-efficacy but failures that occur after successes may not be as influential if a strong sense of self-efficacy has already developed. Without an adequate level of self-efficacy, an individual has little incentive to persevere in the face of challenge (Bandura & Locke, 2003).

Vicarious experiences, or modeling, increase self-efficacy by allowing one to see that if others can succeed, he/she also can. Verbal persuasion such as encouragement and coaching provided by others also contributes to personal success. Bandura (1986) noted that verbal persuasion probably is most effective for those who have capabilities for success but “harbor self-doubts and dwell on personal deficiencies when difficulties arise” (p. 400). Physiological state refers to an individual’s somatic response to stressors and how these responses are perceived. For example, when a task requires strength and stamina, fatigue and discomfort may impact one’s personal self-efficacy. Figure 2-1 is a diagrammatic representation of these influences on self-efficacy and, subsequently, on
behavior. The educational process of nurses encompasses all influencing factors of self-efficacy.

*Figure 2-1. Sources of Self-efficacy Information.*

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Bandura (1993, 1994) suggests that self-efficacy affects four primary areas of psychological processing. In other words, efficacy beliefs demonstrate their effects through the following processes: cognitive, affective, selection and motivational processes (Bandura, 1997). A person’s efficacy beliefs certainly affect how one performs cognitively in many realms including education and work. In the educational setting, Bandura (1997) theorizes that an individual compares what is known with the level of understanding that is desired and then acquires the necessary knowledge. Self-efficacy enhances the individual’s persistence and self-directed performance in acquiring the desired knowledge. Affective processes are also influenced by self-efficacy through...
one’s thoughts, actions and affect. Self-efficacy beliefs focus one’s attention and influence how life events are perceived. Thoughts of perceived control may either cause little or no change in level of anxiety if self-efficacy is high or may lead to high levels of anxiety if self-efficacy is low. Low self-efficacy may also create or worsen anxiety or depressive states and one’s feelings of ability to manage these responses.

Self-efficacy affects the choices one makes in selecting a beneficial environment and the ability to exercise control over the environment. This includes choices involving daily living, social development, education and career path. Bandura (1997) attests that self-efficacy is positively related to performance. In the educational setting, the theorist feels that “a major goal should be to equip students with the intellectual tools, efficacy beliefs and intrinsic interests needed to educate themselves in a variety of pursuits throughout their life” (p 124). Through the development of high self-efficacy, students can become self-directed, lifelong learners.

Lastly, Bandura (1989, 1994) noted that self-efficacy beliefs play a key role in motivation. In fact, he pointed out that self-efficacy determines a person’s level of motivation. Bandura (1997) proposes that high feelings of self-efficacy causes one to set high personal goals and these challenging goals lead to higher levels of motivation and performance. An individual’s past experiences of success increase the feeling of self-efficacy and increase motivation to continue successful performance (persistence).

Motivation is one of the major variables of this study. Bandura relates self-efficacy and outcome expectancy to motivational processes. Other theorists who have focused on motivation are Deci and Ryan (2000, 2000b). Aspects of their theory of motivation, the self-determination theory, are considered for this study along with SCT.
Deci and Ryan’s theory is based on the fact that people are inherently goal-directed with innate psychological needs (2000). Their theory recognizes three specific innate needs that motivate behavior—need for competence, relatedness, and autonomy. Deci and Ryan also identified three aspects of motivation: extrinsic motivation, intrinsic motivation, and amotivation. They note that extrinsic motivation—motivation gained by receiving external rewards or avoiding sanctions—may increase motivation in some cases but usually reduce interest. On the other hand, these authors noted the sustaining quality of intrinsic motivation—the active engagement in activities that an individual finds interesting and “promotes growth” (Deci and Ryan, 2000, p 233). This concept most closely resembles the self-regulation discussed by Bandura. Bandura (1997) suggests that “growth in intrinsic interest is fostered through affective self-reactive and self-efficacy mechanisms” (p. 219). Therefore, a feeling of competence or self-efficacy—a construct central to both theories—increases intrinsic motivation. Bandura and Deci and Ryan differed somewhat in their beliefs on the influences of extrinsic motivation, however, with Bandura (1982) noting that extrinsic rewards may not always decrease interest. This study will look at both perceived self-efficacy and intrinsic motivation, two related concepts important to nursing education and nursing student performance.

Self-efficacy and Learning

Bandura’s lifelong, pioneering research in social learning, including modeling, sensitization, self-reinforcement, and aggression, led to development of the social cognitive theory (Bandura & Barab, 1973; Bandura, 1976, Pajares, 2004). Since 1977, Bandura has published extensively on self-efficacy, studying the construct in a variety of different manners with various populations. In a classic study, for example, Bandura
reported testing self-efficacy through treatment of individuals with snake phobia (1977b). The participants were divided into three groups: one receiving participant modeling (enactive modeling), another receiving modeling alone (vicarious modeling) and a third receiving no treatment. The first group not only observed others in handling and managing boa constrictors, they gradually actively participated in the handling of the snakes. The second group only observed the therapist handling the snake. The control group simply participated in the assessment process at the end of the treatment. The final post-test evaluated the participants’ ability to handle and hold the snakes. For each group, the level, strength and generality of efficacy expectations were measured using an instrument with 18 performance items. Testing was done at the beginning, immediately after treatment, and following post-treatment assessment. The researchers found that “the greater the increments in perceived self-efficacy, the greater the changes in behavior” (p. 206). Those in the participant modeling group had the highest efficacy scores and the greatest change in behavior with the control group the lowest. The vicarious modeling group did have efficacy scores highly predictive of their behavioral changes, too. Self-efficacy predicted performance in 92% of cases who had the enactive treatment and in 84% of the cases where persons did not actively participate or had been so adverse to the treatment that they could not participate or observe. Bandura concluded that self-efficacy and the social cognitive theory were supported by his findings.

Since that study, many others related to self-efficacy and social cognitive theory (SCT) have been performed in the academic setting and pertain to this study. Bandura and Schunk (1981) further tested SCT when they focused on the effects self-efficacy and goal setting have on intrinsic motivation and performance. To test their hypotheses, forty
children with deficits in mathematics were chosen for a treatment plan—a self-directed math learning program focusing on subtraction. Math skills and self-efficacy were measured before and after the implementation of the program. The children were randomly assigned to one of four groups—the control with no treatment, a group with no goals, a group with specific short-term goals (proximal subgoals), or a group with a long-term (distal) goal. Results indicated that, although all children had increases in self-efficacy, the children who received treatment who had set proximal goals had significantly higher increases. Likewise, math performance scores increased significantly, also (p < .01). Those who had the self-directed learning treatment with no goals or with distal goals also had improved scores in both self-efficacy and performance but were not significantly different from each other nor did they score as highly as those with proximal goals. All groups performed better than the control group in all measures. The authors found high levels of congruency between self-efficacy and performance, particularly among the students who had proximal sub-goals. Strength of self-efficacy was found to be a significant predictor of performance (r = .49, p < .001). Also, the higher the self-efficacy rating, the longer the children persevered in solving problems (r = .63, p < 0.025) and the higher the intrinsic interest at the end of the treatment period (r = .27, p < 0.5). Further studies by Schunk (1981, 1983) and Schunk and Hanson (1985, 1989) with school-age children found similar relationships between self-efficacy and performance.

Subsequent studies have analyzed the concept with various types of learners and evaluated self-efficacy’s relationship with other variables. Bandura and Cervone (1983) measured self-efficacy, self-judgment and the effects of goal setting in 90 undergraduate
psychology students. Each of the students completed a survey measuring self-efficacy and self-satisfaction prior to and after the treatment of planned physical exercise using an ergometer. Half of the participants were required to choose personal goals for achievement for the physical exercise program and half were not instructed to set formal personal goals. Within both groups (with and without preset goals), half were provided with performance feedback and half were not. Results indicated that those with goals increased their physical performance by 85% as compared to those who did not set personal goals, who only increased performance by 42%. In addition, those with high self-efficacy ratings increased performance more than those with lower ratings. Self-dissatisfaction—feeling one could have done better than he/she did—was also found to be an important factor. When self-efficacy and self-dissatisfaction scores were combined, they were highly predictive of ability to meet previously set goals ($r = .63$, $p < .002$) and were felt to increase performance motivation. Those with high self-efficacy and high self-dissatisfaction scores performed consistently better on subsequent performance assessments and those with low self-efficacy who rated themselves self-satisfied showed little change in performance. Feedback after the program was also found to be a motivating factor but only significantly when combined with goals. This study demonstrated the importance of self-efficacy and self-evaluation in goal attainment, particularly related to skill performance.

Locke, Frederick, Lee, and Bobko (1984) also studied self-efficacy and goal setting along with task strategies use to evaluate goal choice and task performance. A sample of 209 undergraduate management students were each asked to come up with uses for a simple object. There were 7 trials using different objects, the first being a
practice trial in which ability was measured. The participants were divided into various groups, some receiving training on useful task strategies and others not. Half the group was given goals—the number of uses for the object they should try to come up with—and the other half of groups were asked to set their own goals. Self-efficacy was measured before each trial and performance and the task strategies used were evaluated after each. Multifactorial analysis of ability, self-efficacy strength and magnitude, goals, task strategies, and performance found that all had some influence on performance and self-efficacy had the only direct effect on goal choice. Self-efficacy also had a powerful influence on performance and goal commitment, supporting Bandura’s claims that “self-efficacy is a key causal variable in performance” and “past performance is a key determinant of self-efficacy” (p. 247).

Zimmerman (1989) conceptualized self-regulated behavior of students occurred in a triadic fashion similar to Bandura’s SCT. The three determinants in Zimmerman’s model are personal processes, environment and behavior. Personal processes included academic efficacy which would determine the types of strategies a student would select to alter environment and behavior. Zimmerman and Martinez-Pons (1990) tested the model using structured interviews with middle and high school students. A key finding was a positive relationship between self-efficacy (verbal and mathematical) and self-regulated learning. In other words, high levels of self-efficacy were related to increased use of learning strategies (review of notes, organization of notes, seeking peer assistance, etc). Self-efficacy increased over time when ratings of 5th graders, 8th graders, and high school juniors were compared. The authors also compared students who were considered gifted with those considered regular and found the gifted children had very high ratings
of self-efficacy. They hypothesized this may be related to high motivation and self-regulation in the gifted students. In a similar study, Zimmerman and Kitsantas (2005) found strong relationship between homework completion, self-efficacy and academic performance.

Bouffard-Bouchard (1990), noting that a majority of studies in student self-efficacy were done with school-age children, chose to research the concept at the post-secondary level as well. She studied the effects of self-efficacy and reinforcement on the academic performance of undergraduate psychology students (n = 64). Students rated their level and strength of self-efficacy prior to completing four selected language problems. The students were placed in groups and half received positive verbal reinforcement and half received negative verbal reinforcement. Assessment of performance included the number of correct problems and persistence—the number of problems worked on. Data from each of the groups were compared to ensure that the groups were equivalent and no significant differences were found. Those who received positive reinforcement had higher self-efficacy ratings than those that received negative reinforcement. In addition, the students rating their self-efficacy high completed more problems correctly (r = .63, 0 < .001) and there was a strong positive relationship between high self-efficacy and performance. Conversely, there was no correlation between low self-efficacy and performance in this study. Persistence was also higher in the high self-efficacy group (M = 3.81 vs M=2.64 out of 4). Prior to testing, students were also asked to set goals as to how many of the 4 language problems they wanted to solve. Those with high self-efficacy set high goals, wanting to solve all 4 problems (84%) as compared to the low self-efficacy group (31%). The study’s findings further advanced
SCT and the evaluation of the effects of reinforcement “emphasized the influential role teachers may play in providing their students with cues to help them adequately evaluate their capabilities, particularly when faced with new tasks or domains of learning” (p. 361). The study supported the findings of Schunk and Cox (1986) who found that children receiving positive reinforcement had increased academic self-efficacy and skill.

The types of teaching methods used may affect student self-efficacy and will be explored considering this study will evaluate a new teaching method in relation to nursing student self-efficacy and performance. Schunk (1981) compared school-age children’s development of self-efficacy when receiving different types of mathematics training—either didactic training or cognitive modeling. The didactic training involved assigning the children to read a section in their textbook followed by completion of assigned problems. When they had difficulty, they were asked to read the section aloud and then try again. The children in the cognitive modeling group watched an adult perform math problems while explaining to the children aloud how the results were obtained, followed by the children completing assigned problems. Following initial measures of self-efficacy and math ability (pre-test accuracy), the groups received training and post-treatment measures were obtained. Using multiple regression analysis of five predictors of math performance (self-efficacy, persistence, type of treatment, math achievement score, and pre-test accuracy), the researcher found that each variable explained a significant portion of the variability in the post-test accuracy scores. Those with higher self-efficacy persisted longer in completing problems and performed better. Pretest self-efficacy was found to only account for 16% of the total variation in posttest self-efficacy, however. As predicted, those in the cognitive modeling training group
performed better than those receiving didactic training. Path analysis suggested a direct causal link between treatment and self-efficacy, self-efficacy and persistence, self-efficacy and accuracy, and persistence and accuracy. Those in the didactic group were found to overestimate their abilities prior to the post-test more than did those in the modeling group.

Gist, Schwoerer and Rosen (1989) reported a similarly designed study using an adult population. They evaluated computer self-efficacy in 108 university managers receiving training on new computer software by means of two different training methods. Prior to training, all participants completed an instrument rating computer self-efficacy. They were then randomly assigned to one of two treatment groups. One group received training through a computer tutorial and the other through a video modeling program. The content of each was identical. The results supported the researchers hypothesis that the behavioral modeling training group would achieve higher performance than those in the other training program, F (1, 103) = 6.70, p < .01. They also found, as hypothesized, that those with higher self-efficacy related to computer skills would attain greater mastery than those with low self-efficacy scores. Also, the behavioral modeling training created increased computer self-efficacy for all participants, whether they initially were found to have low, moderate or high self-efficacy prior to the training when compared to the computer tutorial. Those trained via modeling reported more satisfaction with training and felt they would retain the information longer than estimates reported by the computer tutorial group.

Chen, Gully, Whiteman, and Kilcullen (2000) conducted a study looking at the relationships between trait-like individual differences, state-like individual differences,
and learning performance in an academic setting to evaluate for predictors of motivational processes and performance. Self-efficacy was separated into two specific measures—general self-efficacy (trait-like) and task-specific self-efficacy (state-like) in this study of 316 undergraduate students. Overall, the state-like differences (state anxiety, task-specific self-efficacy, and goal orientation) were mediators in the relationship between trait-like differences (cognitive ability, general self-efficacy, and goal orientation) and learning performance. General self-efficacy was determined to be an “important” motivational variable. When it was removed from analysis, it consistently resulted in reduced model fit. Further studies have advanced the concept of general self-efficacy and its measurement (Chen, Gully & Eden, 2001; Sherbaum, Cohen-Charash, & Kern, 2006). Judge, Bono, and Locke (2000) included general self-efficacy as one of the core self-evaluations associated with job satisfaction.

Betz and Hackett (1983) focused on self-efficacy in the area of career decision-making and hypothesized that self-efficacy had an impact on educational and vocational paths. They developed an instrument for assessing mathematics self-efficacy expectations for science-based majors in an undergraduate setting. Results suggested high mathematics self-efficacy was related to the selection of a science-based college major. When comparing men and women participants, the authors also found that men in the sample had higher mathematics self-efficacy than women. Three items related to the use of mathematics with traditionally female skills, such cooking and sewing, were the only items that women scored higher than men. This finding supported Bandura’s prediction self-efficacy expectations are learned and that previous experience was an important source of self-efficacy. The authors explained that this type of research had
important assessment and interventional implications for educators and others have
furthered the understanding of career decision-making self-efficacy, finding it an
important determinant of career decision-making and persistence (Taylor & Betz, 1983,
Peterson, 1983, Peterson & delMas, 2002).

Lent, Brown and Larkin (1984) also evaluated self-efficacy in relation to
academic performance of undergraduate students in a career exploration course at a
technical college. Forty-two students participated in the study and were asked to
complete self-efficacy measures during the first session, at the final session, and 8 weeks
after the course ended. The level and strength of self-efficacy was determined by asking
students to rate how many educational requirements of job duties of 15 science and
engineering fields they could successfully complete (level) and how confident they were
in this prediction (strength). The participants were placed into two groups, high or low
self-efficacy, based on initial self-efficacy scores. Other data was collected for the
participants including PSAT scores and high school rank. When correlations were
performed on course performance, academic measures and self-efficacy level and
strength, those with high levels of self-efficacy consistently had higher course scores. In
follow-up assessment over the course of the students’ time at the college, those with
higher levels of self-efficacy also persisted longer in technical majors. The authors noted
that the general or global aspects evaluated in this study were important to the
advancement of SCT as previous studies had looked at much more specific tasks.

In a similar study, Lent, Brown and Larkin (1987) selected another sample of 105
students taking the same career exploration course. They used multiple regression
analysis to assess the effects of three theoretically derived variables: self-efficacy,
personality/environment interest congruence based on Holland’s (1985) theory, and consequence thinking based on Janis and Mann’s (1982) conflict theory of decision-making. Of the three variables evaluated, they found that self-efficacy was the most predictive of grades and retention in this sample. Self-efficacy was positively related to interest congruence and positive decisional consequences suggesting that with higher self-efficacy ratings, students were more likely to report congruence with the technical/scientific environment and positive consequences of their career choice. As in their previous study, the authors found self-efficacy a useful predictor in the educational setting.

Social cognitive theory and the role of self-efficacy have been tested in many ways and in many disciplines, including health care and organizational arenas. Research in health care has primarily focused on patient self-efficacy for maintaining health or coping with chronic disease. Research in organizational or business literature has usually focused on self-efficacy’s influence on work-related performance. With the increasing number of studies in these areas over the past decades, meta-analyses have been done to further the understanding of the theoretical concepts and relationships of the theory. Holden, Moncher, Schinke, and Barker (1990), for example, conducted a meta-analysis of the ability of self-reported self-efficacy of children and adolescents to predict subsequent behavior. In analysis of the results of 25 appropriate studies, they found the mean effect size to be .334, a moderately strong predictor. Robbins, Le, Davis, Lauver, Langley, and Carlstrom (2004) performed meta-analysis on psychosocial factors and study skills as predictors of college outcomes. There was a moderate relationship (.359)
between academic self-efficacy and college performance and persistence. They found that the best predictors of college outcomes were self-efficacy and grade point average.

Stajkovic and Luthans (1998) provided a meta-analysis of self-efficacy and work-related performance and their findings have application to vocational education as well as to the organizational disciplines. In a review of research spanning over 20 years, 114 studies were selected and reviewed to determine the weight of self-efficacy’s positive relationship with work-related performance. This was found to be $G(r) = .38$, $p < .01$, and the authors suggest that self-efficacy may be a better predictor of work-related performance than other trait-based measures used in organizational studies. They also wanted to determine the magnitude of individual self-efficacy-performance correlation estimates among all studies. Task complexity, task strategies, task focus, skill acquisition were found to be moderators for the relationship between self-efficacy and performance. For example, a very difficult or very easy task or a noisy, stressful environment may decrease the relationship between the two major variables. This study certainly has implications for work settings but may have application in the educational setting considering some of the same moderators (task complexity, task focus, etc) are present in any setting of learning. The authors recommend the development and implementation of “efficacy enhancement programs” to improve self-efficacy and assist in learning complex tasks (p. 256). This idea is also one with application to academia.

Meta-analysis was also employed by Judge, Shaw, Jackson, Scott and Rich (2007) to evaluate self-efficacy and work-related performance. In this analysis, the authors controlled for individual differences including personality variables, intelligence, and job or task experience due to the belief that individuals bring these distal variables to the
work or learning setting with them in addition to self-efficacy and they moderate self-efficacy’s affect on work performance. The meta-analysis included 186 studies. The results somewhat contradicted previous results. The authors found that the effect of self-efficacy was moderated by several of the distal variables. Self-efficacy was found to be more strongly correlated with work-related performance when task complexity was low, there were short intervals between self-efficacy measurement and performance, goals were assigned, and individuals had previous exposure to the task, and students were undergraduate students. Self-efficacy’s affect on work-related performance varied considerably depending on the moderators and, considering all of the distal variables, the predictive value of the construct was decreased by 67.43%. This meta-analysis highlighted the fact that although there are a plethora of studies in this area, there are still questions to be answered.

Other investigators have also questioned aspects of the SCT. Of course, the purpose of basic research is to extend and refine theoretical knowledge (Polit & Beck, 2004) and through challenge and further investigation this will occur. Vancouver, Thompson and Williams (2001) predicted that performance is negatively related to self-efficacy. Basing their study on Powers’ Control Theory (1991), Vancouver et al reported on two studies that indicated that self-efficacy was not positively related to performance. In the first study, the investigators looked at the relationship among self-efficacy, personal goals, and performance. Fifty-six undergraduate students were asked to play a computerized analytical game, Mastermind, for the first study and 187 for the second. In the first study, participants were asked to rate self-efficacy and set personal goals for performance before each of 10 attempts. In the second study, the students were assigned
goals. The authors found a positive relationship between past performance and self-efficacy and past performance and personal goals in between person, across time analysis. However, in the first study, they also found that self-efficacy and personal goals were negatively related to future performance and that the effect of these variables was only 1-4% of the variance in performance in within person analysis. In the second study, the same was true with the variance from self-efficacy approximately 5-7%. They explained that self-efficacy was altered based on past performance but was not a predictor of subsequent performance. They proposed that a high level of self-efficacy may create a sense of complacency that may decrease further performance results.

Vancouver, Thompson, Tischner, and Putka (2002) also reported similar results and Heggestad and Kanfer (2005) additionally reported findings that did not support that self-efficacy was not a strong predictor of performance.

Bandura and Locke (2003) argued that the body of knowledge on self-efficacy definitely supported a positive relationship between self-efficacy, goals and performance. They provided an extensive review of the literature including 9 meta-analyses that contradicted Vancouver, et al’s findings. They felt that Vancouver et al’s selection of a guessing game to evaluate self-efficacy and performance was not the correct method to use to evaluate these variables as chance or luck do not alter self-efficacy. Additionally, Bandura and Locke argued that control theory that proposes that people can alter perceptions but not actions was not appropriate for application to human behavior. The authors concede that when preparing for difficult challenges, some self-doubt may increase preparation. However, they stress that overall, positive self-efficacy, specifically learning self-efficacy, enhances performance.
Prinzell (2002), in a study evaluating pilot safety, found that high levels of self-efficacy was not related to a sense of complacency and supported Bandura and Locke’s arguments. An on-screen flight simulator was used for this experimental study. The study was funded by NASA to determine if pilots with high self-efficacy may relax and allow automation to take control of aircraft, thus potentially decreasing safety in the event of a problem. In fact, finding indicated only pilots with low self-efficacy ratings were noted to experience this sense of complacency in high workload conditions.

Yeo and Neal’s (2006) work indicated that self-efficacy effects may change over time and may vary depending on the level of analysis and specificity. Ninety-three undergraduate psychology students were asked to complete a low-fidelity air traffic control simulation which was repeated in 30 two-minute trials. Measures obtained were task-specific and general self-efficacy, past and current performance. Chen, Gully and Eden (2004) had argued that general and task-specific self-efficacy are different but related variables that may vary in magnitude. Both between person and within person measures were analyzed in addition to changes over time. They found that the relationship between task-specific self-efficacy and performance was negative at the within person level but the relationship was positive between the two variables at the between person level of analysis. General self-efficacy had a positive relationship with task-specific self-efficacy and performance. Both levels of self-efficacy improved with practice over time. The study supported the findings of Vancouver et al (2001, 2002) but also demonstrated novel findings related to SCT. These recent studies demonstrated the need for further research in this area, particularly with varying tasks and populations. Yet, at this point, most agree that self-efficacy is an important determinant of behavior and
learning (Bandura, 1997, Shortridge-Baggett, 2002). One aim of this study is to add to the body of knowledge on the effects of self-efficacy over time.

Motivation and Learning

Motivation is the second concept to be evaluated in this study, a concept related to self-efficacy within behavioral theories. Herzberg, Mausman, and Snyderman’s (1959) Motivation Hygiene Theory introduced two aspects of motivation leading to job satisfaction: intrinsic and extrinsic factors. The theory was based on interviews with business professionals and focused on work-related motivation. Intrinsic motivators, also called satisfiers, are factors that increase work-related motivation and satisfaction such as recognition and personal growth. Extrinsic motivators or hygiene factors are requirements that satisfy workers if in place but lead to dissatisfaction if not in place, such as benefits and adequate working conditions.

Deci (1971) studied the effects of adding rewards on intrinsic motivation and reported on two laboratory experiments and one field study. In all three studies, experimental and control groups performed the same activities deemed to be desirable to the participants. The experimental groups in the laboratory studies were paid for their participation for part of the study but towards the end of the study funding was stopped. The field study experimental group also received rewards, although verbal. Results indicated that the performance of the experimental groups dropped after they were no longer extrinsically motivated, either by monetary or verbal reward. Further research by Deci (1972, 1972 b) also reached similar conclusions and a meta-analysis on studies related to the effects of extrinsic rewards on intrinsic motivation supported this phenomenon (Deci, Koestner, & Ryan, 1999).
Deci and Ryan (2000) pointed out that “no single phenomenon reflects the positive potential of human nature as much as intrinsic motivation” (p. 70). They describe intrinsic motivation as the “prototypic manifestation of the human tendency toward learning and creativity” (p. 69). However, they noted that extrinsic motivation is also a factor in motivating one to pursue certain behaviors. As Deci and Ryan pointed out, a student who does his/her homework due to the value to a chosen career is seen as extrinsically motivated to learn. In their self-determination theory, the authors propose a continuum of motivating factors with some aspects of extrinsic factors nearing intrinsic motivation including those that are seen as personally important and equating to the individual’s own values. They note feelings of competence or self-efficacy increase motivation and feeling incompetence leads to amotivation. (See Figure 2-2). When applied to education, the goal of teaching is to support self-determination through internal motivation and internalization by increasing interest in learning, value of education and confidence (Deci, Vallerand, Pelletier, & Ryan, 1991).

Figure 2-2. Continuation of Self-determination.²

² From Deci and Ryan, 2002.

Pintrich and DeGroot (1990) reported a correlational study evaluating motivational and self-regulating factors affecting academic performance. With a sample of 173 middle school students, the authors tested a Likert-type instrument for determining
factors related to motivation and self-regulation, the Motivated Strategies for Learning Questionnaire (MSLQ). The items were divided into three distinct motivational factors: self-efficacy, intrinsic value, and test anxiety. Cognitive strategies (i.e. memorization, rehearsal, organizing) and self-regulation were also evaluated. High levels of self-efficacy and intrinsic value was found with higher use of cognitive strategies and both also correlated with higher levels of self-regulation and performance. Test anxiety did not correlate with cognitive strategy use and was associated with lower levels of performance. These results indicated motivational factors were linked to cognitive engagement and academic performance. Those who rated high in intrinsic value were motivated to learn, saw the value in the content and reported higher levels of persistence than those rating lower in this motivational factor. Higher levels of performance were not noted to be related to high levels of intrinsic value, however. Pintrich and DeGroot emphasized that both motivational factors, such as intrinsic value and self-efficacy, and cognitive strategies are important for student success. In their words, students must have “the will and the skill to be successful in classrooms” (p. 38). Muller and Louw (2003) also found correlations between intrinsic motivation and interest in content.

Vallerand, Pelletier, Blais, Briere, Senecal, and Vallieres (1992) tested Deci and Ryan’s self-determination theory and motivational continuum by developing another instrument for measurement of academic motivation. The Academic Motivation Scale (AMS) assesses intrinsic and extrinsic motivation along with amotivation. The intrinsic variables measured include motivation to know, accomplish and experience. Extrinsic variables include external regulation, partially internalized (introjected) regulation, and identification--externalized behaviors that become valued by the individual and internally
regulated. Amotivation variables are those that cause a person to feel incompetent, often lead to lack of persistence, and are not felt as either internally or externally motivating. The study of 745 college students found adequate values for validity and reliability for the tool. The authors found slightly higher levels of self-determination and less amotivation in female participants than male. The motivational continuum was supported. The concept has been somewhat questioned since that time by Fairchild, Horst, Finney, and Barron (2005) who used the instrument with a sample of 1406 undergraduate students and found slightly less support for the continuum. Validity and internal consistency of the instrument was supported, however.

Studies have found a relationship between motivation and cognitive abilities and they have been shown to be determinants of learning and job performance as reviewed by Hunter (1986). Kanfer and Ackerman (1989) developed a model of ability-motivation-information processing interactions and reported on a series of studies testing the model. The model proposes that there are distal motivating factors that influence the decision to pursue an activity such as judgments of effort and performance abilities prior to the task (self-efficacy) that will influence goal choice and task effort. Proximal motivating factors also influence performance and these factors include self-regulatory efforts that require attentional effort during task engagement. In the three studies reported, the investigators studied proximal motivating factors of difficult tasks of air traffic controller training. They found that early attention on goal assignments decreased performance probably by decreasing self-regulation and attention to task. The detrimental effect of early goal assignment was greater for those with lower abilities than those with higher. The motivational intervention of goal assignment introduced later in the learning process
was found to produce improved performance, however. This model led to further research on these concepts (Chen, Gully, Whiteman, & Kilcully, 2000, Kirk & Brown, 2003, Yeo & Neal, 2008) and appears to demonstrate the synergistic relationship of motivation and self-efficacy.

Busato, Prins, Elshout, and Hamaker (2000) performed a correlational analysis of intellectual ability, learning style, personality, achievement motivation, and academic success. In the study with a sample of 409 first year undergraduate psychology students, they found a positive correlation between intellectual ability, achievement motivation, and academic success. Achievement motivation, defined as “the striving tendency towards success” (p. 1058), correlated positively with all measures of academic success: after the first exam and after each of three years of undergraduate study (p < .01).

Shell and Husman (2008) noted that personal beliefs continue to be seen as the primary mechanisms affecting motivation. They studied the affect of control on motivation and self-regulation in the classroom setting, noting that control is a component of many behavioral theories including Bandura’s SCT and Deci and Ryan’s SDT. Control and motivation measures included in the ambitious study included self-efficacy, expectancy for success, causal attributions, outcome expectancy, locus of control, goal orientation, future time perspective assessing the relative importance of attaining immediate versus long-range goals, course affect, course anxiety, and strategic self-regulated learning strategies along with study time and effort. Canonical correlational analysis found five patterns in three canonical dimensions ranging from those high in self-regulated strategy use, high effort and high self-efficacy to those with learned helplessness, low self-efficacy, high work avoidance, and high negative affect.
and anxiety. Future time perspective and locus of control were not associated with any of
the canonical dimensions. The finding supported relationships between control and goal
orientation. The study highlighted, as the authors pointed out, the complexity of academic
motivation. The authors recommended further multivariate analysis on these motivational
constructs. Other constructs have been studied for their relationship to academic
motivation including perfectionism (Mills & Blankstein, 2000), sense of relatedness
(Furrer & Skinner, 2003) and various other personality traits (Judge & Ilies, 2002).

Recently, another study also included both motivation and self-efficacy (Walker,
Greene, & Mansell, 2006). In this study, intrinsic and extrinsic motivation, amotivation,
self-efficacy, identification with academics, and cognitive engagement were measured.
The cognitive engagement measure evaluated for either meaningful or shallow
engagement. Significant positive correlations were found between intrinsic motivation,
self-efficacy and meaningful cognitive processing. Negative correlation was found
between identification with academics and amotivation. Shallow cognitive processing
was only correlated with extrinsic motivation. Intrinsic motivation, self-efficacy and
identification with academics were found to be predictors of meaningful cognitive
processing.

Vancouver and Kendall (2006) also evaluated the effects of self-efficacy and
motivation in a study of 63 undergraduate students in an introductory organizational
psychology class. The students completed a series of questionnaires to measure self-
efficacy and motivation before 5 exams. Motivation was measured by evaluating goal
level and planned and reported study time. When evaluating between-person data,
positive relationships were found between goal level and self-efficacy and performance.
Self-efficacy and performance were significantly, positively related, also ($r = .54$). However, when within-person analysis was performed, study time and self-efficacy were negatively related. In addition, when goal level was controlled, self-efficacy and performance were negatively related.

Motivation has been shown to be a key concept relating to academic performance and success. Studies have shown that self-efficacy is an important factor related to one’s motivational level. This study attempted to further understand motivation as it applies to self-efficacy and performance of novice nursing students. Both between-person and within-person analysis are warranted considering the variations in study results in the literature.

Examination of Self-Efficacy and Motivation in Nursing Students

Self-efficacy and motivation have been studied and applied to nursing students’ academic progress over the past two decades. With the complexity of nursing education, including acquisition of scientific and theoretical knowledge along with psychomotor, technologic and psychosocial skills, students must have belief in their abilities to succeed along with the drive to succeed. This is particularly true for associate degree nursing students who have only two years to complete their study. Harvey and McMurray (1994) noted the importance of application of the SCT to nursing. They also noted the lack of an instrument to measure self-efficacy in nursing. They developed the Nursing Academic Self-Efficacy Scale (NASES) and Nursing Clinical Self-Efficacy Scale (NCSES) to measure both academic and skill-related self-efficacy. Psychometric properties of the tools were examined with coefficient alphas for internal consistency of 0.94 for the NASES and 0.96 for NCSES. Construct validity was also evaluated by comparing the
tools to other accepted self-efficacy instruments. Moderately sized relationships were noted (r = 0.20–0.47 for NASES and r = 0.34 – 0.47 for NCSES). This instrument has been used by other researchers since that time.

Andrew and Vialle (1998) explored nursing students’ self-efficacy, motivation and self-regulated learning through learning strategies, and academic performance in science using a variety of instruments including the NASES, the Self-Efficacy for Science (Andrew, 1998) and portions of the MSLQ (Pintrich, Smith, Garcia, & McKeachie 1993). Their research questions focused on finding the relationships between self-efficacy and self-regulated behaviors, to determine differences in these variables between high and low achievers, and to determine the interest in science these students had and how this related to academic success. Three-hundred and three undergraduate baccalaureate nursing students completed the instruments. Results indicated that self-efficacy in science, nursing academic self-efficacy and learning strategy use were significantly correlated to academic performance in science. Those who had the lowest science grades had the lowest scores for all the research instruments. Self-efficacy ratings for high performing students compared with lower performing students were not statistically different in this study. The study did highlight the importance of self-efficacy and self-regulated behaviors for nursing students’ success, particularly in science courses.

DeFelice (1989) conducted a study to determine if self-efficacy was predictive of academic performance of associate degree nursing students. Her results indicated self-efficacy was not a predictor. Jeffreys (1998) surveyed nontraditional undergraduate nursing students and found that self-efficacy, select academic and environmental variable
moderately accounted for variance in predicting academic achievement ($r = .38$, $p = 0.01$). However, students with high self-efficacy did not have the highest course grades. The author explained this finding as related to Bandura’s (1986) thought that those with overly high self-appraisals would take on difficult tasks that would challenge them, thus resulting in lower grades.

Shelton’s (2000, 2003) findings indicated the opposite. She explored factors related to academic success and persistence in nontraditional, associate degree nursing students. The sample was quite large, $n = 458$. Multiple regression analysis was used to determine if demographic variables were predictors of academic self-efficacy, academic outcome expectations, and perceived faculty support. The results suggested demographics were modestly related to academic self-efficacy but were not good predictors of academic outcome expectations or perceived faculty support. Other findings of this study indicated that those with higher ratings for persistence and academic performance had more financial resources and higher grade point averages. In this study, perceived faculty support was related to persistence and academic performance.

Quimby and O’Brien (2006) also evaluated self-efficacy of nontraditional nursing students, a group who may experience significant stress by returning to school and who often have many other roles. The authors specifically chose participants who had children to evaluate the effects of student role self-efficacy, parental role self-efficacy, perceived social support and attachment on factors of well-being (psychological distress, self-esteem and life satisfaction). All of these factors together were found to account for 38% of the variance of psychological distress, 54% of the variance for self-esteem, and
35% of the variance for life satisfaction. Self-efficacy was found to provide unique variance for all three measures of well-being in this group. The authors conclude that assessment of these parameters should be performed by college counselors and interventions aimed at increasing self-efficacy and support for this population.

A few studies related to nursing students’ self-efficacy have evaluated the concept in relation to career choice. Muldoon and O’Reilly (2003) compared levels of self-efficacy between genders in nursing education. Occupational and academic self-efficacy was assessed using a tool adapted from Betz and Hackett (1981). A main effect for gender was found for academic self-efficacy with males scoring slightly higher than females. No main effect was found for gender in occupational self-efficacy. A limitation with this study, as with any looking at gender in nursing, was the disparity between the number of male and female participants in the study (male = 54, female = 350).

In a related study, Ofori and Charlton (2002) developed and tested a model that age and entry qualifications affected motivational factors including self-efficacy, outcome expectancy, and academic worries and these would, in turn, affect support-seeking behaviors and performance. The sample included 315 undergraduate nursing students ranging in age from 18-50. Entry qualification and support-seeking behaviors were found to have a positive relationship with performance. High entry qualifications had a direct positive effect on self-efficacy (p = 0.15, p < .01). Interestingly, students with high self-efficacy showed lower support-seeking behaviors. As the authors point out, this is similar to the findings of Schunk and Hanson (1985) who found that students with high self-efficacy tended to use fewer self-regulating behaviors.
Few studies have looked at motivation in the nursing student population. One of the few, by Braten and Olaussen (2005), noted that many variables together—personal interests and beliefs, self-efficacy, task value, self-regulated learning strategy use, and goal orientation—characterized what is considered motivation. They set out to see if they could identify distinct student profiles that would define student motivation. Nursing and business students were included in the sample. Three clusters of variables were identified for nursing students. Labeled positive, moderate and low motivation clusters, the positive cluster included high personal interest in the field, high self-efficacy, orientation towards task mastery with positive valuing of task mastery. The low motivation cluster included low interest, decreased self-efficacy, and modest interest in task mastery. Those in the positive clusters used more elaborate learning strategies and held more sophisticated epistemological beliefs than the students in the moderate or low motivation groups. A MANOVA with the various clusters found significant differences between them. Nursing students were followed over 2 years and the investigators found a move to a moderate level of motivation for 54% of those who had been in the high motivation cluster. Those that were classified as moderate for the first year remained in that cluster but only 19% of those in the lower motivation cluster improved their motivation level. Similar findings were revealed for the business students.

Nilsson and Stromberg (2008) explored the level of motivation of nursing students through three years of education. The data-collection instrument was developed by the investigators and consisted of a short survey followed by open-ended questions asking for factors that affected motivation. Results showed that motivation significantly fluctuated during the program. Students with low ratings of motivation often reported
difficult content or difficult life circumstances as reasons. Those with high motivation provided more written comments and often associated stimulating content and instructors, a positive attitude, and the desire to be a nurse as motivational factors. The results of this study support Spouse’s (2000) qualitative findings that positive preconceptions of nursing motivate students to persist despite academic setbacks and difficult work/study environments.

With the variety of studies in many disciplines supporting the positive correlations between self-efficacy and increased academic performance, studies have also been designed to test interventions that increase self efficacy. Madorin and Iwasiw (1999) reported results of a study evaluating changes in self-efficacy after use of a computer-assisted instructional simulation program. Using a quasi-experimental pretest/posttest design, the experimental group demonstrated higher self-efficacy scores immediately after the computer-assisted program as compared to a control group. However, 8 weeks after the program, the experimental and control groups had no difference in mean self-efficacy scores.

Jeffries, Rew and Cramer (2002), in a study of 70 undergraduate nursing students, compared students’ perceptions of use of an interactive, self-paced learning CD-ROM program which provided simulated case scenarios to perceptions of learning with traditional didactic and skills training. The participants were found to be significantly more satisfied with interactive learning versus traditional lectures and demonstrations. This study did not show significant differences between the two learning methods in regard to pre- and post-test educational assessment scores. Self-efficacy was addressed, however, and there was a trend toward higher self-efficacy in the interactive group.
Babenko-Mould, Andrusyszyn, and Goldenberg (2004) also used a pretest/posttest quasi-experimental design to determine changes in nursing self-efficacy in addition to computer self-efficacy in fourth year baccalaureate nursing students using computer clinical conferencing during their last semester clinical course (n = 24). Nursing self-efficacy did not differ between the two groups in either pre or posttests. Both experimental and control groups demonstrated increased self-efficacy scores overall and time was felt to account for approximately 15% of the variance with a significant within-subject effect for time. Students who used the computer conferencing did show a significant increase in computer self-efficacy when compared to the control group. The authors supported use of clinical conferencing and recommended further study over a longer period of time, possibly over at least 2 semesters.

Parsons (2007) evaluated an online training program to improve self-efficacy of nurse preceptors. Nursing programs frequently turn to experienced clinicians to mentor nursing students in the health care setting and use of nurse preceptors is one of the most popular methods of providing safe clinical experiences. Before and following online preceptor training, nurse preceptors completed knowledge and self-efficacy instruments with repeated testing 30 days after the training, also. Results suggested effectiveness of the training as self-efficacy and knowledge scores both significantly improved after the training. Limitations noted in this study are common for many studies--small sample size and lack of randomization. The instructor-developed tools also lacked previous measures of reliability and validity.

Although computer-assisted instruction and online training are available and have been shown to be effective in meeting learning outcomes and satisfying to faculty and
students (Halstead & Coudret, 2000; Jeffries, Woolf & Linde, 2003; Salyers, 2005),
psychomotor skills may be difficult to teach in a virtual format. Jeffries (2000) analyzed
use of an interactive CD-ROM program to teach psychomotor skills. Her results found no
difference in pre and posttests between students training by an instructor and those who
used the CD-ROM. Psychomotor testing was not significantly different between the
groups. The experimental group reported more satisfaction with learning than those in the
traditional group.

Salyers (2007) conducted a similar study, testing the outcomes of a web-enhanced
training program for psychomotor skills. Formative and summative cognitive exam
scores were evaluated along with the outcomes of psychomotor examinations and
satisfaction ratings. Nasopharyngeal suctioning, catheter insertion and wet-to-dry
dressing change were selected as the psychomotor skills to be evaluated. Results
indicated the experimental group using the web-enhanced training performed
significantly better on the cognitive exams than the control group who received
traditional training. The experimental group also performed better on the psychomotor
examination but the difference was not significant. Satisfaction scores in this study were
not significantly different either.

Another type of health care simulation training found in the literature is the
simulated or standardized patient. This teaching strategy requires that a person play the
role of a patient. The health care student interviews the patient and may perform certain
aspects of physical assessment (Yoo & Yoo, 2003; Gibbons, Adamo, Padden, Ricciardi,
Graziano, Levine, & Hawkins, 2002). Care for the simulated patient may be proposed but
actual hands-on treatment is limited. Training is required for the standardized individuals
to allow them to portray certain types of patients accurately and consistently (Lane, Slavin, & Ziv, 2001). This type of simulation requires little technology, has been shown an effective teaching strategy, and leads to authentic assessment (Nu & Barrows, 1994; Ebbert & Connors, 2004).

The more advanced form of technology-assisted instructional method in nursing and health care is high-fidelity human patient simulation. Whereas computer-assisted instruction and web-enhanced instruction offer many aspects of the real life situation, HPS offers a nearly realistic setting. Students can be asked to demonstrate only certain skills or integrate a variety of them. What are its effects on performance, self-efficacy and motivation? The next section will discuss the history HPS and use in nursing education followed a review of the literature related to self-efficacy and motivation with HPS.

History of Simulator Use in Health Care Education

Medical education had its origins in the apprenticeship or guild system but by the late 1700’s to early 1800’s, it had moved into the academic setting, conducted in large lecture halls and laboratories (Flexner, 1910; Christopher, 2006). Medical educators began to realize over 100 years ago, however, that didactic education must be balanced with clinical practicum. William Osler, Physician-in-Chief at Johns Hopkins School of Medicine in the 1870’s, introduced this concept into his medical instruction and is felt to have revolutionized health care education with his method of teaching students at the patient’s bedside (Johns Hopkins, 2004). In a manner unique for the time, Osler “not only required his students to perform autopsies but took them with him to observe his treatment with patients” (Houle, 1976, p. 29).
In 1910, the Flexner Report, a report sponsored by the Carnegie Foundation and named for author Abraham Flexner, proposed that medical schools combine the instruction of science with clinical subjects taught by scholarly physicians (Flexner, 1910; Hiatt & Stockton, 2003; Hotez, 2003; Papa & Harasym, 1999). The report summarized Flexner’s suggestions about the state of medical education following his exploration of 155 schools. He noted that medical education at the time either completely didactic or a type of apprenticeship without didactic instruction. He also noted that there was no consistency in the adequacy and quality of laboratories as well as the training and qualifications of laboratory instructors. This landmark report created great changes in health care education.

Health care educators have since noted the benefits of allowing students to practice in a simulated environment as they learn procedural skills prior to performing them on real patients. John S. Lundy of the Mayo Clinic proposed the establishment of an anatomy laboratory in 1925 to provide medical students the opportunity to practice surgical techniques (Ellis & Bacon, 2003). Cadavers were used for anatomical study. Lundy observed that surgical fellows that practiced techniques in the anatomy lab later performed more skillfully in the operating room. He then developed a simulation program by recreating an operating room environment in the anatomy laboratory. Surgical fellows were observed in performing procedures under conditions similar to those in the operating room and were given valuable feedback on their performance. At the time, however, use of cadavers was limited to large medical teaching facilities. Without the use of cadavers, practice was done during actual surgical experiences and in
the hospital wards. Medical and nursing educators in the early twentieth century recognized the need for better training methodologies.

Consequently, as manufacturing techniques improved, low-fidelity models were developed to simulate the human body and allow students the ability to practice invasive procedures safely and repeatedly. The most commonly used mannequins are low fidelity models, simulating the human body yet not incorporating technology in any way. Fidelity refers to the accuracy with which the model or simulator reproduces the domain (Riley, 2000). Low fidelity mannequins do not provide feedback or respond to interventions. Their correlation to performing procedures on a human is somewhat limited in this respect. As Issenberg (2004) pointed out, these training tools are useful for students’ early practice with simple skills when learning techniques of a procedure are vital and repetition is required.

As technology has advanced so have simulators. The development of screen-based simulation models grew as computer technology advanced. These simulation programs allow students to use on-screen text and graphics to assess simulated client cases, choose therapeutic actions, and evaluate the effects of the chosen actions. Lack of realism and practical “hands on” skill training are criticisms of screen-based computerized simulations, however (Doyle, 2004). These limitations led to the development of the mannequin/model-based high fidelity computerized simulator.

Currently, patient simulators are available that incorporate the computer technology of today with a full-sized mannequin. There are many versions available and often simulate breathing, pulses, heart and lung sounds, pupillary reaction, and the ability to produce urine. The simulators may be programmed to respond to medications and
other treatments as a human would react. Human patient simulators have moved beyond offering students just the ability to learn anatomy or practice techniques or procedures. Today’s students learn the aspects of true patient care when working in the simulation laboratory. They see the simulators’ responses to actions and the consequences of decisions made and actions delivered. Students may develop critical thinking and the diagnostic skills as they react to the simulators’ responses.

Computerized patient simulators were first used in medical education, specifically in anesthesiology, cardiology and emergency trauma management (Sanders, Haas, Geisler, & Lupien, 1998; Marshall, Smith, Gorman, Krummel, Haluck, & Cooney, 2001; Treloar, Hawayek, Montgomery, & Russell, 2001; Holcomb, Dumire, Crommett, Stamateris, 2002). Studies have shown benefits and positive effects of simulation. Issenberg (1999) and his associates identified many benefits of simulation training and assessment and are as follows: (a) predictable behavior; (b) simulators are not stressed or embarrassed as real patients are; (c) findings can be accurately recorded; (d) simulators can be repeated frequently with fidelity and reproducibility; (e) can be used without risk to humans in case of error; and (f) procedures can be practiced that would cause risk to a human if a life-threatening event were not in place. Improved patient safety and dramatic improvement in preparedness in an area of critical risk are solid arguments for implementation of simulation training, however (Yaeger, Halamek, Coyle, Murphy, Anderson, Boyle, Braccia, McAuley, De Sandre, & Smith, 2004). Many reports in the literature explain how to establish a HPS program in health care education programs and provide examples of case scenarios and other curricular issues that need to be addressed (Halamek, Kaegi, Gaba, Sowb, Smith, Smith, & Howard, 2000; Salas & Burke, 2002;
Most medical literature using HPS has found it effective in meeting learning objectives. Both Chopra, Gesink, DeJong, Bovill, and Speirdijk (1994) and Gaba, Howard, Flanagan, Smith, Fish, and Botney (1998) evaluated the clinical performance of anesthesia personnel during crisis situations using HPS systems. Noting that paper and pencil testing may not be able to accurately assess what an examinee would do in an actual setting, these authors realized the need to evaluate actual clinical practice. They also recognized that retrospective recall of crisis events may not provide completely accurate interpretations of events and lend poorly to comparison of events.

Schwid, Rooke, Michalowski, and Ross (2001) studied results of computer anesthesia simulation after use of a mannequin-based anesthesia simulator. Thirty-one anesthesia residents were randomized into two groups. One group received handouts to read prior to use of the screen-based anesthesia simulator. The other received mannequin-based training prior to the computer screen-based simulation. Students who received the mannequin-based simulator training performed better than the other group, mean of 52.6 of 95 possible points versus 43.4 points, p < 0.004. The authors concluded that “computer simulations with feedback are effective as supplementation to traditional residency training methods for the management of medical emergencies.”

Forrest, Taylor, Postlethwaite, and Aspinall (2002) discovered that anesthesia students improved their skills after training with a patient simulator. A group of six novice anesthesia students who had intermittent experiences in a HPS lab were followed.
Scores for novices on rapid induction of anesthesia improved greatly over a 12 week period. These scores were compared to a group of seven post-fellowship anesthetists who had not received HPS lab training and were found to be significantly higher for the HPS group (p < 0.05).

As the high-fidelity simulators have become a more prevalent tool in medical education, it has moved to medical practice research. Simulators are now being used in studies evaluating patient safety issues and licensed practitioner competence (Jha, Duncan, & Bates, 2001; Epstein & Hundert, 2002). Nishisaki, Keren and Nadkarni (2007) discussed simulation’s effect on patient safety and noted that no previous studies had analyzed the relationship between competence, self-efficacy and patient safety.

High-Fidelity HPS Research in Nursing Education:
   Evaluation of Performance and Satisfaction

Use of the high-fidelity HPS with nursing students has developed over the past decade. Much of the published literature on the subject describes the simulators on the market and their use (Bove, 2001; Lupien & George-Gay, 2001; Peteani, 2004; Underberg, 2003; Beyea & Kobokovich, 2004). Some of the reports describe planning to develop an HPS program including writing a business plan, purchasing advice, infrastructure and training, and curriculum and faculty development (Hamo, 1994; Seropian, Brown, Gavilanes, & Driggers, 2004; Seidel & Franko, 2004; Morton & Rauen, 2004). A variety of authors have described learning activities or case scenarios developed for HPS learning (Nehring, Lashley, & Ellis, 2002; Rauen, 2001; Spunt, Foster, & Adams, 2004). Anecdotal evidence suggests that simulation is a very good method for learning in nursing (Lupien, 1998; Kovalsky, 2004).
Nehring and Lashley (2004) reported the results of an international survey used to examine use of HPS in nursing curricula and to evaluate students’ opinions on the methodology. Surveys were sent to 66 schools of nursing and 150 simulation centers, hospitals, and other higher education programs that had schools of nursing nearby. Respondents consisted of 34 schools of nursing (18 university-based and 16 community college-based) and 6 simulation centers. The survey consisted of 37 items designed by the authors. They found that community college programs used HPS for more hours in all courses except maternity than other types of programs. HPS was used least often in graduate nursing programs with only 6 of 18 programs incorporating some type of HPS experience. Thirty of the schools reported less than 25% of their faculties used HPS. Seventy-five percent (75%) of the schools reported that one faculty member had primary responsibility for running the simulator. Information on student opinion toward the HPS use was received from 21 schools. Respondents reported that they felt HPS was useful for developing critical thinking skills, applying theory to practice, providing for better transition to clinical experience, and providing a safe experience without risk to patients. Forty-one percent (41%) of respondents felt HPS should be used for competency evaluation, 11% felt HPS should be used for competency verification in some circumstances, and 23% felt that HPS should not be used to evaluate competency. Also of note is that only three schools reported that they conducted research about their use of HPS.

Feingold, Calaluce, and Kallen (2004) evaluated undergraduate nursing students’ and faculty perceptions of using HPS. These researchers hypothesized, based on a literature review, that clinical simulation involving assessment, clinical decision-making,
communication, and psychomotor performance would be an adequate evaluation of students’ clinical competence. They also felt that simulation experience would provide transferability to clinical practice. A 20-item survey consisting of items mainly categorized into three areas (realism, transfer, and value) was used. Results indicated that students felt that the simulator experience was an accurate test of clinical skills and the item “The technical skills taught in this course are valuable” was rated highest. Lowest rated was that the simulator “improved my clinical experience.” All faculty members felt that the principles taught in the HPS lab would be transferred to a “real world” situation. However, only half of the students agreed that there would be transferability. The authors referred to Benner’s (1984) work on novice to expert practice to explain this finding. Benner had reported that novice nurses were found to focus more on individual bits of information and “lacked a unified view of the whole.” Kuznar (2007) also found student satisfaction with HPS experiences in the associate degree nursing student population using a similar data collection instrument.

Effectiveness of the methodology has also been explored. Nehring, Ellis, and Lashley (2001) evaluated 42 undergraduate students in their study of the effects of HPS on learning in medical-surgical nursing content. Students were placed into groups of five to six students and all received a one hour lecture on the content. A pretest was given after the lecture. All groups then participated in three case scenarios with the HPS. Immediately after the HPS experience, a post-test was completed. Approximately one week later, a second post-test was administered. Results showed a significant difference existed between the pre-test and the first post-test ($z = -5.84, p < 0.05$). No significant
difference was found between the two post-tests. The authors attributed this to retention of information to the HPS experience.

Hoffman, O’Donnell, and Yookyung (2007) compared nursing knowledge of nursing students in critical care nursing following both a 7-week traditional clinical experience in critical care and 7-weeks of HPS experiences. Measures of knowledge were obtained prior to the traditional clinical and following the HPS experiences. The researchers found that there was a significant improvement in the knowledge measures following these experiences. They concluded that use of HPS assisted students in knowledge gain.

Evaluating Motivation and Self-Efficacy with Human Patient Simulation

To date, limited studies have evaluated HPS in relation to its effects on self-efficacy and motivation and few were found with the associate degree nursing student population. A few other studies have evaluated a similar concept, self-confidence, in relation to HPS use and have found increases following HPS experiences (Cioffi, Purcal, & Arundell, 2005; Corbridge, McLaughlin, Tiffen, Wade, Templin & Corbridge, 2008).

Goldenberg, Andrusyszyn, and Iwasiw (2005) reported on evaluating self-efficacy of baccalaureate nursing students (n = 22) before and after 2 half-day HPS experiences. A researcher-made tool to assess self-efficacy for health teaching was developed and divided into sections for assessment, planning, implementation, and evaluation of teaching. They found that health teaching self-efficacy did significantly increase overall when comparing pretreatment ratings to posttreatment ratings (p < .001). Also, specific areas of the teaching process--assessment, implementation and evaluation--also increased
significantly. No significant relationships were found between self-efficacy scores and
demographics. Over half of the participants rated the simulations as effective.

Ravert (2005) reported on her study comparing three groups of undergraduate
nursing students: one group not using HPS technology but only enrichment activities in
nursing education (n = 13), one group using HPS technology along with enrichment
activities (n = 12), and a third using HPS technology along with only standard lecture, no
enrichment activities (n = 15). The three groups were compared in regard to critical
thinking, self-efficacy with nursing skills, and perceptions of benefit with HPS. Learning
styles of the members of each group were also analyzed. Overall, critical thinking and
self-efficacy improved for all groups but no statistically significant differences were
found between groups. The author noted that sample size limited the power to detect the
effects of the groups’ differences. No statistical differences in learning styles between
groups were found. The second group members were evaluated for their perceptions of
working with the simulator. They were asked to rate the benefits of the simulator from 1
(of little benefit) to 5 (very beneficial). All areas evaluated were found to be perceived as
beneficial: understanding physiology (4.08); performing nursing interventions (4.33);
working as a team (4.42); developing confidence in abilities (4.58); and developing
critical thinking (4.83).

Rockstraw (2006) evaluated self-efficacy of undergraduate nursing students who
were educated using HPS and standardized patients—individuals who role-play as
patients (n = 60). He hypothesized that both methods would increase self-efficacy but
there would be a difference in self-efficacy between the students in these groups. Also,
he felt performance of taking blood pressure and pulse would be improved but more so in
the groups with high self-efficacy. His research indicated that both methods of simulation significantly increased self-efficacy of undergraduate nursing students and supported student learning outcomes. There were no significant differences between the self-efficacy scores of the two groups. Also, the level of self-efficacy did not have an effect on the performance of the skills.

In a similar study, Michael (2005) found that simulation increased self-efficacy scores in undergraduate nursing students to a higher degree than traditional laboratory experiences. Eighty-nine students rated self-efficacy after traditional lecture, after traditional skills laboratory and then after a simulation experience. Significant increases in self-efficacy occurred over time but the greatest increase in self-efficacy was seen after the simulation experience. Larson (2006) reported a pilot study comparing 2 small groups of undergraduate nursing students. Three students received HPS training and 3 received standard clinical experience. He found that self-efficacy on the NCSES was significantly higher in the group that had received HPS training.

In a descriptive study, Schoening, Sittner, and Todd (2006) evaluated undergraduate nursing students’ perceptions of meeting learning outcomes after HPS experience. A 2-point Likert-type evaluation tool based on the learning outcomes was used. Students rated the objectives as met to a high degree (m = 3.64). Review of reflective journals after the experience found students commenting on increased feelings of confidence and competence more than any other aspect of HPS. The authors equated these comments with increased self-efficacy.

Leigh (2008) conducted a study with senior undergraduate nursing students to evaluate their competence as they were preparing to graduate, citing the significant
responsibilities placed on new graduate nurses. Response to simulated emergency situations was tested and a one-group pre-test, post-test design was selected (n = 65). The investigator found statistically significant increases in self-efficacy after the simulation experience.

Jeffries and Rizzolo (2006) directed a national multisite study of HPS use in nursing. One portion of the study evaluated nursing confidence levels following simulation experience. Groups of undergraduate nursing students received either HPS experience, static mannequin simulation experience, or paper-and-pencil case study experience. Using an 8-item instrument, the Self-Confidence in Learning Using Simulation Scale, the researchers found that both groups of students who had simulation experience had an increase in self-confidence over the group of students who received the paper-and-pencil experience.

Bambini, Washburn, and Perkins (2009) conducted a study to determine the effects of HPS on self-efficacy and clinical judgment of 112 undergraduate students about to enter their first clinical experience, a clinical rotation in maternal-child nursing. Students rotated through 8 stations that focused on various aspects of postpartum and newborn care. Pretests, posttests, and follow-up surveys were obtained. Results of the instruments indicated an increase in self-efficacy (p < 0.01) and confidence in postpartum assessment skills (p < 0.001). A qualitative portion of the study found students felt more prepared for clinical practicum in regard to communication with patients, confidence with required psychomotor skills, and improved clinical judgment and prioritization abilities.

Based on the research to date and experience, Jeffries (2005) developed a theoretical framework for simulation design. The framework was designed to specify relevant
variables of HPS and explain their relationships. The goal of the model is to guide design and implementation of simulations the assessment of their outcomes (Jeffries, 2005). The framework explains the interactions and relationships of teacher, students, educational practices, learning outcomes, and simulation design characteristics. Teacher factors include the demographics. Student factors to be considered are the type of nursing program the student is enrolled, the level the student has reached in the program, and student age. Educational practice factors included in the model are active learning, feedback, collaboration, student/faculty interaction, high expectations, diverse learning styles, and time on task. Simulation design characteristics are other important to consider when designing simulations. These include the learning objectives, degree of simulator fidelity, problem-solving and the level of complexity of the simulation, available student support, and reflection/debriefing. The last component of the model is the outcomes of the simulation experience. The factors for this component include the knowledge gained, skills performed, learners’ satisfaction, critical thinking and self-confidence (Jeffries, 2005; Jeffries, 2007). (See Figure 2-3). Continued use and testing of the model is recommended by the author.
Summary

Conclusions drawn from the review of literature are:

1. Self-efficacy is an important factor in vocational education and high self-efficacy is associated with improved learning outcomes.

2. Intrinsic motivation improves academic and personal outcomes and may as well increase the identification learners develop with content area study interest (Deci, Vallerand, Pelletier, & Ryan, 1991, Muller & Louw, 2003).

3. Advances in technology and the need to provide realistic, safe clinical experiences in medical education led to the development of the human patient simulator. The literature, primarily in the areas of anesthesiology, cardiology and emergency medicine, supports the effectiveness and satisfaction of HPS use.
4. Nursing research on the use of HPS is limited but does support use of this method with potential increases in self-efficacy, intrinsic motivation, and, ultimately, improved competence which will translate to safer practitioners. Few studies have explored the constructs with associate degree nursing students. A framework has been developed for nursing education simulation but further education is research is required to support the framework.

5. Further research and replication of research in this area of nursing education is needed to establish important generalizations about this methodology.
Chapter III: Methodology

Introduction

This chapter outlines the mixed method design of this quasi-experimental study intended to determine the effects of human patient simulation (HPS) experiences on novice nursing students’ self-efficacy, motivation, and learning. The sample selection process and a description of the sample are presented. The data collection instruments are reviewed as are the methods for data collection. The final section of the chapter discusses the plan for data analysis.

Research Purpose

Self-efficacy and motivation play important guiding roles in achievement (Bandura, 1997, Linnenbrick & Pintrich, 2003) and are important variables to assess when determining the effectiveness of a new learning strategy. Self-efficacy is described as the feeling that one has the ability to achieve. Motivation is the value in an activity or the desire to engage in the activity (Linnenbrick & Pintrich, 2003).

Nurse educators, faced with supplying nurses to meet the challenge of the nursing shortage, utilize traditional methods of providing education including classroom activities and clinical practicum in the health care setting. However, as Jarzemsky and McGrath (2008) point out, acuity level and shortened length of stay limit the ability of student nurses to practice skills and solve clinical problems in acute care settings. A popular adjunct is human patient simulation (HPS), an innovative method of providing more hands-on experiences for nursing students in order to improve safety and competence. The purpose of this study was to determine if HPS experiences alter self-efficacy, motivation and knowledge of first-semester associate degree nursing students. Students
who received simulation will be compared with a control group who do not have HPS experiences. The study will determine if simulation experiences alter students’ self-efficacy and motivation when evaluated on two separate occasions.

Research Questions

The research questions that guided this study are:

1. Is there an increase in self-efficacy with exposure to human patient simulation training?
2. Does student motivation increase with exposure to human patient simulation training?
3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-fidelity human patient simulation experiences and those who have not had this type of experience?
4. What are the experiences of first semester associate degree nursing students both with and without simulation?

Research Design

A pretest/posttest quasi-experimental design was initially chosen for the study. More specifically, a non-equivalent control-group design was used to determine the effect of the treatment without random assignment of participants into experimental and control groups (Gall, Gall, & Borg, 2003). Two groups of subjects were surveyed as to their self-efficacy and motivation at two points during the semester, mid-semester and at the end of the semester. One group received three clinical experiences using high-fidelity HPS in addition to traditional instruction. A measure of fundamental nursing knowledge was
also obtained at the end of the semester to further compare the two groups. Table 3-1 outlines the study’s independent and dependent variables.

Table 3-1

*Independent and dependent variables*

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Self-efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Motivation</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Human Patient Simulation Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demographic data including:</td>
</tr>
<tr>
<td></td>
<td>age, gender, previous education,</td>
</tr>
<tr>
<td></td>
<td>previous health care experience,</td>
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<tr>
<td></td>
<td>previous simulation experience,</td>
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<tr>
<td></td>
<td>familiarity with technology,</td>
</tr>
<tr>
<td></td>
<td>and expected grade</td>
</tr>
</tbody>
</table>

Following initial data collection, a qualitative portion was added to the study to provide further understanding of the experiences of first semester associate degree nursing students both with and without simulated practicum. Qualitative studies, unlike their quantitative counterparts, look for patterns in association to illuminate the underlying meaning and dimensions of the phenomena of interest (Polit & Beck, 2004). Rich descriptions via interviews and observations can increase the researcher’s analytical power (Sandelowski, 2000). Qualitative methods provide the researcher a better position in obtaining meaning from statistical findings. For this study, a two-stage approach or iterative approach was determined as optimal with qualitative data collected after
obtaining the structured self-report data. Individual interviews were conducted with students from both the experimental and comparison groups.

A phenomenological approach was chosen for the qualitative portion of the study. This method’s goal is to determine the “lived experience” of the participants experiencing the phenomenon, in this case HPS learning experience. As Van Manen (1990) described, phenomenology “aims at gaining a deeper understanding of the nature and meaning of our everyday experiences” (p. 9). Interviews were conducted to determine the common and unique experiences of these students. Rich descriptions were used to provide textual data for analysis and aided in determining the essence of the first semester associate degree nursing students’ experience with HPS learning.

The philosopher Edmond Husserl is considered the father of phenomenology. He felt science should be related to human concerns and the everyday life in order to understand and describe the “life world” (Cohen & Omery, 1994). Heidegger studied with Husserl and also worked to develop phenomenology in the early twentieth century, focusing on “being” as opposed to Husserl’s focusing on “knowing.” Over the years, three schools of thought have developed in phenomenology: descriptive (eidetic), interpretive (hermeneutic), and a combination of the two (the Dutch phenomenology). Others have further expanded the phenomenological approach such as Ricoeur, Gadamer, Giorgi, and Van Manen (Ray, 1994). Phenomenology is now one of the major qualitative methods. Van Manen (1990) directed researchers in phenomenology to describe and interpret meanings of life experience in a deep and rich manner. This study will use the tenets of hermeneutic phenomenology set forth in the literature by Van Manen.
Select demographic data were collected from each student including age, gender, previous educational degree, previous experience in the health care setting, previous health care training, previous simulation experience, familiarity with technology, and expected grade. The data was collected using instruments developed by the researcher and included data felt appropriate to the study based on the literature review and the researcher’s experience with HPS methodology. (See Appendix C). The item selection for the demographic data collection instrument took into consideration aspects of the students and their previous life experiences that could impact their response to first semester clinical and HPS practicum.

The age range of the students at the technical colleges varies from 19 to over 50 years of age. Both technical colleges report a majority of Caucasian students. Traditionally, there are few men in the nursing courses. Another factor that varies among students includes their previous health care experience. All students had been trained as nursing assistants, but no work experience was required at either college. Occasionally students have had experience as medical assistants, emergency medical technicians, or military medics. Although the students are in their first semester of the nursing program, some may have been exposed to simulation experience through other health care education programs.

Familiarity with technology, including medical equipment, was another factor considered as important and that could impact the students’ first semester experience. A 5-point, Likert-type scale included on the demographic instrument was designed by the researcher to allow students to rate familiarity with technology. The instrument included
general computer use, email, internet, word processing, cell phone, personal digital assistant, and medical device use. Expected end-of-semester grade was asked as this has been tied to self-efficacy in many educational studies. A majority of the demographic data (age, gender, previous educational degree, previous experience in health care, and familiarity with technology) was collected on the pretest and the remaining items on the posttest (expected grade and end-of-semester familiarity with technology). Instructor demographic variables were also collected including educational level, years of teaching experience, and years of experience teaching with simulation.

The main variables in the study are self-efficacy, motivation, and end-of-semester fundamental nursing knowledge. A group of structured self-report instruments with established reliability and validity measures were selected to measure self-efficacy and motivation. An instructor-developed instrument was selected to measure knowledge. Cronbach alpha reliability measures indicating internal consistency or homogeneity (Polit & Beck, 2004) were determined for the instruments used in the study to measure self-efficacy and motivation. Kuder-Richardson 20 and 21 were calculated to determine internal consistency of the multiple-choice fundamental knowledge examination.

The structured self-report instrument utilized to measure nursing-specific self-efficacy was developed by Harvey and McMurray (1994) and includes two scales, the Nursing Academic Self-Efficacy Scale (NASES) and the Nursing Clinical Self-Efficacy Scale (NCSES). (See Appendix D). The scales were initially developed to assist nursing educators in predicting student attrition and are based on Bandura’s belief that self-efficacy is a best evaluated in a specific fashion, in this case, focusing on nursing and academics. In a series of studies, Harvey and McMurray evaluated the items for
reliability and validity. Initial items were tested for discriminability and items eliminated that had small sample deviations indicating they resembled other items. Factor analysis was performed on the remaining items and factors for the NCSES were determined: treatment skills, interpersonal skills, hygiene skills, and technical skills. Further reduction in items was done and calculation of coefficient alpha results for the remaining items to determine internal consistency were found to be $r = 0.67$ ($p < 0.001$) for the NASES and $r = 0.62$ ($p < 0.001$) for the NCSES. The authors reported test-retest reliabilities for the NCSES was $r = 0.76$ and NASES $r = 0.75$ ($p < 0.001$), showing reliability over time. Construct validity was also evaluated by the Harvey and McMurray, comparing the NASES and NCSES with the other accepted commitment scales. Results of all measures were compared and predictive value for continuation in nursing was found to be present in both nursing self-efficacy scales.

The NASES a 22-item scale that measures a nursing student’s confidence in meeting the academic requirements of a nursing program using a 10 point scale ranging from 1 (very unsure) to 10 (very sure). Items fall within one of four factor areas: basic nursing constructs, science base, microbiology/anatomy, and interpersonal concerns. The items include confidence in the sciences such chemistry, physics, anatomy and physiology, microbiology, and psychology in addition to general aspects of patient care management (“Administrative skills related to unit management.”). All items of the NASES were chosen as appropriate to include for novice associate degree nursing students. For this study, Cronbach’s alpha reliability for the instrument was calculated to be 0.86 for the pretest and 0.96 for the posttest.
Similarly, all 24 items on the NCSES were used in this study. The NCSES uses a 10-point rating scale to determine students’ confidence with patient treatment and the technical and interpersonal skills required of nurses. The original instrument was developed in Australia and a few differences exist in terminology so minor wording changes were made to reflect nursing practice in the United States. For example, some of the medical terminology and spelling is slightly different than in the United States (gynaecology versus gynecology). The use of the instruments with minor wording changes was approved by the primary author of the instrument. Cronbach’s alpha reliability for the instrument was 0.948 for the pretest and 0.955 for the posttest (See Table 3-3).

The Motivated Strategies for Learning Questionnaire (MLSQ) ((Pintrich, Smith, Garcia & McKeachie, 1991)) was selected to measure motivation in this sample. The MLSQ was developed by Pintrich, et al (1991) for assessing college students’ motivational orientations and learning strategies. The instrument was tested by administration to hundreds of Midwestern college students over a period of five years prior to publication. Established Cronbach’s alpha values for internal consistency for each subscale range from 0.52 to 0.93 (Pintrich, et al, 1991). Scale correlations with final grades were found by the authors of the instrument to have moderate predictive validity.

The item has two sections—a motivation section and a learning strategies section. The motivation section measures vital aspects of general motivation such as value, expectancy and affect. Value is measured in subscales of intrinsic goal orientation, extrinsic goal orientation, and task value. The instrument includes subscales for expectancy measuring self-efficacy for learning and performance and control for learning
belief. The original MSLQ includes a subscale for test anxiety but this subscale wasn’t chosen for use in this study. The motivation scales felt to relate most closely to nursing practice were chosen for the study.

The learning strategies section includes rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, time and study environment, effort regulation, peer learning, and help seeking. Only the subscale for critical thinking was chosen from the learning strategies section due to its importance to nursing practice. As defined by Pintrich, et al, critical thinking refers to “the degree to which students report applying previous knowledge to new situations in order to solve problems, reach decisions, or make critical evaluations with respect to standards of excellence” (p. 22). Due to the importance of nursing students’ acquisition and use of critical thinking strategies for safe clinical practice, this learning strategy was included.

Definitions for each subscale are provided in Table 3-2. The number of items varies per subscale from 4 to 8 items. All are rated on a 7-point Likert-type scale, rating items from 1 (not at all true of me) to 7 (very true of me). The items in each of the MSLQ subscales chosen for the study are included in Appendix D and the instrument as arranged for this study is included in Appendix E.

Table 3-2

*MSLQ subscales and their definitions*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Goal Orientation</td>
<td>Participating in a task for challenge, curiosity, or mastery.</td>
</tr>
</tbody>
</table>
Extrinsic Goal Orientation: Participating in a task for rewards, grades, competition, or performance evaluation by others.

Task Value: Degree the student finds the task interesting, important, or useful.

Control of Learning Beliefs: Beliefs that efforts to learn will result in positive outcomes.

Self-Efficacy for Learning and Performance: Self-appraisal of one’s ability to master a task. Also relates to one’s performance expectations and confidence.

Critical Thinking: Applying previous knowledge to new situations to solve problems and make decisions.

Psychometric properties for the self-efficacy and motivation instruments are summarized in Table 3-3. Values were calculated for both the pretest and posttest measures.

Table 3-3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Instrument</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretest</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>Nursing Academic Self-Efficacy Scale</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>Nursing Clinical Self-Efficacy Scale</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>(Both by Harvey and McMurray, 1994)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivated Strategies for Learning Questionnaire</td>
<td>0.97</td>
</tr>
<tr>
<td>Motivation</td>
<td>Intrinsic goal orientation</td>
<td>Extrinsic goal orientation</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Motivated Strategies for Learning Questionnaire</td>
<td>0.71</td>
<td>0.62</td>
</tr>
<tr>
<td>(Pintrich, et al, 1991)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evaluation of student knowledge acquisition was achieved using a 30-item multiple choice examination developed by the researcher. Following review of the course objectives for all first semester courses, review of the textbook content for the courses, and the textbook instructor resources, a series of 40 questions were compiled for evaluation of overall final first semester learning outcomes. The areas included were physical assessment, technical skill performance, the nursing process, pharmacology, documentation, and therapeutic communication skills. The draft exam was reviewed by two experienced nursing educators to determine face validity. A pilot test with a group of nursing students who had recently completed the first semester nursing courses was completed (n = 15). Test statistics were evaluated including difficulty and discrimination indices for each item. The instrument was then revised to include 30 of the 40 items, deleting items that were deemed to be unclear, too easy, or too difficult.
The pilot test achieved an initial Kuder-Richardson-21 of 0.14 followed by 0.20 after revision, both quite low. The Kuder-Richardson (K-R) formulas are “methods of rational equivalence” to determine test internal consistency (Gall, Gall, & Borg, 2003 p. 198). The KR-21 test, a simplified version of the K-R 20, measures consistency between items on a test by evaluating all possible split-half variations. The more the test means are spread out from the mean, the better the test (McDonald, 2001). Preferred ratings should be close to 1 (range 0-1) (McDonald, 2001; Polit & Beck, 2004) with ratings above 0.80 desirable. Billings & Halstead (2005) point out that reliability values function better with the high variability seen with testing of large groups of students and evaluation of small numbers of students often results in low values. The results of the test used for this study were low likely due to the small numbers of students in the pilot test but are a limitation of the study. (See Appendix F).

Following data collection, item analysis of the examination for inter-item consistency revealed a Kuder-Richardson 20 of 0.57 and a Kuder-Richardson 21 of 0.50 for all participants as analyzed by NCS ExamSystem II software (Pearson, 2008). Although these values are higher than the pilot study yielded, they are still lower than optimal of 0.7-1.0 and may indicate items that are too diffuse (Bradley, 1994). Item analysis revealed difficulty factors for the items were adequate with items ranging between 0.364 and 1.000 with a mean of 0.816. Cunningham (1998) suggests that ideal difficulty for 4 item multiple-choice tests is 0.625. Items rated low are more difficult and above 0.900 are too easy. McDonald (2001) points out, however, that small samples may yield low difficulty scores.
The second portion of the study was qualitative and two semi-structured interview guides were developed by the researcher, one for the experimental group and one for the comparison group. The open-ended interview questions focused on the research questions for the study and allowed for students to reflect on their first semester experience. Probing questions were added as needed to clarify content or explore areas where further information was needed.

The semi-structured interview guide was followed for all interviews. (See Table 3-4). Students were provided background information about the study and its purpose by the researcher to gain informed consent at the onset of each interview. With student permission, all interviews were recorded for accurate transcription.

Table 3-4.

Semi-structured interview guides

<table>
<thead>
<tr>
<th>Group</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation (Experimental)</td>
<td>I am trying to understand the nature of the student experience with simulated clinical experience and I would like you to respond to provide feedback on your own experience.</td>
</tr>
<tr>
<td></td>
<td>1. What part did your clinical experience play in your growth over the semester?</td>
</tr>
<tr>
<td></td>
<td>How about your skills lab experience?</td>
</tr>
<tr>
<td></td>
<td>2. How did you find the simulation experience?</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3. What was the simulation experience like for you?</td>
<td></td>
</tr>
<tr>
<td>4. Did the simulation experience help you understand the content better?</td>
<td></td>
</tr>
<tr>
<td>5. What types of things did you learn in your simulation experiences?</td>
<td>Were these things you also learned in clinical practice?</td>
</tr>
<tr>
<td>6. What types of learning was reinforced by simulation (if any)?</td>
<td></td>
</tr>
<tr>
<td>7. How did simulation affect your confidence level or feelings of being a nurse?</td>
<td></td>
</tr>
<tr>
<td>8. What did you find helpful in your first semester experience?</td>
<td></td>
</tr>
<tr>
<td>9. If you could have changed something last semester, what would it have been?</td>
<td></td>
</tr>
</tbody>
</table>

**No Simulation (Control)**

I am trying to understand the nature of the first-semester experience as a nursing student. Can you share with me some of your experiences?

1. What part did your clinical experience play in your growth over the semester?
How about your skills lab experience?

2. How did your first semester experience affect your confidence and feelings of being a nurse?

3. What part did your clinical experiences play in your learning?

4. What did you like most about your first semester experience?

5. If you could have changed something last semester, what would it have been?

Human Subjects Protection

Every precaution was taken to protect subjects from any physical or mental harm. The only potential risk expected was anxiety accompanying the self-reflection of competence and the students’ time. The investigator completed required human subjects protection training through the University of Minnesota. Data collection was completed after approval of the Institutional Review Board (IRB) at the University of Minnesota. In addition, following initial data collection, further approval for interviewing of select subjects was also requested and obtained from the University of Minnesota IRB. Approval for surveying and interviewing of students was also received from the Institutional Review Board at the technical colleges where the data were collected.

All students were provided information about the study verbally and in writing. Consent forms were obtained from all participants prior to data collection. The consent
form is located in Appendix G. Participation was voluntary and confidentiality was assured. Students were given up to 20 minutes to complete the instruments. Surveys were separate from the consent forms. Interviews were held in a private setting and each took approximately 15-30 minutes. Confidentiality was assured. Students wishing to receive results of the study were provided contact information of the researcher to request a summary of the results. A summary will be mailed by the researcher to any participants requesting feedback.

All instrument forms were collected from HPS instructors by the researcher and all interviews were conducted by the researcher who analyzed the data. All direct identifiers were removed from the forms and interview transcripts and they were coded immediately after collection. The forms were kept confidential and stored in a locked filing cabinet by the researcher. Compiled data is kept on a password-protected computer with access only by the researcher. Only aggregate data has been reported.

Description of the HPS Environment

Both technical colleges in the study have HPS technology. Only at one college was simulation experience begun in the first semester. At this college, the HPS lab is located in the health sciences building on the technical college’s campus. The lab consists of a simulated hospital emergency room with a small anteroom with ambulance doors that open to simulate taking a patient from an ambulance and bringing him/her directly into the ER room and a larger area with a simulated nursing station and 2 patient rooms. A control room is centrally located between the rooms. The control room door can be closed to separate the operator/instructor from the students. However, one-way mirrors and video cameras allow observation of student activity throughout the simulations. The
video cameras allow close visualization of student activity and, with student permission, enable instructors to tape the actions of the students for later evaluation. Adjacent to the lab area is a small classroom for pre- and post-simulation discussion and debriefing.

The lab is staffed by a technician who operates the simulator and by one clinical instructor assigned to teach the students using the lab. Several different instructors have been active in the clinical course each semester over the past two years. The faculty has received initial training on HPS operation and nursing case scenario materials. The technician operated the simulator and the instructors had responsibility for selection and management of the case scenarios, instruction, debriefing, and evaluation.

The human patient simulators used in the study are high-fidelity simulators. Two separate models are available at the college and their use was dictated by availability. The most common model used was METI’s (2009) Emergency Care Simulator (ECS). The ECS is a life-size mannequin that simulates breathing, has palpable pulses, heart, lung, and bowel sounds, and pupils that can be varied. It may be altered to be either male or female. The simulators are controlled by the instructor or technician to respond to medications and other treatments as a patient in the clinical setting would respond.

Data Collection Procedures

All students in the study received the same didactic content, skills instruction, and long-term clinical experience throughout the semester to meet the objectives of the curriculum. A variety of instructors teach the courses and the researcher determined that the data collection should be done in one course consistently to decrease training of those administering the instruments and decrease the chance that a student may complete the instrument more than once. The instruments were completed during clinical and HPS
experiences at one technical college (experimental and part of the comparison group) and in the skills laboratory course at the other campus (comparison group). Instructions on administration of the instruments were provided at a faculty meeting at one college and via phone to the instructor at the other college.

Data collection occurred following approval by the institutional review boards at the technical colleges and the University of Minnesota. Shortly after the study was approved by the IRB and at a point approximately mid-semester of the 16 week semester, the pretest instruments were completed. Informed consent was obtained and confidentiality assured. Initial demographic data, self-efficacy and MLSQ scores were gathered from students who agreed to participate. In the final two weeks of the semester, the self-efficacy and motivation instruments were completed in addition to final demographic questions. The fundamental nursing knowledge examination was also completed at this time. Instructors who administered the instruments were also asked to complete an instructor demographic instrument at the end of the semester.

Each student in the experimental group participated in three HPS experiences. The first case scenario focused on professional behavior and communication, safety, and basic physical cares. The scenario was developed by instructors at the technical college. The other two scenarios were part of a package of scenarios, Program for Nursing Curriculum Integration (PNCI), developed by nursing educators and purchased through Medical Education Technologies, Inc. (METI, Tampa Bay, FL, 2009). The standardized scenarios used for this study were selected from the PNCI introductory scenarios recommended for novice nursing students. The scenario selected for the second experience was an adult male athlete in rehabilitation following a spinal cord injury.
Students were asked to assess the patient’s physical status to which includes adventitious breath sounds, skin breakdown, and depression. The third scenario, also selected from the PNCl introductory scenarios, is more complex and requires demonstration of a variety of nursing skills. The scenario involves care of an elderly Hispanic woman hospitalized with a non-healing leg wound following a femoral-popliteal bypass graft. She is diabetic. She requires assistance with pain management, glucose control, and intervention for wound care and urinary retention. In addition, she has a history of tripping and spraining her ankle while coming to the hospital.

Each student received introductory information about each HPS scenario approximately 2 weeks prior to the experience. The written information included the directions for the experiences, objectives for the session, and preparatory questions that must be completed prior participation. Students who had not completed this work are not allowed to participate in the HPS activity. The questions increase in complexity as do the scenarios. (See Appendix B for scenario outlines, objectives, and preparatory questions.)

Initial data collection occurred at a mid-point in the semester, just as a majority of the participants were beginning their clinical experience. The posttests were completed during the last week of the semester following completion of HPS experiences. At the beginning of the subsequent semester, interviews were arranged with a group of students, 8 who had received HPS experience and 8 who had not.

Care was taken to ensure rigor for the qualitative component of the study as it was for the quantitative component. In planning the interviews, the researcher reflected and documented ideas and thoughts about the study, identifying any preconceptions of the phenomenon prior to the study. This process of bracketing assisted the researcher in
identifying any preconceptions and allowed her to concentrate on the phenomenon of study during data collection and analysis (Wojnar & Swanson, 2007). The journaling or memoing process continued throughout the data collection process and into the analysis phase of the study. This process assists in tying empirical events and data to the theoretical level with an emphasis on conceptualization of ideas (Hutchinson, 1986). Although traditionally discussed with grounded theory, memoing can be used with any qualitative method with functions of mapping research activities, extracting meaning from the data, maintaining momentum, and opening communication (Birks, Chapman, & Francis, 2008). Memoing included three specific aspects of the study: methodology, analysis, and personal reflections.

Following approval of the institutional review board at both the University of Minnesota and at one of the technical college, interviews were conducted with 16 students, 8 that had received simulation experiences during the first semester nursing clinical course and 8 that had received the traditional clinical experience. Both groups of students interviewed were from two campuses of the same technical college during the next semester. Those who had received simulation were at the main campus and the students in the control group were at the satellite campus where simulation had not been included in the first semester clinical experience. An email was sent to all students who had been asked to participate in the first portion of the study inviting them to participate in the interviews. The email included the questions on the interview guide that would be asked during the interview. This was done to prepare the subjects for the interview and focus the discussion.
Sample Selection

A non-probability, purposive sample was chosen for the study and consisted of students enrolled in a 2-credit first semester clinical course in two associate degree nursing programs. Both programs are part of moderately-sized technical colleges in Midwestern cities of approximately 60,000. The students primarily are from the approximately 16 counties served by the two technical colleges in western Wisconsin. Students at the technical colleges may select to complete the clinical course in either 8 weeks or 16 weeks—either one or two days per week. The students may be taking courses on either a full or part-time basis.

Both technical colleges are part of the Wisconsin Technical College System. All technical, two-year colleges in the state that offer nursing have implemented a statewide nursing curriculum. The curriculum includes a 2-credit clinical practicum course and didactic other courses taken concurrently by all students during the first semester of the statewide nursing program: 1) Nursing Fundamentals, a 2-credit theory course; 2) Nursing Pharmacology, a 2-credit theory course; and 3) Nursing Skills, a 3-credit course including psychomotor skills, physical assessment and interviewing skills. Other courses that may be taken during the first semester may include General Anatomy and Physiology, Written Communications, and Developmental Psychology. (See Appendix A for an outline of the curriculum).

At one of the colleges, ninety-six students enter the associate degree nursing program and are enrolled in the 2-credit clinical practicum course each fall semester. Seventy-two students are at the main campus and 24 at the satellite campus approximately 60 miles from the main campus. Simulation experience was offered as part
of the clinical course at the main campus at the time of data collection but not at the satellite campus. The second technical college also has two campuses with a total of 55 students enrolled each semester. No simulation is offered during first semester courses at this college.

For clinical and skills courses, students are placed in smaller groups of 8-12 students. Students receiving HPS experience are in groups of 8 students and are further divided so that 4 students at a time participate in a simulation experience. Students in both groups registered for and self-selected their clinical groupings based on their preferred time and days of the week for the clinical course.

In the experimental group, each group in the clinical course completed a clinical “rotation” (scheduled time in a specific specialty area) in the long-term care setting (nursing home). However, on three separate days, they were scheduled to spend three hours in the simulation laboratory working on three separate scenarios dealing with safety, communication, basic physical care, medication administration and nursing skills including injections, dressing changes, and urinary catheter insertion. Various scenarios were used including hospitalized patients requiring care for fever, rehabilitation after spinal cord injury, and diabetes. (See Appendix B). The students in the comparison group also had clinical practicum in a long-term care setting but did not have simulation experiences. As mentioned previously, the students in both groups were concurrently enrolled in a didactic course covering fundamentals of nursing practice including professional issues, nursing history, communication, documentation, and basic physical care, a pharmacology course, and a laboratory skills course that provided hands-on psychomotor skill instruction.
The sample for this study was chosen as it was readily available at the time the study was conducted. At the main campus of the technical college offering simulation, the 72 students admitted to nursing program offering simulation were invited to participate as the experimental group. The satellite campus of this college admitted 24 students but simulation was not offered to students in the first semester during the semester when data was collected so these students were included in the comparison group. Fifty-five students at the other technical college were also included in the comparison group. Participation in the study by the students was voluntary, however. The sample size was consistent with recommendations set forth by Gall, Gall & Borg (2003).

Demographic data were collected to determine variables associated with the students and to compare the two groups. These variables included age, gender, previous educational experience, previous nursing experience, expected grade for the first semester clinical course, previous use of simulation in education, and familiarity with technology. In addition, demographic data were requested of the instructors whose students participated in the study. Instructor demographic items included age, highest degree attained, nursing education experience (in years), years of experience teaching with HPS, and familiarity with simulation. Items for both groups were felt by the researcher to potentially influence the student self-efficacy, motivation, learning and instruction, particularly in a simulated setting. The student items were collected through questions attached to the pre and post-surveys. Age, gender, previous educational experience, and previous nursing experience were included in the pre-survey documents. Expected grade, previous use of simulation in education, and familiarity with technology were included in
the post-survey. The instructor data was collected at the end of the semester via an individual survey. One student in each group did not complete the demographic data.

Coding of the demographic data was done using SPSS software and is outlined in Table 5. Gender and previous simulation experience were entered as dichotomous categorical variables. Other demographic variables—age, previous educational experience, previous health care experience, and expected grade—were entered as categorical variables. Familiarity with technology was rated on a 5-point Likert-type scale, coded from 1 (not very skilled) to 5 (very skilled).

Table 3-5

Coding plan for the demographic variables

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Type of Variable</th>
<th>Coding Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Categorical</td>
<td>0 Male</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Female</td>
</tr>
<tr>
<td>Gender</td>
<td>Dichotomous categorical</td>
<td>0 18-25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 26-30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 31-35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 36-40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 41-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 46-50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 Over 50</td>
</tr>
<tr>
<td>Previous Education</td>
<td>Categorical</td>
<td>0 High School</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Technical degree</td>
</tr>
</tbody>
</table>
### Human Patient Simulation 90

<table>
<thead>
<tr>
<th>Previous Health Care Experience</th>
<th>Categorical</th>
<th>0</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>CNA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Medical assistant, EMT, paramedic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Other</td>
</tr>
<tr>
<td>Expected Grade</td>
<td>Categorical</td>
<td>0</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Pass</td>
</tr>
<tr>
<td>Previous Simulation</td>
<td>Dichotomous categorical</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>Familiarity with technology</td>
<td>Interval</td>
<td>1</td>
<td>(not very skilled)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>(very skilled)</td>
</tr>
</tbody>
</table>

**Demographic Data**

Participants were first semester associate degree nursing students at one of two technical colleges in a Midwestern state. Of the 151 students admitted to the programs, a
total of 136 students participated in some portion of the study. However, a number of students participated in only the pretest or the posttest or only completed a portion of the instruments. Fifty-four students who received simulation as part of their first-semester clinical practicum participated in all components of the study as the experimental group, representing 75% of the possible participants. All students were from the larger campus at the technical college offering simulation.

At the satellite campus of the college, students did not receive simulation during the first semester. The students were invited to participate but of 24 students at this campus, only 10 participated in the study (42%). Of these 10 students, only 4 students agreed to participate in the full study. Two students completed only the pretest surveys and 3 students completed the posttest and surveys. One student chose only to complete the posttest. Due to limited participation at this campus with the quantitative measures, these results were not included in the study. Qualitative student data was included in the study, however.

At the other technical college, none of the 55 students received simulation experience in the first semester of the associate degree nursing program and comprised the comparison group for the quantitative portion of the study. Fifty-one of the students participated in some part of the study. Eighteen students completed only the pretest surveys and one student completed only the posttest and survey. These results were not included in the study as they were incomplete. Thirty students participated in the full study, 54.5% of the total. The total number of subjects in this group was 30. (See Table 3-6).
Table 3-6.

*Summary of the number of subjects in the quantitative sample*

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Percent of Admitted First Semester Students (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental (Simulation)</td>
<td>54</td>
<td>75</td>
</tr>
<tr>
<td>Comparison (No simulation)</td>
<td>30</td>
<td>54.5</td>
</tr>
</tbody>
</table>

*Age.* Age was the first demographic item evaluated. Of the 82 students that completed pretest demographic data, 55 (67%) were between 18-25 years of age, 9 (11%) were 26-30, 8 (10%) were between 31-35, 6 (8%) were between 36 and 40, 1 (1%) were between 41-45, 2 (2%) were 46-50 and 1 (1%) were over 50 years of age. Table 3-7 summarizes the ages of participants by experimental or comparison group. The distribution was relatively equal between the two groups and chi-square was not significant, $\chi^2 (6, N = 82) = 0.334, p > 0.05$.

Table 3-7.

*Age of participants by group*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Simulation: (n = 53)</th>
<th>Comparison (n = 29)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>18-25</td>
<td>38</td>
<td>71</td>
<td>17</td>
</tr>
<tr>
<td>26-30</td>
<td>7</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>31-35</td>
<td>3</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
Gender. Gender of participants was also assessed. As characteristic of the nursing population, women overwhelmingly outnumbered males in the study. In a 2004 national nursing study, the population of male nurses in the U.S. was found to be 5.8% (Health Resources and Services Administration, 2004). The distribution of the male participants in this study was just a bit higher. Of the students providing answers to this item in the simulation group (n = 53), 45 participants were female (85%) and 8 were male (15%). In the group without simulation (n = 29), 28 were female (97%) and 1 was male (3%). As seen in Table 3-8, the distribution of the two groups in relation to gender was very similar. Chi-square showed no significant differences between the two groups, $\chi^2 (1, N = 82) = 0.107, p > 0.05$.

Table 3-8

<table>
<thead>
<tr>
<th>Gender</th>
<th>Simulation</th>
<th>Comparison</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>85</td>
<td>28</td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100</td>
<td>29</td>
</tr>
</tbody>
</table>
Previous educational experience. Another demographic variable considered was previous education. Selections included education through high school only, previous technical degree, bachelor’s degree, or graduate degree. This factor was considered as it could have affected the students’ perceptions of education and simulation experience. Of the students who responded to this item (n = 82), 57 (70%) had completed high school education only up to this point in their nursing education. Thirteen (16%) had a previous technical degree. Previous bachelor’s degrees were held by 12 (14%) of the respondents. No students had previous graduate degrees. The experimental (simulation) group had 74% with only high school degrees, 15% with previous technical degrees, and 11% with previous bachelor’s degrees. The comparison group was relatively similar in distribution with 62% having only high school degree, 17% having previous technical degrees, and 21% holding previous bachelor’s degrees. (See Table 3-9.) Comparison between the two groups using chi-square was not significant, $\chi^2 (2, \ N = 82) = 0.464, \ p > 0.05$.

Table 3-9.

<table>
<thead>
<tr>
<th></th>
<th>Simulation</th>
<th></th>
<th>Comparison</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>High school</td>
<td>39</td>
<td>74</td>
<td>18</td>
<td>62</td>
<td>57</td>
</tr>
<tr>
<td>Technical degree</td>
<td>8</td>
<td>15</td>
<td>5</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>6</td>
<td>11</td>
<td>6</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100</td>
<td>29</td>
<td>100</td>
<td>82</td>
</tr>
</tbody>
</table>
Previous health care experience. Another factor included was previous health care experience. In the simulation group, 11 (21%) had no previous health care experience, 37 (70%) had experience as certified nursing assistants (CNA), 2 (3%) had experience as medical assistants (MA), emergency medical technicians (EMT), or paramedics, and 3 (6%) had reported other previous health care experience. In the comparison group, 3 (10%) had no previous experience, 22 (77%) had experience as certified nursing assistants, 1 (3%) had medical assistant, EMT, or paramedic experience, and 3 (10%) had worked in some other capacity in health care (“resident assistant,” “care assistant,” or medical secretary). The distribution between groups is demonstrated in Table 3-10. Although skewed, the distribution was relatively equal in the two groups and chi-square was not significant, $\chi^2 (3, N = 82) = 0.604, p > 0.05$.

Table 3-10.

<table>
<thead>
<tr>
<th></th>
<th>Simulation</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No previous</td>
<td>11</td>
<td>21</td>
<td>3</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>CNA</td>
<td>37</td>
<td>70</td>
<td>22</td>
<td>76</td>
<td>59</td>
</tr>
<tr>
<td>MA, EMT, or Paramedic</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100</td>
<td>29</td>
<td>100</td>
<td>82</td>
</tr>
</tbody>
</table>

Expected Grade. Expected grade for the clinical course was assessed with the post-survey instruments and is displayed in Table 3-11. Self-efficacy has been measured
in some studies by looking at the students’ expectation of grade for a course. In this study, 80 students responded to this item, 52 in the experimental group and 28 in the comparison group. In the simulation group, 28 (54%) expected to receive an A in the course, and 24 (46%) expected a B. No students reported expecting any grade lower than a B. In the control group, 14 (50%) expected an A, 6 (21%) expected to receive a B, no students expected a C or to fail the course, and 8 (29%) reported they expected to pass the course but did not provide an expected letter grade. The difference in proportion of students’ expected grade was significant, $\chi^2 (2, N = 80) = 0.000, p < 0.001$, largely attributed to the 8 students who expected to pass in the comparison group.

Table 3-11.

<table>
<thead>
<tr>
<th>Distribution of Expected Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>Pass</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*Previous use of simulation in education.* Also evaluated on the post-survey was previous use of simulation in educational experiences. As simulation technology use grows in health care education, a variety of disciplines within health care are using this
technology. Previous exposure may alter the response of respondents to their experience in the first semester of nursing education, particularly those who are in the simulation group. A few respondents did report previous experience in previous health care training programs including EMT or medical assistant training. Some students also reported exposure to simulation in anatomy and physiology courses. Of the 54 in the simulation group who completed the post-survey, 6 (11%) had previous simulation experience. Seven of the 29 responding in the control group (22%), had previously experience with simulation in an educational setting. (See Table 3-12). There were no significant differences between the proportions of students in each group, \( \chi^2 (1, N = 83) = 0.120, p > 0.50. \)

Table 3-12.

*Previous simulation experience*

<table>
<thead>
<tr>
<th>Prior Simulation</th>
<th>No</th>
<th>%</th>
<th>Yes</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation</td>
<td>48</td>
<td>89</td>
<td>6</td>
<td>11</td>
<td>54</td>
</tr>
<tr>
<td>No Simulation</td>
<td>22</td>
<td>76</td>
<td>7</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>(100)</td>
<td>14</td>
<td>(100)</td>
<td>83</td>
</tr>
</tbody>
</table>

*Familiarity with technology.* Familiarity with technology was also assessed.

Much of the required work in the nursing require assistances of some form of technology to complete, including computer use for word processing, email, or internet access. All students in these nursing programs are learning to competently use a variety of medical
devices in the laboratory and clinical setting—electronic thermometers, automatic blood pressure cuffs, pulse oximetry, and electronic medical records, just to name a few. Simulation training combines technology with a patient care mannequin. The student who is uncomfortable with technology placed in a simulated health care patient room surrounded by medical devices may feel an increase in anxiety with learning.

A 5-point Likert-type rating scale was developed to assess familiarity with technology. Items evaluated included computer use in general, email, word processing, internet use, handheld computer use (personal digital assistant or PDA), cell phone use, and electronic medical device use (examples included BP cuff and oximeter). Students were asked to reflect and rate their familiarity with equipment at the beginning of the first semester. The items were rated from 1 = not very skilled to 5 = very skilled. All items were then averaged to provide a general assessment of familiarity with technology. Results indicated that the 82 students responding to this item had a high degree of familiarity with technology with a mean rating of 4.13 for all items. (See Table 3-13.) Independent t-tests on each item showed no significant differences between the two groups. When all items were added together for a technology mean score, however, the simulation group had a mean of 4.16 and the comparison group a mean of 4.52. Independent t-test comparison between the groups showed significant differences in familiarity with technology ($t = -2.636$, df 80, $p = 0.010$).
Table 3-13.

*Summary of the mean scores for familiarity with technology*

<table>
<thead>
<tr>
<th></th>
<th>General Computer Use</th>
<th>Email</th>
<th>Word Processing</th>
<th>Internet</th>
<th>PDA</th>
<th>Cell Phone</th>
<th>Medical Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation (n = 54)</td>
<td>4.20</td>
<td>4.61</td>
<td>4.57</td>
<td>4.59</td>
<td>2.69</td>
<td>4.69</td>
<td>3.89</td>
</tr>
<tr>
<td>No Simulation (n = 25)</td>
<td>3.66</td>
<td>4.50</td>
<td>4.28</td>
<td>4.42</td>
<td>2.56</td>
<td>4.40</td>
<td>3.84</td>
</tr>
</tbody>
</table>

_Instructor Demographic Data._ The instructors who were teaching the first semester clinical and skills laboratory courses at the technical colleges participating in the study were asked to complete a demographic instrument. Eleven of the sixteen instructors completed the survey, 8 who taught in the simulation lab and 3 at the campuses where simulation was not offered. All of the instructors are registered nurses licensed in Wisconsin. In addition, all of the instructors who provided demographic data had at least a master’s degree in nursing as this is a requirement of the state’s board of nursing. One of the instructors reported holding an Education Specialist degree and another reported the Education Specialist degree was in process.

Another parameter assessed was number of years of experience as a nursing instructor. One of the instructors who taught in simulation reported less than one year of experience in nursing education, 5 instructors had between 1 and 5 years of experience, 1 instructor had between 6 and 10 years of experience, and 1 instructor had over 10 years
of experience. Of the instructors who taught the students in the comparison group (n = 3), one instructor had between 1 and 5 years of experience and 2 had between 6 and 10 years of experience. This data is summarized in Table 3-14. Experience teaching in the simulation environment was assessed of those teaching the students in the experimental group. Those responding had from 0.5 years of experience to 6 years with the mean being 3.18 years (n = 8). Chi-square did not show significant differences on the instructor demographic measures.

Table 3-14.

Summary of instructor years of experience

<table>
<thead>
<tr>
<th>Group</th>
<th>Less than 1 year</th>
<th>1-5 years</th>
<th>6-10 years</th>
<th>Over 10 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Comparison</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Instructor familiarity with computer use was also assessed and is presented in Table 3-15. On the 5-point Likert scale, the same scale used for the student assessment, the mean score was 4.11 (n = 10). Of the 10 instructors responding, 7 were teaching in the simulation laboratory and their mean score was 4.12. Instructors reporting from the comparison group had a mean score of 4.09. An independent t-test on the mean score for familiarity with technology was not significant, t(10) = 0.088, p = 0.932.
Table 3-15.

*Summary of the mean scores for instructor familiarity with technology*

<table>
<thead>
<tr>
<th></th>
<th>General Computer Use</th>
<th>Email</th>
<th>Word Processing</th>
<th>Internet</th>
<th>PDA</th>
<th>Cell Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 7)</td>
<td>4.14</td>
<td>4.43</td>
<td>4.00</td>
<td>4.57</td>
<td>3.57</td>
<td>4.00</td>
</tr>
<tr>
<td>No Simulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 3)</td>
<td>4.25</td>
<td>4.75</td>
<td>4.75</td>
<td>4.25</td>
<td>3.30</td>
<td>4.60</td>
</tr>
</tbody>
</table>

*Further comparison of the groups.* Further comparison of the experimental and comparison groups were made on the pretest data through use of independent t-tests. In addition, Spearman rank order correlation was used to determine if correlations were present between the variables. The pretest mean scores of most of the self-efficacy and motivation variables were higher in the comparison group with exception of task value (experimental $M= 6.5148$ and comparison $M= 6.5113$) and use of critical thinking strategies (experimental $M= 5.0196$ and comparison $M= 4.7333$). However, results of the independent t-tests found no significant differences in mean scores of the two groups on NASES, NCSES, and the MSLQ subscales of intrinsic goal orientation, extrinsic goal orientation, self-efficacy for learning, task value, control of learning beliefs, and use of critical thinking strategies. These results are presented in Table 3-16.
Table 3-16.

*Comparison of pretest mean scores*

<table>
<thead>
<tr>
<th></th>
<th>Simulation Pretest</th>
<th>Comparison Pretest</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>NASES</td>
<td>8.3472</td>
<td>1.00</td>
<td>8.3533</td>
<td>1.22</td>
<td>-0.024</td>
</tr>
<tr>
<td>NCSES</td>
<td>9.0420</td>
<td>0.97</td>
<td>9.1407</td>
<td>0.92</td>
<td>-0.456</td>
</tr>
<tr>
<td>MSLQ Self-Efficacy</td>
<td>5.8507</td>
<td>0.74</td>
<td>6.0150</td>
<td>0.80</td>
<td>-0.949</td>
</tr>
<tr>
<td>Intrinsic Orientation</td>
<td>5.8102</td>
<td>0.75</td>
<td>5.9250</td>
<td>0.83</td>
<td>-0.649</td>
</tr>
<tr>
<td>Extrinsic Goal Orientation</td>
<td>5.2778</td>
<td>0.95</td>
<td>5.4000</td>
<td>1.21</td>
<td>-0.510</td>
</tr>
<tr>
<td>Task Value</td>
<td>6.5148</td>
<td>0.54</td>
<td>6.5113</td>
<td>0.64</td>
<td>0.026</td>
</tr>
<tr>
<td>Learning Beliefs</td>
<td>5.5772</td>
<td>0.94</td>
<td>5.8917</td>
<td>1.09</td>
<td>-1.381</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>5.0196</td>
<td>0.96</td>
<td>4.7333</td>
<td>1.12</td>
<td>-1.236</td>
</tr>
</tbody>
</table>

*Note. p < 0.05*

Spearman rank order correlation (Spearman rho) was used to further compare the two groups and determine if correlations exist between demographic variables, HPS experience and the dependent variables of self-efficacy, motivation and knowledge acquisition in first semester associate degree nursing students. Spearman rho is a nonparametric evaluation appropriate when all data are not at the interval scale or the parametric assumptions have been violated (Polit & Beck, 2004; Field, 2005). In this study, the nonparametric groups of age and gender are not normally distributed, violating the parametric assumptions. For these reasons, Spearman rho was chosen. This test ranks
the data following by application of the Pearson equation to determine if relationships exist between variables.

The results reveal that NASES and NCSES are highly correlated (r_s = .806) indicating they are measuring related dimensions of nursing self-efficacy, as also found by Harvey and McMurray (1994). This correlation was significant at the p < .001 level. No other variables were as strongly correlated to the nursing self-efficacy measures. The self-efficacy scale of the MSLQ was slightly correlated to the nursing self-efficacy measures (NASES: r_s = 0.187, p < 0.05; NCSES: r_s = 0.211, p< 0.05). The scales of the MSLQ were moderately to strongly correlated to each other (0.293 to 0.651). (See Table 3-17).

Age was mildly correlated to general MSLQ self-efficacy (r_s = 0.225, p < 0.05), gender (r_s = -0.251, p < 0.001), and previous simulation (r_s = 0.272, p < 0.05). Previous education and age were moderately correlated (r_s = 0.527, p < 0.05). Familiarity with technology was slightly correlated with intrinsic motivation and use of critical thinking strategies NASES: r_s = 0.268, p < 0.05; NCSES: r_s = 0.231, p< 0.05) and moderately correlated with age (r_s = -0.291, p < 0.001). Gender was also mildly correlated with intrinsic motivation (r_s = -0.282, p < 0.001) and task value (r_s = -0.250, p < 0.001). Many of these correlations are likely due to the number of younger students of similar gender.
Table 3-17.

Spearman rho correlation coefficients of the dependent variables and demographic variables

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>9</th>
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<th>13</th>
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<th>15</th>
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<tr>
<td>1.</td>
<td>NASES</td>
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<td></td>
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<tr>
<td>2.</td>
<td>NCSES</td>
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</tr>
<tr>
<td>3.</td>
<td>Intrinsic</td>
<td>.075</td>
<td>.101</td>
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<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Extrinsic</td>
<td>.162</td>
<td>.178</td>
<td>.348**</td>
<td>---</td>
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<td>5.</td>
<td>Task Value</td>
<td>.186*</td>
<td>.207*</td>
<td>.646**</td>
<td>.324*</td>
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<tr>
<td>6.</td>
<td>Learn Belief</td>
<td>.090</td>
<td>.111</td>
<td>.632**</td>
<td>.412**</td>
<td>.651**</td>
<td>---</td>
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<td></td>
</tr>
<tr>
<td>7.</td>
<td>Self-Efficacy</td>
<td>.187*</td>
<td>.211*</td>
<td>.643**</td>
<td>.416**</td>
<td>.734**</td>
<td>.765**</td>
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<tr>
<td>8.</td>
<td>Critical Thinking</td>
<td>.145</td>
<td>.112</td>
<td>.446**</td>
<td>.405**</td>
<td>.293*</td>
<td>.348**</td>
<td>.344**</td>
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<td>9.</td>
<td>Knowledge</td>
<td>-.117</td>
<td>-.123</td>
<td>-.053</td>
<td>-.246*</td>
<td>.069</td>
<td>.078</td>
<td>.118</td>
<td>-.086</td>
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</tr>
<tr>
<td>10.</td>
<td>Age</td>
<td>-.005</td>
<td>.094</td>
<td>-.036</td>
<td>-.050</td>
<td>.091</td>
<td>.082</td>
<td>.225*</td>
<td>.089</td>
<td>-.071</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Previous Ed</td>
<td>-.004</td>
<td>-.009</td>
<td>.132</td>
<td>-.070</td>
<td>.103</td>
<td>.085</td>
<td>.203</td>
<td>.011</td>
<td>.043</td>
<td>.527**</td>
<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Previous HC Exp</td>
<td>.020</td>
<td>-.080</td>
<td>-.038</td>
<td>-.038</td>
<td>-.017</td>
<td>-.001</td>
<td>-.055</td>
<td>-.057</td>
<td>.232*</td>
<td>-.021</td>
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<tr>
<td>13.</td>
<td>Exp Grade</td>
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<td>-.026</td>
<td>-.042</td>
<td>.035</td>
<td>-.171</td>
<td>-.152</td>
<td>-.178</td>
<td>.022</td>
<td>-.143</td>
<td>-.043</td>
<td>-.157</td>
<td>-.076</td>
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<tr>
<td>14.</td>
<td>Tech Use</td>
<td>-.111</td>
<td>-.037</td>
<td>.268*</td>
<td>.056</td>
<td>.138</td>
<td>.100</td>
<td>.058</td>
<td>.231*</td>
<td>-.019</td>
<td>-.291**</td>
<td>-.074</td>
<td>-.014</td>
<td>-.055</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Gender</td>
<td>.084</td>
<td>.067</td>
<td>-.282*</td>
<td>-.196</td>
<td>-.250*</td>
<td>-.120</td>
<td>-.045</td>
<td>-.093</td>
<td>.022</td>
<td>.251*</td>
<td>-.107</td>
<td>.033</td>
<td>-.021</td>
<td>-.121</td>
</tr>
<tr>
<td>16.</td>
<td>Previous Sim</td>
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<td>-.004</td>
<td>.097</td>
<td>-.047</td>
<td>.135</td>
<td>.206</td>
<td>.128</td>
<td>.168</td>
<td>-.133</td>
<td>.272*</td>
<td>.044</td>
<td>-.019</td>
<td>-.049</td>
<td>.050</td>
</tr>
</tbody>
</table>

*p < .05, **p < .001
Data Analysis Procedures

Data analysis for the quantitative data began after all instruments were collected from all students in the course consenting to participate. No identifiable personal information was included in data analysis with all surveys identified by a participant number. Data were entered into the Statistical Package for the Social Sciences for Windows (SPSS) 17.0 program (SPSS, 2009). Demographic data was coded as discussed above and presented in Table 3-5. The nursing self-efficacy data was rated by subjects on a 10 point scale. Data for each item on both the NASES and NSSES were entered as a number between 1 and 10 and a mean score for each calculated. Likewise, items on the MSLQ subscales were rated on a 7 point scale, items were entered as a number between 1 and 7 and a mean score determined. The knowledge examination consisted of 30 items and the score entered for each subject was the number of items that he/she had gotten correct. Following entry, the data were examined for completeness and accuracy. Incomplete instruments were not included in the sample with the exception of a couple of subjects who had not completed all of the demographic items. Four students in the comparison group had not completed the knowledge examination but had completed all other pretest and posttest measures so their self-efficacy and motivation measures were included in the sample. Statistical procedures were completed using the SPSS program, also.

Descriptive statistics, including measures of central tendency, were done on all measures. Combinations of bivariate tests of significance (independent and paired t-tests) were used to compare data between the participants. T-tests are commonly used to determine if the differences between mean scores on rating scales and other parametric
data are significant (Utts & Heckard, 2006). This statistic was used to compare mean scores of self-efficacy, motivation and the knowledge examination. To answer the first two research questions, paired t-tests were used to compare pre and posttest mean scores for the simulation group. To answer the third research question, independent t-tests to compare mean differences in rating scores of self-efficacy and motivation between the two groups were determined. An independent t-test was also performed to compare the scores on the 30-item multiple choice knowledge examination.

Data analysis for the qualitative portion of the study to answer the fourth research question began with memoing prior to the interviews and continued through transcription and review of interview text. Emails asking for volunteers for interviews were sent to all students at one of the technical colleges where students at the satellite campus had not received simulation but those at the main campus had received the three HPS experiences. Sixteen students agreed to be interviewed, 8 from each group. Following each face-to-face interview (n = 16), the researcher repeatedly listened to the audiotape of the interview. Each was transcribed verbatim and coded immediately after it was conducted. The transcripts were then reviewed several more times for accurate understanding. Field notes and memos were also kept by the researcher and these were also read several times and further notes taken. The transcripts and field notes included thick descriptions of the experiences and interviews. Constant comparative analysis was used to note important findings and tailor further interview questions.

Following review of transcripts and notes, coding was done to identify key experiences, feelings, or actions. The coding was done in a sequence of four steps and following the principles of thematic analysis outlined by Van Manen (1990). First, a line-
by-line review using Microsoft Word software was done to look for potential codes. Further coding and grouping of like codes followed, also using Microsoft Word. Pattern recognition was the goal of these coding exercises with categories and themes identified in the codes. Themes are elements that occur repeatedly in the text (Van Manen, 1990). The final step was cross case analysis to look for commonalities, differences, and other significant information.

Summary

Technological advances will continue to add choices of educational methods to the repertoire of educators. As nurse educators are faced with the task of increasing both the numbers of new graduate nurses and the abilities of these new graduates to quickly take on the challenges of today’s professional nurse, these various instructional methods must be evaluated. Competence and safety have been increasingly emphasized in clinical practice with evidence-based practice a goal. The Institute of Medicine (2001) defines evidence-based practice as integration of “best research with clinical expertise and patient values for optimum care” (p. 4). Education also needs to provide evidence that techniques are effective and achieve optimum outcomes. High fidelity HPS, one of the newest and most popular of the health care technology-based instructional methods, was chosen for this study. The study focused on two important variables to learning, self-efficacy and motivation, and evaluated the influence HPS experiences had on them and the students’ learning.

This chapter provided a description of the study and the research questions along with a review of the study’s methodology. The sample included associate degree nursing students in their first semester of a nursing program at two Midwestern technical
colleges. A detailed description of the sample demographics was provided. Instruments to measure the major variables of the study, self-efficacy and motivation, were administered at two points throughout the semester. In addition, a 30-item multiple-choice examination was given at the end of the semester to assess overall learning. A synopsis of the procedures of the study was included in this chapter as was a review of the planned statistical and qualitative analyses.
Chapter IV: Data Analysis

Introduction

In this chapter, the results of the study are presented. The purpose of the study was to evaluate the effects of high-fidelity human patient simulation (HPS) on first semester associate degree nursing students’ self-efficacy, motivation, and acquisition of fundamental nursing knowledge. The statement of the problem and the research questions will be reviewed. Descriptive statistics, paired and independent t-tests were utilized to analyze the data and answer the research questions. Analysis of the qualitative data will also be included in this chapter.

Statement of the Problem

Changes in health care with emphasis on safety have led to implementation of new methods to provide education for health care students. Health care educators must work to provide high quality education using evidence-based methods. The National League of Nursing (2005) has stressed that effective nursing education requires educational strategies grounded on educational theory and evidenced-based teaching strategies. HPS is one of these strategies and research on the uses and effectiveness of simulation is in its infancy. Few studies have evaluated its effects on students’ self-efficacy and motivation, particularly with associate degree nursing students. In addition, even fewer studies have focused on the appropriate time to initiate this methodology. The goal of this study is to determine the effects of self-efficacy, motivation and learning in nursing education using high-fidelity HPS.

Research Questions

The research questions for the study are:
1. Is there an increase in self-efficacy with exposure to human patient simulation training?

2. Does student motivation increase with exposure to human patient simulation training?

3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-fidelity human patient simulation experiences and those who have not had this type of experience?

4. What are the experiences of first semester associate degree nursing students both with and without simulation?

**Data Analysis**

Following data collection, the data was coded and analyzed by the researcher using the Statistical Package for the Social Sciences (SPSS) software. Parametric statistical procedures were selected in analyzing the data in relation to the first 3 research questions. These included paired and independent t-tests.

**Research Question 1.** Is there an increase in self-efficacy with exposure to human patient simulation training?

To answer the first research question, the mean results of the pretest and posttest self-efficacy measures of the students who received simulation were compared using paired t-tests. All measures showed an overall increase in self-efficacy on the posttest as compared to the pretest. However, both the NASES and the NCSES posttest means were not significantly different than the pretest means using a paired t-test (NASES p = 0.478, NCSES p = 0.573). (See Table 4-1). The MSLQ self-efficacy subscale posttest mean was significantly higher than the pretest at the p< 0.05 level (p = 0.038). Based on the
results of the nursing-specific self-efficacy scales, the null hypothesis is not rejected. Only for the MSLQ self-efficacy subscale result, a measure of general course learning and success, is the null hypothesis rejected.

Table 4-1.

Pretest and posttest self-efficacy means of the simulation group

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>Standard Deviation</th>
<th>95% Confidence Lower</th>
<th>95% Confidence Upper</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASESpre</td>
<td>8.347</td>
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<td>-0.19054</td>
<td>0.51828</td>
<td>-0.714</td>
<td>53</td>
<td>0.478</td>
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<tr>
<td>NASESpost (n = 56)</td>
<td>8.483</td>
<td>1.15</td>
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</tr>
<tr>
<td>NCSES pre</td>
<td>9.042</td>
<td>0.97</td>
<td>-0.35809</td>
<td>-0.20031</td>
<td>-0.567</td>
<td>53</td>
<td>0.573</td>
</tr>
<tr>
<td>NCSES post (n = 56)</td>
<td>9.121</td>
<td>0.92</td>
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</tr>
<tr>
<td>MLSQ-SEpre</td>
<td>5.851</td>
<td>0.75</td>
<td>-0.32882</td>
<td>-0.00944</td>
<td>-2.124</td>
<td>53</td>
<td>0.038*</td>
</tr>
<tr>
<td>MLSQ-SEpost</td>
<td>6.019</td>
<td>0.63</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < 0.05

Research Question 2. Does student motivation increase with exposure to human patient simulation training?

Paired t-tests were also used to evaluate the results of simulation on the motivation measures of nursing students who received educational experiences with HPS. Each subscale of the MSLQ was evaluated separately for differences. The mean scores of intrinsic motivation, learning beliefs, self-efficacy for learning, and critical thinking increased when comparing pretest to posttest mean scores. In contrast, the other
subscales measured, extrinsic goal orientation and task value, showed a decline in mean scores. Significant differences in pre and posttest means (before and after simulation) at the p < 0.05 level were seen for extrinsic motivation (p = 0.002), control of learning beliefs (p = 0.001), and self-efficacy for learning (p = 0.038). There were no significant differences for the other subscales. As measured by the MSLQ, the null hypothesis is rejected only for the subscales of extrinsic motivation, learning beliefs and self-efficacy.

Table 4-2 provides a summary of this data.

Table 4-2.

*Pretest and posttest MSLQ means of the simulation group*

<table>
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<th>Subscale</th>
<th>M</th>
<th>Standard Deviation</th>
<th>95% Confidence Lower</th>
<th>95% Confidence Upper</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
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<td>-.31708</td>
<td>.08560</td>
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<td>.254</td>
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<td></td>
</tr>
<tr>
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<td>3.310</td>
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<td>.002*</td>
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<td>Pretest</td>
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<td></td>
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<td></td>
</tr>
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<tr>
<td>Task Value</td>
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<td>0.54</td>
<td>-.10015</td>
<td>.19200</td>
<td>.631</td>
<td>53</td>
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</table>
Research Question 3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-fidelity human patient simulation experiences and those who have not had this type of experience?

To answer this research question, differences between pretest and posttest mean scores on the dependent variables were calculated and compared for significant
differences. In addition, the students’ results of the knowledge examination were compared.

As reported in the above sections, there were a few significant differences between the self-efficacy and motivation pre and posttests of the experimental group.

Similar analysis using paired t-tests was performed for the control group. Compared to the experimental group, these results showed a statistically significant increase in self-efficacy on the NASES (p= 0.033) but not on the NCSES (p= 0.243) at the p < 0.05 level.

On the self-efficacy subscale of the MSLQ, results for the control group were not significantly different from pretest to posttest (p = 0.388). Results for other subscales of the MSLQ showed increased scores in intrinsic motivation, extrinsic motivation, task value, learning beliefs, self-efficacy, and critical thinking. A significant difference was found between pretest and posttest mean scores only on the critical thinking subscale (p = .012). These results are summarized in Table 4-3.

Table 4-3.

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>Standard Deviation</th>
<th>95% Confidence Lower</th>
<th>95% Confidence Upper</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
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<tr>
<td>NASES Pretest</td>
<td>8.353</td>
<td>1.22</td>
<td>-1.196</td>
<td>-0.054</td>
<td>-2.237</td>
<td>29</td>
<td>0.033*</td>
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<td>-1.191</td>
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<td>Mean 2</td>
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<tr>
<td>Extrinsic Goal</td>
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<td>Learning Beliefs Posttest</td>
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<td>-2.693</td>
<td>29</td>
<td>0.012*</td>
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</tbody>
</table>
The means of the pretest and posttest scores for the two groups were compared and for each of the dependent measures, the degree of change from pretest to posttest was calculated for both the experimental and the comparison groups. (Mean pretest and posttest scores are shown in Table 4-4). Independent t-tests to compare the posttest self-efficacy and motivation scores revealed no significant differences between the two groups at the p < 0.05 level.

Table 4-4.

*Mean pretest and posttest results for self-efficacy and motivation measures for experimental and control groups*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Simulation Group</th>
<th></th>
<th></th>
<th></th>
<th>Comparison Group</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean Pretest</td>
<td>SD</td>
<td>Mean Posttest</td>
<td>SD</td>
<td>Mean Pretest</td>
<td>SD</td>
<td>Mean Posttest</td>
<td>SD</td>
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<td>NASES</td>
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<td>8.4833</td>
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<td>1.22</td>
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<td>NCSES</td>
<td>9.0420</td>
<td>0.97</td>
<td>9.1209</td>
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<td>MSLQ Self-efficacy for learning</td>
<td>5.9052</td>
<td>0.77</td>
<td>6.0199</td>
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<td>6.0150</td>
<td>0.80</td>
<td>6.1693</td>
<td>0.56</td>
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<td>Intrinsic Goal Orientation</td>
<td>5.8102</td>
<td>0.75</td>
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<td>5.9250</td>
<td>0.83</td>
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<td>Extrinsic Goal Orientation</td>
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<td>4.8565</td>
<td>1.12</td>
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<td>Task Value</td>
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<td>6.5113</td>
<td>0.64</td>
<td>6.5773</td>
<td>0.66</td>
</tr>
</tbody>
</table>
Independent t-tests were then performed on the differences in mean scores to answer this research question. Results showed a significant difference between the groups only on the measure for critical thinking. Both groups had approximately equal initial critical thinking mean scores on the MSLQ and both groups’ posttest mean scores were also higher. However, the comparison groups’ mean score was significantly higher than the simulation groups’ mean score ($t = -2.490$, df 82, $p = 0.015$). These results are shown in Table 4-5.

Table 4-5

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>95% Conf. Level-Lower</th>
<th>95% Conf. Level-Upper</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASES</td>
<td>-0.4889</td>
<td>0.33</td>
<td>-1.145</td>
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<td>0.142</td>
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<tr>
<td>MSLQ Self-efficacy for learning</td>
<td>0.0148</td>
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<td>0.088</td>
<td>82</td>
<td>0.930</td>
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<td>Intrinsic Goal Orientation</td>
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<td>-0.5654</td>
<td>-0.2135</td>
<td>0.899</td>
<td>82</td>
<td>0.371</td>
</tr>
</tbody>
</table>
Human Patient Simulation 118

<table>
<thead>
<tr>
<th>Human Patient Simulation 118</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extrinsic Goal Orientation</strong></td>
</tr>
<tr>
<td><strong>Task Value</strong></td>
</tr>
<tr>
<td><strong>Learning Beliefs</strong></td>
</tr>
<tr>
<td><strong>Critical Thinking</strong></td>
</tr>
</tbody>
</table>

*Note:* *p* < 0.05

The 30-item multiple choice test provided evidence of end-of-semester learning. The experimental group scored higher on the knowledge examination than did the comparison group. Scores for the experimental group ranged from 18 to 29 (out of 30). The comparison group scores ranged from 17 to 28. The mean score for the experimental group was 24.91 (n = 54, sd 2.55, 83%) and 23.38 (n = 26, sd 3.29, 78%) for the comparison group. (See Table 4-6). This difference was found to be significant at the *p* < 0.05 level (*t* = 2.272, df 78, *p* = 0.026).
Table 4-6.

*Results of the knowledge examination*

<table>
<thead>
<tr>
<th></th>
<th>Mean Score</th>
<th>SD</th>
<th>T</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>24.91 (83%)</td>
<td>2.55</td>
<td>2.272</td>
<td>78</td>
<td>0.026*</td>
</tr>
<tr>
<td>Comparison</td>
<td>23.38 (78%)</td>
<td>3.29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * p < 0.05

Research Question 4. What are the experiences of first semester associate degree nursing students both with and without simulation?

Two groups of eight students, one group who had received simulation experiences and one group who had not, were interviewed to further determine differences in the experiences of the two groups. A variety of themes were noted through analysis of the interviews with the both groups. Although both groups had some common findings, there were also unique findings between the groups.

The students in the simulation cohort were very positive about their HPS experience. They felt the experience was very helpful to their learning and recommended this component of the first semester should continue for future students. Themes noted in the interviews with the experimental group included initial anxiety with the experience, comprehensive skill practice, safe practice in a risk-free environment, group learning benefits, and importance of the discussion and debriefing with instructor feedback following the simulation experience.

The students in the simulation group expressed satisfaction with the experience despite initial discomfort with performing in the simulated environment where they were
closely observed. Terms used to describe initial experience in the simulation lab included “awkward,” “weird,” and “stressful.” These feelings were common to all students in the simulation group despite preparatory assignments and initial orientation to the HPS setting. Students described feeling more relaxed in the environment after they had acclimated to the functioning of the simulator and the location of equipment.

I found the simulation experience really awkward at first. It was hard knowing that you were being watched. It was kind of confusing at first and I didn’t know where things were. It seemed like the supplies were all over. But after we got started, it was o.k.

Many of the students commented on the ability of simulation to allow them to practice a variety of nursing skills shortly after they had been learned, another theme of the simulation group interviews. They reported few opportunities for use of new technical and therapeutic communication skills in the long-term care clinical setting.

You really learned to put it all together (in the simulation lab). You weren’t just doing one thing at a time. You had to talk to the patient, give meds, even pay attention to what they ate. I think the scariest part was calling the doctor.

Students in the experimental group also commented on the quality of learning in the simulated setting. Placed in realistic situations and required to use problem-solving skills to coordinate the care for the simulated patient, students were provided more responsibility for coordination of care in the simulation laboratory. They expressed satisfaction with this experience. As one student commented on his simulation experience:
I loved it…because you tried to do just as good as anywhere else. You were actually put more at ease. You could make an error. You could make a mistake and no harm, no foul. You could throw away and learn from your mistakes. This is the place to make a mistake. You can’t be punished and no one is harmed or in harm’s way. So it was a good way to learn. I could say I need to learn to do that. There were no repercussions.

Students reported the experience strongly reinforced their learning. A particularly memorable scenario for many in the experimental group was the first scenario where a variety of safety principles are violated for students to recognize.

The skills [were reinforced by simulation]. Foley, dressings…and the safety simulation. Now when I first go into a patient’s room I think of that and look around for problems. I’ll never forget that one.

Other students relayed similar comments when asked if simulation reinforced her learning:

Oh, very much so. I probably took more away from the three simulations we had in the first semester than what I learned in half of the clinical experience…because it is such a routine at the nursing home. O.K.--like, you get them up and get them dressed and fed, then give them their morning pills. There may be two rounds of medicine in the morning and then it was basically fill time until you were done with your clinical. Where as in simulation you were focused and really hit a problem and then back up and say, ‘Hey, someone made a mistake and let’s go back and take a look at this.’ Then you could all learn from this. It was less of a routine but more of an impact. It was burned into your memory.
The two simulations we had were… um… one was a safety simulation where it was someone admitted overnight and it was nice to see how to deal with the mess you were put in. You came in to a bad situation and had to make it right. The teacher helped you find the best way to do that. The other was ah, ah, a paraplegic, a new paraplegic in rehab with depression so it was more of a communication lesson through the patient, you know. That was probably the hardest one for me because, you know, I like to talk but you can’t just come out and talk the way you were thinking, especially with someone who is horribly depressed. You can’t say, you know, ‘This is an opportunity for you.’ He’s not looking at it as an opportunity right now. That was probably the hardest thing for me to learn the whole last semester was the therapeutic communication cause…you…you just don’t talk like that. The simulation lab was a good place to learn it. We were asked, “What else could you have said instead of this right here?” and, oh, of course, after you have said something you realize, ‘Oh, I shouldn’t have said that; I should have said this.’ It was the perfect place to learn because you didn’t hurt anyone’s feelings or do any more harm.

Another student commented,

It was a little more challenging to talk to the mannequin but in real life when it came back to that I found it was very helpful. The HPS probably helped more than the nursing home did--for me.

Additionally, the students reported satisfaction with working in groups. At times, students would observe the performance of other students. They felt this opportunity aided in their learning.
I liked working in small groups. We worked in pairs. One group watched while the other worked with the simulator. You can learn a lot while you are watching. That’s something you never get to do in clinical—just watch.

Similarly, one informant reported on the group benefit of the simulation experience:

Like I’ve said, I’ve always learned from mistakes. I learned from the mistakes I made there. We had a good group of people for the clinical experience. No one said, “Oh, you made a mistake.” As a group, we’d say we made a mistake and let’s figure out how to fix it and go on so we don’t do it again. We’d step back and say, “How should this have happened?” and then no one ever bad mouthed others. It was very professionally run. That’s what impressed me. You were treating that patient and acting in the scenario, even when you weren’t live or whatever you call it, you treated the manikin like it was a patient.

Some of the students commented on the preparatory assignments that were done prior to the simulation experience. The assignments were required for entry into the HPS session and were often reviewed as a group prior to the hands-on work with the simulator. Following the HPS experience, the group again met to “debrief” or discuss the experience and students’ responses.

The prep assignments were voluminous but I learned from them. And, I think I learned more in the post-conference after the simulations than I did in any other clinical. We would go through all of the things that happened. It was really helpful.
Students in the experimental group reported their feelings of confidence, their feelings of “being a nurse,” was increased through simulation experiences. They also felt that their motivation to continue learning was increased by the experiences.

There were some things that I didn’t know and that kind of turned the light on—I need to study more in this part. It had a big motivational effect on me, kind of a drive to study more. I saw what we had learned was just the tip of the iceberg. It definitely opened up more avenues.

The students in the comparison group usually reported that the nursing skills course—the course in which they learned psychomotor and physical assessment skills—as the course that most increased self-efficacy and motivated them to continue learning. For example, when asked which class made her feel most like a nurse, one student replied,

Ah…(pause)…it wasn’t probably in the nursing home because we were doing mostly C.N.A. skills. And when we gave meds, well, we were giving meds but we were still doing the C.N.A. things. Um, I don’t know. I guess when we were doing catheters and some of those in skills class, it was like, wow, we are really doing this.

In the clinical course, students in the comparison group cared for residents in a long-term care setting. They reported learning from this experience but those without nursing assistant experience reported learning a bit more. The clinical experience was not the course that made all of the informants in the control group feel like a nurse. Some patient care issues reported in the clinical course included responses such as this:
It’s new coming in as an outsider. Sometimes the aides kind of take over and do everything. You might go and ambulate your resident and find it has already been done. We had a problem when we had to do a dressing change and then we would get there and the patient would already be up. You had to do it before you got her up for the day. You would get there and they would already have the patient up. We were trying to do dressing changes when the patient was up. We changed dressings on their feet when they were already up. It wasn’t like in the skills lab.

The students’ clinical experience in the long-term care setting is meant to assist students in learning to work with a relatively stable population of clients. They develop abilities to provide basic physical care and physical assessment skills. As the first semester proceeds, they begin to incorporate other skills as they have learned them including medication administration, blood glucose monitoring, and dressing changes.

When asked if there were any pivotal and memorable events that occurred in the clinical setting, only one student could recall one event that fit this description.

My resident seemed different in the morning when I saw her. She wasn’t as awake. I told the nurse and she let me help in her care. We transferred her to the hospital. I found this experience very interesting.

All students reported they felt they had improved confidence and were motivated to learn as they began their second semester of the nursing program. All of the students interviewed reported they felt a combination of the first semester courses aiding in increasing their self-efficacy and motivation. Students in both groups acknowledged the nursing skills course as increasing their self-efficacy and motivation, seeing acquisition of psychomotor skills as key to their identification as a nurse. In addition, their
pharmacology course was frequently identified as a stimulus for increased self-efficacy, more so by those in the control group than in the experimental group. One student in the experimental group, when asked about the course that increased feelings of confidence, stated,

Pharmacology. I thought I knew a fair amount going in about drugs. (Rolls his eyes.) So that was the biggest course that made me really feel like a nurse.

A similar response was provided by a student in the comparison group:

Well, I learned from the paperwork. In Fundamentals, there was a lot of paperwork, like charting. I knew there would be paperwork and I guess I felt like a nurse doing it. It opened my eyes on what you need to do for charting. I guess that is what I liked the best. And I liked pharmacology. It made me feel like a pharmacist. But it also made me feel more like a nurse.

Students in both groups also commented on the importance of instructor support. Both in the skills lab, clinical setting and simulation lab, instructor observation and feedback was highly important to the development of self-efficacy and motivation of the novice students. Students, particularly in the simulation group, commented on how important debriefing sessions after the simulation experience were in helping them to process the experience and reinforce their feelings of accomplishment. As one student commented,

It was so nice to have that time with your instructor and to be observed and get immediate feedback. I never realized how observant the instructors have to be.

In general, the simulation experience was found to be a powerful learning experience easily identified by the experimental group as one which increased self-
efficacy and motivation. The experience also increased the students’ retention of learning. Other first semester courses common to both groups were also pivotal in the first semester experience, however. Students in the comparison group reported very beneficial experiences that definitely improved their self-efficacy and motivation. This group commonly reported the acquisition of psychomotor skills as most influential in their confidence and feelings “like a nurse.” Likewise, students in the experimental group also identified performing psychomotor skills as pivotal to their learning. Few students in either group specifically identified physical assessment skills as important in their growth as nurses. Students in the comparison group were unable to provide many specific examples of their learning as compared to the students in the simulation group.

Summary

This chapter has reviewed both the quantitative and qualitative findings. Using bivariate statistical procedures, data was analyzed to compare pre and posttest self-efficacy and motivation measures and a posttest knowledge assessment for two groups of students, one receiving HPS experience and one not receiving these experiences. Initial analysis compared the pretest scores of the two groups which did not vary significantly. Throughout the semester, measures of self-efficacy and motivation increased for both groups. The exceptions were the measures of extrinsic motivation which declined for the simulation group during the semester and task value which also declined slightly for the simulation group. In addition, the simulation group had a statistically significant increase in general self-efficacy but no significant increase in nursing-specific academic or clinical self-efficacy. Motivation measures also did not significantly increase for the experimental group.
Results of the measures were further analyzed to compare the two groups of first semester associate degree nursing students. As compared to the group of students who did not receive simulation experiences, the experimental group did not demonstrate an overall change on self-efficacy and motivation measures. Measures of nursing-specific academic and clinical self-efficacy were not significantly different between the two groups. Motivation measures were also similar with the exception of the use of critical thinking strategies which showed a significant increase by the comparison group. Also noted was a significant difference between the two groups on the fundamental nursing knowledge examination at the p<0.05 level. The experimental group had a significantly higher mean score on the examination than did the comparison group.

Results of follow-up interviews revealed specific themes, some unique to the simulation group and some common to members of both groups. The simulation students reported the importance of comprehensive skill practice in a simulated setting, risk-free practice, group participation and learning, and debriefing and instructor feedback. They were often able to identify a specific learning experience in the simulation lab that had impact on their practice. Students in the control group also discussed the important or technical skill practice as increasing their self-efficacy and the importance of instructor feedback. The role of technical skill abilities was common for both groups as a factor that improved nursing self-efficacy and motivation. Students in both groups related the importance of a variety of courses in the first semester as increasing their nursing knowledge, self-efficacy and motivation.
Human Patient Simulation 129

Chapter V: Summary, Conclusions and Recommendations

Introduction

This chapter begins with a summary of this mixed method, quasi-experimental study. Initial data was gathered using two previously-developed self-report instruments determining levels of self-efficacy and motivation along with an instructor-developed, multiple choice posttest evaluating first semester associate degree nursing students’ learning. Eighty-four nursing students at two technical colleges in Wisconsin participated in the study, 54 in the experimental group and 30 in the comparison group. In addition, 16 students were interviewed after the first part of the study to further clarify the first semester experience, both with and without human patient simulation (HPS). The results of the study are discussed in this chapter and compared to previous studies reported in the literature to highlight any similarities in results and expand the base of nursing knowledge on simulation use in nursing education. Limitations of this study are addressed. Conclusions are explained and a discussion of recommendations for nursing education and research concludes the chapter.

Summary and Discussion of Findings

This study examined associate degree student nurses’ self-efficacy, motivation, and end-of-semester knowledge following human patient simulation experience. Two groups of students at different nursing schools, both functioning under the same standardized, statewide curriculum, comprised the experimental and comparison groups. Analysis of demographic data and pretest measures indicated that the two groups had quite similar characteristics and initial levels of self-efficacy and motivation. The self-efficacy and motivation measures were evaluated for internal consistency reliability and
were found to be acceptable. In addition, correlations between the measures of self-efficacy and motivation indicated many mild to moderate relationships. Following instrument analysis, both quantitative and qualitative data were analyzed to answer the four research questions. The following results were determined.

**Research Question 1.** Is there an increase in self-efficacy with exposure to human patient simulation training?

When pre and post-surveys were compared, students in the simulation group were found to have an increase in all measures of self-efficacy: discipline-specific self-efficacy as measured by the NASES and the NCSES and general self-efficacy for learning measured by the self-efficacy subscale of the MSLQ. The increases in mean NASES and NCSES were not significantly higher after simulation experiences, however. The measure of general academic self-efficacy, as measured by the self-efficacy subscale of the MSLQ, was significantly higher at the p < 0.05 level following simulation experience.

Self-efficacy, often used interchangeably with confidence, has long been known to be related to health care professionals’ learning and competence. Lasater (2007) created a model of development of clinical judgment that includes confidence as an important variable. Likewise, Jeffries (2005) included self-confidence as an important outcome variable in her theoretical framework of nursing education simulation. The results of this study fit within these models as self-efficacy of students did increase in the first semester as a result of the nursing courses. Simulation may be related to this increase for the experimental group.
Rockstraw (2006) found similar results in his study of nursing student self-efficacy after exposure to HPS as compared to exposure to simulated patients. Although self-efficacy of undergraduate students in his study did increase with HPS experience, the measure was also increased in the group that had experience with a simulated patient. Another study (Brannon, White, & Bezanson, 2008) compared nursing students’ increase in cognitive skills and confidence in caring for patients experiencing acute myocardial infarction following HPS experience as compared to students receiving traditional lecture instruction. Although cognitive skill increased more in the group receiving HPS, confidence level was not different when compared to students receiving traditional lecture instruction.

Other studies have shown increases in nursing student self-efficacy following HPS experience (Cioffi, Purcal & Arundell, 2005; Bremner, Adudell, Bennett & VanGeest, 2006). Leigh (2008) found an increase in pretest and posttest self-efficacy scores in senior baccalaureate nursing students who received HPS experiences. Another study focused on baccalaureate students about to enter their first clinical experience (Bambini, Washburn, & Perkins, 2009) and found an increase in self-efficacy and confidence the postpartum assessment skills that had been presented and practiced. Horan (2009) focused on associate degree nursing students who had HPS “mini-scenario” experiences associated with a lecture course and found that 89% of 57 students reported an increase in confidence. Further discussion of self-efficacy will be provided with the third research question results comparing the experimental HPS group with those receiving traditional clinical experience.
Research Question 2. Does student motivation increase with exposure to human patient simulation training?

This research question was answered by the students’ responses to the subscales of the MSLQ. Levels of intrinsic motivation, control of learning beliefs, self-efficacy for learning (as discussed above), and critical thinking increased after simulation experiences. The increases were significant (p < 0.05) for the self-efficacy and control of learning beliefs subscales which are internal beliefs about learning and motivation. Extrinsic motivation and task value levels decreased after simulation experience. Of these two subscales, the decrease in extrinsic motivation was significant at the p <0.05 level. This finding indicates learning rewarded by external forces (extrinsic goal orientation) such as grades, competition, and rewards was rated lower at the end of the semester.

Dean and Kenworthy (2000) noted that initial exposure to experiential learning is almost always based on an extrinsic motivation. They explain that early successes in the learning environment and ongoing reinforcement create a move to intrinsic motivation. Both contextual and situational influences can affect motivation (Vallerand & Ratelle, 2004). The HPS environment may provide the context and situations necessary to increase students’ interest and satisfaction in their learning. Previous studies have indicated that increased intrinsic motivation and decreased extrinsic motivation are beneficial. For example, Walker and Green (2006) found that high extrinsic motivation levels were associated with shallow learner engagement while high levels of intrinsic motivation and self-efficacy were associated with meaningful learner engagement. Intrinsic motivation has been noted to be a more effective and satisfying stimulus to learning (Csikszentmihalyi, 1991).
HPS may improve nursing students’ confidence that will serve to further motivate learners. Takayesu, Gordon, Farrell, Evans, Sullivan, and Pawlowski (2002) found that motivation was an important aspect of HPS experience when they surveyed 74 students in emergency medicine and critical care and found that many students reported HPS experience increased their motivation to learn. Motivation has been linked to academic persistence in the face of difficult content and to academic success (Bussato, Prins, Elshout, & Hamaker, 2000; Lundberg, 2008). Nurse educators must continue to consider HPS learning as a method to enhance student learning through increased motivation.

Consideration of adult learning principles is also related to motivation in the nursing educational setting. Students entering associate degree nursing programs vary in age but all are adult learners. Knowles (1984, p. 55-61) noted that adults need to understand why they are learning the content required by the educational program and to realize where their learning deficits are. Adult learners appreciate experiential learning techniques—techniques that tap into the experiences of the learner (Knowles, 1984, p. 61). They are motivated to learn and learn more effectively when the learning is presented in the context of application to real-life situations. Simulation learning can offer this type of experiential learning to motivate adult learners. The study supports this aspect of HPS learning.

Research Question 3. Is there a difference in self-efficacy, motivation and learning of fundamental nursing knowledge between first semester associate degree nursing students exposed to high-fidelity human patient simulation experiences and those who have not had this type of experience?
The levels of self-efficacy and motivation for the experimental and comparison groups were compared by calculating differences in the pre and posttest scores and performing independent t-tests to determine if significant differences existed between the two groups. In addition, a comparison was made on the posttest fundamental nursing knowledge examination scores of the two groups. In general, the pre and posttest scores of the experimental group for self-efficacy and motivation subscales were slightly lower than the mean scores of the comparison group. The only significant difference between the two groups was in the critical thinking subscale at the $p < 0.05$ level. The comparison group reported a larger increase in the use of critical thinking strategies for learning than did the experimental group. None of the other self-efficacy and motivation measures were significantly different.

Salyers (2007) found similar results when comparing student learning of psychomotor skills with two different learning strategies. When comparing a traditional lecture and practice approach with a technology-based instructional program, he found students in the treatment group performed slightly better on a cognitive exam but not significantly better than those in the traditional group on a psychomotor exam. In addition, those in the treatment group were less satisfied with their learning experience. Ravert (2008) also found increases in control and treatment groups that were similar when testing the outcomes of HPS on nursing students’ critical thinking. In a related study of using computer-mediated learning, Bobenko-Mould, Andrusyszyn, and Goldenberg (2004) found significant increases within experimental and control groups on self-efficacy measures but no significant between group differences.
The results of the knowledge examination suggest that HPS may be an acceptable instructional method for nursing students early in the associate degree nursing curriculum. Students in the simulation group scored higher on the fundamental knowledge examination than those in the comparison group, significant at the p < 0.05 level. The examination included a variety of concepts from the first semester curriculum including those from nursing fundamentals, physical assessment, psychomotor skills, and pharmacology. All of these content areas may be put into practice in the clinical and HPS settings.

Likewise, Hoffman, O’Donnell, and Kim (2007) in a one-group, pretest/posttest study of baccalaureate nursing students found an increase in basic nursing knowledge following simulation experiences. Brannan, White and Bezanson (2008) also found an increase in knowledge in students who had received HPS instruction. However, when compared to a group of students who had not received HPS, they found no significant difference in knowledge scores. They concluded that HPS is an appropriate teaching method to include in the nursing curriculum but traditional lecture and discussion are needed components of nursing education, also. As Yaeger, et al (2004) point out, there currently have been “no adequately powered, prospective controlled randomized trial completed to indicate transfer of skill or changes in patient outcomes as a result of high-fidelity simulation-based training” (p. 329).

Research Question 4. What are the experiences of first semester associate degree nursing students both with and without simulation?

The qualitative results further identified differences between the experiences of the students in the two groups and supported increases in self-efficacy and motivation as
a result of HPS. Common themes of the students who had simulation included initial anxiety at being observed in a new environment, comprehensive skill practice, group learning, the importance of the debriefing session, and the memorable learning experiences. Other studies have found similar results (Lasater, 2007; Bambini, et al, 2009).

The students in the study reported anxiety with the new environment and of not knowing what to expect during their first simulation experience. The anxiety subsided as the scenario progressed, however, and was not felt to hinder learning. A similar finding was reported by Hoffman, O’Donnell, and Kim (2007). Elfrink, Nininger, Rohig, and Lee (2009) found anxiety a more significant issue as reported by students participating in post-simulation focus groups. Students reported embarrassment and not knowing “where to begin and what to do” (p. 84). Thorough orientation and group preplanning was suggested by these authors as a means to decrease initial anxiety. Kuznar (2007) also recommended orientation sessions be held prior to initiation of simulation. The students in this study did experience anxiety despite an orientation to the environment. However, with varying instructors facilitating the HPS sessions, the degree of orientation could have varied, an aspect of HPS not controlled in this study.

The students in the study recognized that the simulation practice incorporated knowledge from all of the courses they were taking. They expressed surprise that psychosocial communication skills were even included as part of the simulations. By tying all learning together, students can learn about the reality of nursing practice. Critical thinking can be enhanced through application of various concepts and skills. Leigh (2008) reviewed a variety of HPS literature and noted that the ability to apply
knowledge to practice is among the important features of HPS. Lasater (2007) who conducted focus groups with undergraduate students who had HPS experience to identify the strengths and weaknesses of the learning strategy, also found that students identified the ability to “bring together” learning from theory courses with learning from psychomotor skills and “lessons learned from clinical practice” (p. 272). As Yaeger, et al (2004) explained, HPS provides learners the ability to develop higher-order learning—analysis, synthesis, and evaluation—an advantage over the traditional lecture method.

Student informants reported they learned a great deal from not only practicing in the simulation laboratory but from observing the practice of others. They reported few opportunities to observe each other in the clinical setting and felt they learned from seeing not only the successes of others but in identifying mistakes of others. Many of the students identified the strength of learning in an environment where errors could be made without harm to clients and these errors corrected, likely preventing error in the future in the actual clinical setting. Learning from observing others was noted as a strength by Lasater (2007) and Biddle, Hartland, and Fallacaro (2005). Simulation has been used to enhance teamwork and group function in the clinical setting (Gaba, 2001; Beyea & Kobokovich, 2004; Issenberg, et al, 2005). Bandura (1986) noted vicarious experience, learning through observation of others, was an important factor in the development of self-efficacy. This observation by students is an important benefit not mentioned by the students in the comparison group.

Students reported practice in an environment without risk to actual clients was helpful and increased their comfort level in future clinical experiences. Previous studies have found similar results. Bond, Kostenbader and McCarthy (2001) found that realism
and the ability to see immediate and appropriate response to treatment were the two most frequently identified positive responses in their study of the effects of HPS. Lasater’s (2007) participants noted realism of HPS a benefit in addition to the ability to provide a wide breadth of experiences.

Other studies also found that learners appreciated HPS learning. Gaba and DeAndra (1989), Gordon (2000), Gordon, Wilkerson, et al (2001), and Graydon, Blum, Cooper, et al (2004), among others, found that medical students rated HPS learning highly effective. In a study of 70 nursing students, Jeffries, Rew and Cramer (2002) found that students who used interactive learning were significantly more satisfied with learning than students who did not have interactive learning included in their course. Students appreciated the realistic environment in which they learned. As Rauen (2001) pointed out, an obvious advantage of simulation is that HPS learning presents no risk to patients. Errors can be made, corrected and discussed immediately without harm to a real patient (Medley & Horne, 2005) and this was reflected in the comments of the experimental group.

The students who had received simulation also commented on the benefit of the debriefing sessions held after the simulation scenarios. Knowing other students and the instructor had observed them, the students were positive about the ability to discuss clinical issues that had arisen and to verify learning. Students valued the feedback of their instructors and found that they had more interaction with their instructor while they were in the simulation lab. They found these interactions increased their motivation for further learning.
The comparison group commonly reported the importance of the nursing psychomotor skill course in their feelings of confidence. Pharmacology was also reported more often by this group of students as an important course. They were less likely to report memorable experiences in the clinical setting. Both groups identified psychomotor skill practice as important to them. They also both identified instructor support and feedback very meaningful to them. A combination of all of the first semester courses, particularly the skills and pharmacology courses, were identified as increasing an overall feeling of self-efficacy, motivation, and knowledge.

Learning and performing psychomotor skills was seen by both groups as highly important to their feeling of reaching their goal of becoming a nurse. However, respondents from both groups related that they were not able to perform these newly learned skills frequently in the clinical setting, reporting their skills laboratory course and the HPS lab the sites they had the ability to perform them.

Students in the experimental group were able to express many more significant events that enhanced learning than did those interviewed from the control group. However, students in both groups did identify some common themes of the first semester, including the importance of all the first semester courses. Both groups of students felt they experienced learning activities within the first semester curriculum that increased their self-efficacy and motivated them to learn.

HPS offers nursing instructors a method of equally providing all students powerful learning experiences that may not be obtained in the clinical environment. Students agreed that comprehensive skill practice and group learning, combined with
close instructor interaction and feedback, increased their feelings of self-efficacy and motivation.

**Conclusions**

The creation of technical nursing programs in the 1950’s opened the door for many to enter nursing who would have never been able to do so either in the time-intensive hospital-based system existing at the time or at the baccalaureate level. Technical nursing programs continue to provide a flexible avenue for many to enter nursing. To improve the outcomes of these students and develop their higher-order learning, advanced teaching methodologies such as HPS have been added to the associate degree nursing curriculum. Limited research has evaluated the use of HPS with this population, however. This study adds to the research on HPS application with associate degree nursing students.

Increasing numbers of technical and community colleges, along with 4-year programs, have been integrating HPS experiences into their curricula. HPS offers students the ability to put their learning into practice and may assist in preparing them for today’s fast-paced, high acuity health care milieu. Improvement in health care safety and quality can be assisted by the implementation of simulation into education and clinical settings. In this study, students who had HPS experience were found to have few statistically significant differences in self-efficacy and motivation from their counterparts who did not have this type of experience. Learning, as measured by a 30-item posttest was significantly higher in the experimental group. The results indicate HPS is a method that resulted in equal learning outcomes as the traditional methods. It is an acceptable adjunct in nursing education and can successfully be used with first semester students.
HPS cannot fully replace lecture, discussion, or actual clinical practice within health care programs. The method can, however, be used to support self-efficacy, motivation and learning within the curriculum.

A strength of HPS is its ability for repetitive practice (Issenberg, et al, 2005). Novice nursing students are often motivated by the learning of new skills and introduction to HPS fits well within this reality. Scenarios in the HPS setting should incorporate a variety of skill sets including psychomotor skills, communication, and physical assessment skills, even for the first semester nursing student. As del Bueno (2005) explained, “Like getting to Carnegie Hall, being an effective nurse requires practice, practice, practice” (p. 282).

Learning theorists such as Bloom (1956) and Gardner (1983) recognized the psychomotor or kinesthetic component of learning. Many nursing students are kinesthetic learners, as are many learners in other disciplines. Ability to safely perform psychomotor skills is crucial for nursing students. Although this practice can take place with low-fidelity models, HPS experiences allow students to put theory into practice, requiring not only performance of skills but thought about how to apply concepts and practice in an ever changing, challenging environment. Students in this study identified the importance of combining a variety of skills and theory into the HPS experiences. Combining skill practice in a case study/scenario format adds the prioritizing, decision-making, and critical thinking components required of nursing practice. As del Bueno (2005) points out, with the increasing amounts of nursing content presented to nursing students, students “need consistent experience with both visual simulation and real patients to learn how to effectively focus on and manage patient problems” (p. 281).
Although simulation did create anxiety for learners, the students reported that the anxiety was soon relieved. They also mentioned that subsequent clinical experiences were less anxiety-provoking as a result of HPS experience. Bremner et al (2006) also found similar results as did Feingold, et al (2004). Orientation sessions, modeling and encouragement are required for students new to HPS.

This study indicates that research on HPS must be conducted using various methods, including qualitative research methods. Although the Likert-type instruments used did provide answers to the research questions, rich, descriptive qualitative text added significantly to the results. Students were willing to discuss their experiences and were overall quite enthusiastic. The overall context of the learning experience of these students became much clearer with the addition of the qualitative data.

Increasing use of technology is inevitable in health care and nursing students need to be prepared to adapt to this growth. Including HPS in the nursing curriculum adds another example of technology use in health care and can further assist students in adapting to changing technology. Supportive medical equipment used along with the simulator can further enhance students’ interaction with various technologies. The students in this study reported high levels of familiarity with various technological applications. No student verbalized concern about technology in the interviews. Likely, many students today expect incorporation of technology into the curriculum.

Limitations

Limitations of social, scientific and educational research generally come from sampling inadequacies, methodological weaknesses, and statistical deficiencies. This study is not without limitations. These include:
1. The sample size and selection was a limitation. The sample size was relatively small and not randomly selected. In addition, the experimental and comparison groups were unequal in size. Despite similarities in the demographic data and pretest results, there were likely other variables that may have differed between the groups. Sample differences and lack of randomization are inherent limitations of quasi-experimental research design.

2. There was little diversity in the sample. The sample was overwhelmingly comprised of females younger than 30 years of age. Although this is characteristic of the population of students entering the nursing profession, it may limit the results of the study. Only first semester nursing students in two associate degree nursing programs in Wisconsin were included in the sample; the group was relatively homogeneous in relation to ethnicity. Generalizability is also limited by these sample limitations.

3. The data collection timing may also have been a limitation. Institutional review board approval was obtained after the semester was already in process and the initial pretests were completed in the 6-8th weeks of the 16-week semester. Experiences in the initial weeks of the semester may have altered the self-efficacy and motivation ratings to some extent. Had pretests been completed earlier, the results may have been a bit different. The posttests were all completed in the last 2 weeks of the semester.

3. The self-report instruments used for the study had previously established reliability and validity. However, the self-efficacy and motivation
measures were rather lengthy and may have led to fatigue while completing them. Replicating the study using alternative instruments that are preferably shorter is also recommended.

4. The multiple-choice examination given to participants at the end of the semester was developed by the researcher. The pilot test of the examination was helpful in determining the best questions to include but was limited in size (n = 15). This may have limited the results of the examination.

5. The demographic collection instrument was also developed by the researcher and was limited. Items such as age and previous experience were placed into categories but could have been better analyzed if placed in a more interval manner.

6. Interviews were conducted by the researcher who, although experienced as a nurse, nurse practitioner and educator, had not done qualitative research interviews prior to this study. The number of students interviewed was a small sample of the whole and, although common themes emerged after only a few interviews, a larger sample for the qualitative portion of the study would be recommended.

7. Faculty members using the HPS methods had varying amounts of teaching experience and experience in the HPS lab. Eleven different instructors provided HPS education at the technical college using simulation in the first semester of the nursing program. These variations in instructors may
have altered the students’ experiences and their responses to the surveys and interviews.

8. There are limitations related to the methodology of the study. Assessing for the variables at two points in the semester may have introduced bias on the part of the subjects. There may be some degree of carry over effect from previous clinical or simulation experience or from other courses that present similar content. Threats to internal validity considered include history, maturation, and testing.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. HPS learning was used with first-semester nursing students in this study and the results were promising. Further early nursing courses should be planned to include HPS learning. As students begin and continue to work in the HPS, their comfort level with the environment will increase. Although self-efficacy and motivation did not significantly increase in the experimental group, the interviews definitely supported that important learning experiences took place in the lab that enhanced their clinical practicum and improved their learning. The ability to practice in a risk-free yet realistic environment and revise their performance until mastered will have a powerful effect on self-efficacy and persistence in the face of future challenge. According to Bandura (1986), personal success and mastery is one of the most powerful sources of self-efficacy.
As simulation is incorporated into nursing education, research must guide its use. Issenberg and his colleagues (2005) reviewed existing literature on medical simulation for the Best Evidence Medical Education Collaboration and identified 10 features of HPS adoption that lead to effective learning: provision of ongoing feedback; repetitive practice; a range of difficulty level; incorporation of multiple learning strategies; clinical variation in patient issues; control of environment; individualized learning; defined outcomes or benchmarks; simulator realism; and curricular integration. This study supports these recommendations as participants commented on many of these principles.

2. Students interviewed from the simulation group reported initial anxiety and stress as the HPS experience began. Jeffries (2005) points out that a detailed orientation to the lab environment and the simulator itself must be included. She stresses that the time spent in orientation will better allow students to concentrate on the objectives of the sessions without distraction. Adequate time for orientation prior to or, possibly, at a separate time, is recommended when initiating HPS experience.

3. This study’s certainly has implications for the nursing programs in the technical college system in Wisconsin. Despite the fact that the ratings of self-efficacy and motivation on the instruments were not statistically different between the experimental and comparison groups, novice nursing students in this study were quite highly satisfied with many aspects of HPS learning and were able to highlight many benefits. HPS learning
should be continued at this level of the nursing educational process. The memorable learning experiences that took place were very powerful for these students.

4. Further study of HPS learning should continue to include both quantitative and qualitative research methods. The results of this study were much richer with the addition of the qualitative piece. Phenomenological qualitative methods aim to reflect the lived, contextual realities of individuals and groups (Lopez & Willis, 2004) and are appropriate for research in nursing education.

5. The study should be replicated with a much larger sample size. This could be done by collecting data over time at one college. An alternative would be to collect data from associate degree nursing students from a variety of associate degree programs sites. Expanding the study to include many sites offering a similar curriculum would be optimal. Further study will increase insight into the differences between groups of students with and without simulation including the differences in extrinsic motivation, critical thinking strategies and examination scores.

6. With larger sample sizes, differences between different demographic aspects could be better evaluated. Although reflective of the population entering nursing in Wisconsin, the sample was quite homogeneous and not representative of the nursing population in other areas. Replicating the study in other geographical sites and with larger sample sizes could
provide data to determine the effects of HPS on self-efficacy, motivation and knowledge on more diverse groups of learners.

7. Score on the 30-item multiple choice examination were higher for the experimental group in this study. This finding needs further investigation. While other studies have shown initial increases in learning following HPS sessions, results on retention of this learning has varied (Nehring, et al, 2001; Hoffman, et al, 2007; and Laschinger, Medves, Pulling, McGraw, Waytuck, Harrison, & Gambeta, 2008). Further investigation is required in this area, also.

8. The ability to repetitively perform skills is a strength of HPS and should be further studied. Performance measures were not included in this study. Further studies should also include performance evaluation as a component of assessing HPS’ effects on nursing student learning.

9. Effects of HPS learning on self-efficacy, motivation and knowledge should also be expanded to look at different levels of the associate degree nursing curriculum and at different levels of educational preparation for nursing, i.e. associate degree, bachelor’s degree, and master’s level. The effects could be compared between the various levels of education.

10. HPS studies should also look beyond the experience of the student nurse and evaluate the transition of new graduates over the first year of their careers. Comparison could be made between graduates who had HPS experiences in their programs and those who did not to see if their levels of adjustment vary in the first year of practice.
11. HPS use has been suggested as a method to help nurses and other health care professionals prevent errors in the clinical setting (Durham & Alden, 2008, Kuznar, 2007). Further study should evaluate error rates between recent graduates who were trained using HPS technology and those who were not to determine if this is truly the case. Little empirical data is available on this topic in nursing to date and research of this type is vital in furthering error prevention and safety strategies.

12. Results of this study and further HPS research must be disseminated to health care educators. If further research continues to show positive outcomes of this type of teaching strategy, steps should be taken to expand access to HPS technology to more schools of nursing.

Summary

This study evaluated the effects of HPS experience on first semester associate degree nursing students’ level of self-efficacy and motivation and acquisition of fundamental nursing knowledge. All students rated self-efficacy and motivation higher at the end of the semester and only the use of critical thinking skills was found to be significantly different between the two groups on these measures. The HPS group had a decrease in mean score for extrinsic goal orientation indicating that they looked less to grades and other rewards for motivation for their learning as they progressed in the program. Students in the experimental group (who had received simulation experience) scored significantly higher on the knowledge examination.

Interviews with a small group of the sample revealed that students in the simulation group found the HPS learning very important to their first semester learning
experience and had very memorable learning experiences. Themes of learning in the HPS lab included initial anxiety, comprehensive learning using concepts from all first-semester nursing courses, learning from group participation, and the importance of immediate instructor feedback and debriefing in the HPS setting. Students in both groups expressed that the combination of courses in the first semester of the curriculum improved their level of confidence and motivation for further study. All students recognized psychomotor skills as important in their increasing their self-efficacy and motivation to learn and become nurses.

A Chinese proverb states, “I hear, I forget; I see, I remember; I do, I understand.” This saying can certainly be applied to HPS learning. Students in this study reported they learned important theoretical and psychomotor content in the HPS environment and felt it enhanced their self-efficacy, motivation and knowledge. Although quantitative results did not show significant increases in self-efficacy and motivation, it did indicate increases in knowledge acquisition. HPS offers students a unique learning option and can enhance their self-efficacy by influencing all formational sources of self-efficacy—personal mastery, vicarious experience, verbal persuasion, and emotional state (Bandura, 1986). Further study in the area of the effects of HPS learning is recommended.
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## Sample Program Course Sequence

### FIRST TERM

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<th>Course Title</th>
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<tr>
<td>+ * 543-102</td>
<td>Nursing Skills</td>
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<td>Nursing Pharmacology</td>
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<tr>
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<td>Written Communications</td>
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### FOURTH TERM

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ * 543-113</td>
<td>Nsg: Complex Health Alterat 2</td>
<td>3</td>
</tr>
<tr>
<td>+ * 543-114</td>
<td>Nsg: Mgt &amp; Profess Concepts</td>
<td>2</td>
</tr>
<tr>
<td>+ * 543-115</td>
<td>Nsg: Adv Clinical Practice</td>
<td>3</td>
</tr>
<tr>
<td>+ * 543-116</td>
<td>Nursing Clinical Transition</td>
<td>2</td>
</tr>
<tr>
<td>+ 809-196</td>
<td>Intro to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
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</tbody>
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### Minimum Program Credits Required - 70

### Course Descriptions

#### 543-101 Nursing Fundamentals

This course focuses on basic nursing concepts that the beginning nurse will need to provide care to diverse patient populations across the lifespan. Current and historical issues impacting nursing will be explored within the scope of nursing practice. The nursing process will be introduced as a framework for organizing the care of patients with alterations in cognition, elimination, comfort, grief/loss, mobility, integument, and fluid/electrolyte balance. Prerequisite(s): 543-103 Nursing Pharmacology (or taken concurrently) and 806-177 Gen Anatomy & Physiology (or taken concurrently). Restricted to students admitted to the following program(s): 10-543-1 Nursing-Assoc Degree, 31-543-1 Practical Nursing.

#### 543-102 Nursing Skills

This course focuses on development of clinical skills and physical assessment across the lifespan. Content includes mathematical calculations and conversions related to clinical skills, blood pressure assessment, aseptic technique, wound care, oxygen administration, tracheostomy care, suctioning, management of enteral tubes, basic medication administration, glucose testing, enemas, ostomy care, and catheterization. In addition the course includes techniques related to obtaining a history and basic physical assessment skills using a body systems approach. Prerequisite(s): 543-101 Nursing Fundamentals (or taken concurrently) and 543-103 Nursing Pharmacology (or taken concurrently) and 806-177 Gen Anatomy & Physiology (or taken concurrently). Restricted to students admitted to the following program(s): 10-543-1 Nursing-Assoc Degree, 31-543-1 Practical Nursing.

#### 543-103 Nursing Pharmacology

This course introduces the principles of pharmacology, including drug classifications and their effects on the body. Emphasis is on the use of the components of the nursing process when administering medications. Prerequisite(s): 543-101 Nursing Fundamentals (or taken concurrently) and 543-102 Nursing Skills (or taken concurrently) and 806-177 Gen Anatomy & Physiology (or taken concurrently). Restricted to students admitted to the following program(s): 10-543-1 Nursing-Assoc Degree, 31-543-1 Practical Nursing.

#### 543-104 Nsg: Intro Clinical Practice

This introductory clinical course emphasizes basic nursing skills and application of the nursing process in meeting the needs of diverse clients across the lifespan. Emphasis is placed on performing basic nursing skills, the formation of nurse-client relationships, communication, data collection, documentation, and medication administration. Prerequisite(s): 543-101 Nursing Fundamentals (or taken concurrently) and 543-102 Nursing Skills (or taken concurrently) and 543-103 Nursing Pharmacology (or taken concurrently) and 806-177 Gen Anatomy & Physiology (or taken concurrently). Restricted to students admitted to the following program(s): 10-543-1 Nursing-Assoc Degree, 31-543-1 Practical Nursing.
Appendix B—HPS Lesson Plans and Preparatory Assignments

Introduction to Clinical Practice – Clinical Simulation I - Rosemary Smith
HPS Facilitator Lesson Plan

Students: Students scheduled for HPS in Intro to Nursing. Early in program, just learning basic patient interaction skills. Also will include basic orientation to manikin and simulation lab.

Time frame: 3 hours

Student objectives:
1. Develop routine for introducing self to patients.
2. Demonstrate appropriate nursing actions when first entering patient rooms.
3. Identify basic safety concerns in the hospital and nursing home settings.
5. Compare findings with peers.
7. Demonstrate proper procedure for checking patients’ identity.
8. Protect patients, self and others from blood borne pathogens.
9. Display professional behaviors.
10. Provide meaningful feedback to peers.

Lesson plan
1. General orientation to the lab and Stan.
2. Rosemary Smith will provide information if the nurse asks or if a cue is appropriate. The patient may respond to any other nurse-posed questions as the student feels appropriate. The “student nurse” is instructed to bring the patient his/her morning meds, inform the patient that they will return to assist them with ADLs, and be prepared to chart, in narrative format, his/her observations and the medication administered on the MAR.
3. Nursing student will be challenged with patient behaviors, Patient will ask personal questions, will attempt to split staff, will complain about previous shift, will be anxious at times, etc.
4. Debriefing and discussion
Preparation
Set up “patient rooms” with a selection of several “props” from the list (can be used in a mix-and-match fashion, making sure there’s at least one basic safety concern and one blood borne pathogen concern; other props as desired).

Suggested Props
- Side rails up/down
- Bed in high/low position
- Bed wheels unlocked
- Call light within reach/not within reach
- Sharp lying on overbed table
- Blood on floor
- Dirty “used” Kleenex on floor or tray table
- Dirty linen on bed, chair or floor
- Sharps container over-full
- Sharps container without a label
- Garbage container over-full
- Frayed electrical cord
- Overloaded outlet
- Water spill on floor
- Dentures on tray table
- Phone off the hook
- Oxygen running but cannula not in patient’s nostrils
- Breakfast tray full/empty
- Used urinal on tray table – urine dark, bloody, cloudy, normal
- Identification band on/not on
- Money/valuables lying around
- Pills left on tray table
- Meds from home lying out
- Herbals on bedside table
- Cultural/religious artifacts present
- Cigarettes, lighter, matches lying about, and oxygen on
Debriefing

1. Discuss comparative findings (What was observed, what was missed, what was learned, value of comparing observations).
2. Discuss feedback from patients (How did your patient want to be addressed? Did you ask? What was valuable, how was it presented, better ways of providing feedback, value of feedback).
3. Discuss professional appearance and behaviors (What are they, what is not professional, perceptions created, effect on patients/family/co-workers, example situations from students’ experiences).
4. Discuss procedure for checking identification (JCAHO requirement, safety issues, perceptions created by doing/not doing a proper ID check).
5. Discuss the five rights of medication administration individually, have them point out (or point out to them) situations which make checking that right more difficult.
6. Review prep assignment questions. Discuss any questions that have not been addressed already.
**Introduction to Clinical Practice – Session I**

**HPS Student Prep Assignment**

**Completion of this Prep Assignment** is required for participation in the simulation lab. Failure to turn in completed assignment at the start of your scheduled time will result in your clinical instructor placing you on remediation. **Prep must be hand written.**

**Dress:** For this simulation experience you are required to wear your white uniform, shoes, and name tag. You should dress as you would for a hospital or nursing home clinical. If you are not dressed properly, you will not be allowed to participate, you will be placed on clinical remediation, and this experience will not be rescheduled.

**Objectives:**
1. Interact with patients professionally.
2. Attend to safety concerns in the health care setting.
3. Document findings objectively.

**Answer the following questions:**

1. What information should a nurse provide a patient and/or family member when introducing him/herself? Why?

2. Describe experiences you’ve had when a nurse or other health care provider did or didn’t introduce him/herself appropriately. What feelings did that introduction (or lack of) provoke?

3. Aside from introducing him/herself, what else should a nurse do when entering a patient’s room? Why?

4. How do you expect a health care professional to look and act? (“Professionally” cannot be the answer. Describe what you expect in detail.)

5. What do you surmise about a health care provider who looks and acts professionally? What about one who doesn’t?

6. What do you expect from a nurse who is caring for you or a loved one?

7. What does a nurse “owe” a patient?

8. What do you expect from a peer in a clinical situation? What do you “owe” your peers?

9. What are common risks faced by patients in hospital and nursing home settings?

10. How do you know for sure that you are providing care to the right patient?
11. How might a patient/family member feel if the nursing staff is constantly checking the patient’s identification? How might they feel if care providers don’t check identification?

12. How does a student nurse know if s/he has interacted with patients appropriately or performed a skill properly?

13. Who can help a nursing student evaluate his/her abilities? How?

14. What type of information is helpful in improving one’s abilities?

15. Describe a situation where someone has given you valuable feedback about something you have done. What skills or techniques did that person use that were effective?

16. Now do the opposite. Remember a situation in which someone gave you poor feedback (overly critical, communicated cruelly, or said you were great when you obviously weren’t). How did that make you feel? Was it helpful?

17. What is the purpose of documentation in the clinical setting? What are characteristics of proper, appropriate documentation?

18. Two people can look at the same thing and see it differently. What influences people’s observations? How do you know which observation is right? How can you determine if what you’ve observed is accurate?
### Simulated Clinical Experience (SCE™) Overview

**Location:** Skilled Nursing Facility

**History/Information:**
The patient is a 34-year-old man with a spinal cord injury that occurred 1 year ago in a workplace accident. The spinal cord injury is at the T11 level. He was in the hospital for 2 months and then was transferred to a skilled nursing facility for rehabilitation. He is currently depressed and has not wanted to get out of bed or participate in physical and occupational therapy for the last 2 weeks.

Health history: Healthy prior to accident

**Healthcare Provider’s Orders:**
- Hydroxyzine 10 mg PO every evening
- Acetaminophen 650 mg every 4-6 hours prn pain
- Perutec diet
- Physical and Occupational therapy for activities of daily living and job preparation
- Anti-embolism hose
- High-top tennis shoes

### Learning Objectives

1. Perform basic physical assessment of the patient with spinal cord injury (APPLICATION).
2. Identify normal and abnormal assessment findings (APPLICATION).
4. Collaborate to determine when to notify the appropriate health team members of significant findings (ANALYSIS).
Simulated Clinical Experience (SCE™) Overview

Scenario:  The simulated clinical experience presents the learner with an 80 year old Hispanic female admitted to the medical-surgical unit with a non-healing femoral-popliteal bypass graft site. It consists of five stations and includes the assessment of vital signs, level of cooperation, pain, movement, and breathing. It includes the performance of techniques for urinary catheter insertion, catheter care and removal, dressing and administration of regular and NPH insulin, intravenous and subcutaneous medications, application of elastic bandages, and wet-to-dry dressing change. The learner will also document assessments and treatments. The simulated clinical experience represents the skill validation appropriate for learners at the end of Semester I.

History Information:
An 80 year old Hispanic female has been admitted to the medical-surgical unit with a non-healing wound on her right upper leg where a femoral-popliteal bypass graft was performed 2 weeks ago. She has some and has no insurance. She is alert and oriented x3. She has a history of diabetes. This patient also has an intravenous catheter, which is used when she needs to be on a continuous intravenous therapy. She wants to know if she can soak her foot in hot water to make it feel better.

Healthcare Provider's Orders:
On Admission to the Floor 0600

1.  Intravenous therapy (IV)
   
   Up with fluid three times a day

2.  Diet 1,200 calories ADA

3.  Blood glucose AG and HbA1c

4.  NPH insulin 30 units SQ every AM

5.  Weight maintenance NPO and HbA1c

6.  Less than 10 — Notify healthcare provider

   0-100 — NPH insulin 0.5-2.0 units

7.  NPH insulin 0.5-2.0 units

   Greater than 10 — Notify healthcare provider

   Please remove catheter for intravenous therapy

   Morphine 2 mg IM every 4-6 hours prior to dressing change and 6 AM with 4-hour intervals

   Change dressing every 2-4 hours to prevent graft site using sterile field and dry technique with normal saline

   Apply an elastic bandage to left ankle for moles using a figure eight

   NPH healthcare provider at BP greater than 180/100, HR greater than 100, RR greater than 30.

   Temp greater than 38°C

Learning Objectives/Questions

1.  Identify the significance of the patient’s symptoms and assessments

2.  Identify appropriate techniques for urinary catheter insertion, catheter care and removal, dressing and administration of regular and NPH insulin, intravenous and subcutaneous medications, application of elastic bandages, and wet-to-dry dressing change.

3.  Demonstrate insertion, care, and removal of a urinary catheter (APPLICATION).

4.  Demonstrate intravenous therapy utilizing a needle and syringe (APPLICATION).

5.  Demonstrate intravenous therapy utilizing a needle and syringe (APPLICATION).

6.  Demonstrate intravenous therapy utilizing a needle and syringe (APPLICATION).

7.  Identify appropriate teaching strategies for students in regards to diabetic foot care in an elderly, Hispanic, lower socioeconomic patient (APPLICATION).

Questions to Prepare for the Simulated Clinical Experience:

1.  What is a femoral-popliteal bypass? Describe possible postoperative complications.

2.  What is the correct technique for the insertion, care, and removal of a urinary catheter?

3.  What is the correct technique for administering a non-heparinized intravenous medication?

4.  What is the correct technique for inserting a urinary catheter?

5.  What are the signs and symptoms of hypoglycemia and hyperglycemia? How would you treat each?

6.  What are the principles of sterile technique?

7.  What is the procedure for performing an initial sterile dressing change?

8.  What is the correct technique for applying an elastic bandage using the figure eight bandage?

9.  What would be appropriate teaching strategies for an elderly, Hispanic patient regarding diabetic foot care?

Faculty: [Name]
APPENDIX C—DEMOGRAPHIC DATA INSTRUMENT

Thank you for completing the survey. Please complete the following informational items by circling the data that most describes you.

1. Age:
   a. 18-25               e. 40-45
   b. 25-30               f. 45-50
   c. 30-35               g. over 50
   d. 35-40

2. Gender
   a. male
   b. female

3. What was your approximate high school grade point average? ________________

4. What is your expected grade for this course? ________________

5. Previous educational experience
   a. high school graduate or equivalent
   b. previous technical degree
   c. previous bachelor’s degree
   d. previous graduate degree

6. Previous nursing experience
   a. No previous experience
   b. Certified nursing assistant
   c. Medical assistant, EMT, or paramedic
   d. L.P.N.
   e. Other: ________________________

7. Some nursing programs are using patient simulators in training. Prior to this semester, have you been trained using a patient simulator?
   a. No
   b. Yes
   c. If yes, when and where did the training occur? __________________

8. How familiar are you with the use of technology?
   (Please rate your skills from 1 = not skilled at all to 5 = very skilled.)
   
<table>
<thead>
<tr>
<th>Skill</th>
<th>Not very skilled</th>
<th>Very skilled</th>
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</thead>
<tbody>
<tr>
<td>a. Computer use in general</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>b. Computer use for email</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>c. Computer use for word processing</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>d. Internet use</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>e. Handheld computer use (e.g. PDA)</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>f. Cell phone use</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>g. Electronic medical device use (BP cuff, oximeter, etc.)</td>
<td>1 2 3 4 5</td>
<td></td>
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Thank you for participating in this study. Please complete the data collection by completing the following informational items by circling the data that most describes you.

1. What is your expected grade for the course “Nursing; Introduction to Clinical Practice?”

2. As you complete the first semester of the nursing program, how would you now rate your abilities to use the following technologies?
(Please rate your skills from 1 = not skilled at all to 5 = very skilled.)

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<thead>
<tr>
<th>Technology</th>
<th>Not very skilled</th>
<th>Very skilled</th>
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APPENDIX C – NURSING SELF EFFICACY SCALES

Nursing Academic Self-Efficacy Scale (NASES)

For each of the nurses’ academic education requirements listed below, please indicate the extent to which you believe you could successfully complete these. Assume you are motivated to make your best effort using the 10 point scale to indicate your level of confidence. If you are very unsure and don’t think you could successfully complete the educational requirement circle ‘1’. If you think you could complete the requirement successfully, use the numbers ‘2’ to ‘10’ to rate how confident you are, circling ‘10’ if you are very sure you could.

I could learn:

1. the principles of physics as they apply to radiology, radio-activity and nuclear medicine
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

2. nursing management skills related to client care
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

3. about individual differences in people’s abilities
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

4. how people communicate and apply this knowledge to my interaction with others
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

5. administrative skills related to unit/ward management
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

6. the different theoretical explanations of health, illness and abnormal behavior
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

7. sufficient chemistry to understand the mechanisms of breathing, micturition (urination), reproduction and pharmacology
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

8. sufficient physics to understand mechanics, basic electricity and electrical safety
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

9. pathophysiology and apply this knowledge to infections, trauma, tumors and allergies
   - I don’t think I could do it
   - Fairly sure I could do it
   - I am very sure I could do it

10. nutrition needs in health and disease
    - I don’t think I could do it
    - Fairly sure I could do it
    - I am very sure I could do it
11. the legal and ethical aspects of professional nursing
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

I could learn:

12. how emotional and social needs are modified during illness
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

13. obstetrics (maternity) and gynaecological (female reproductive) health care
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

14. sufficient physics to understand equipment management, unit measurement, body mechanisms and pressure processes
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

15. sufficient microbiology to understand the body’s immune system
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

16. the neural (nervous control) system
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

17. the emotional and social needs of clients and their families
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

18. sufficient microbiology to understand infection control
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

19. roles people occupy and their attitudes
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

20. sufficient pathophysiology to understand the effects of disease on cells, tissues, organs, and systems of the body
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

21. aspects of chemistry such as atomic structure, chemical bonding, acids and bases and biological molecules
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |

22. the body’s endocrine (glandular control) system
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10  |
   | I don’t think I could do it | Fairly sure I could do it | I am very sure I could do it |
Nursing Clinical Self-Efficacy Scale (NCSES)

Below are a number of skills that nurses acquire in the course of their work. By circling one of the numbers given, please indicate how confident you are that you could learn each skill successfully. If you don’t think you could learn this skill successfully, circle ‘1’. If you think you could learn this skill successfully, use the numbers from ‘2’ to ‘10’ to rate how confident you are, circling ‘10’ if you are very sure you could.

I could learn to:

1. reassure or comfort a distressed client and help them to cope
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

2. collect a wound specimen from a client
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

3. give a client an enema or suppositories (make their bowels move or pass their motion)
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

4. remove a client’s stitches
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

5. clean and instill medication in a client’s eyes, ears, or nose
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

6. cope with working with new staff and in new environments following ward changes
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

7. advise a doctor about his/her client’s condition or contact a doctor in an emergency
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

8. ask for clarification of instructions or for help with any procedures not understood
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

9. explain to the client about the treatment to be given (dress wound, take out stitches, give injection)
   
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   Fairly sure I could do it
   I am very sure

10. form a positive working relationship with the charge nurse and other nursing staff
    
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    Fairly sure I could do it
    I am very sure

11. form an interpersonal relationship which assists the client to ask my help, i.e., get on so well with clients that they are able to seek my help without embarrassment
    
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    Fairly sure I could do it
    I am very sure
I could learn to:

12. take a client’s pulse and ECG (record of heartbeats)
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

13. establish and maintain continuous catheter drainage (urinary drainage)
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

14. assist the anesthetist in inducing and maintaining an anesthetic
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

15. organize the equipment for and maintain an intravenous drip (monitor flow rate, infusion regulator, change containers)
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

16. catheterize a female client (remove urine via a tube)
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

17. give a baby or child an injection
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

18. nurse a client in isolation
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

19. attend to a body after death
   1 2 3 4 5 6 7 8 9 10
   I don’t think I could do it
   I am very sure I could do it

20. give a client drugs by injection as ordered
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    I am very sure I could do it

21. discuss problems with a client and help in finding solutions, keeping disclosures in confidence
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    I am very sure I could do it

22. assist at an operation (hand instruments to a surgeon)
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    I am very sure I could do it

23. give prescribed tablets at the correct times and supervise the drug cart during this routine
    1 2 3 4 5 6 7 8 9 10
    I don’t think I could do it
    I am very sure I could do it
Dear Kathleen,

I have attached copies of the two scales. Feel free to adapt them to your needs. Best wishes for your research.

Regards,
Nancy McMurray

-----Original Message-----
From: kuzna004@umn.edu [mailto:kuzna004@umn.edu]
Sent: Wed 7/2/2008 1:37 PM
To: Nancy Ellen Mcmurray
Subject: Nursing Self-Efficacy Scales

Dear Dr. McMurray,

I recently read with interest your article on the development of two nursing self-efficacy scales published in the International Journal of Nursing Studies in 1994. I am writing to request your permission to use the scales in a study I am planning. The purpose of the study is to determine if nursing students experience a change in self-efficacy as a result of human patient simulation training.

A doctoral student at the University of Minnesota, I am also nursing instructor at a technical/vocational college in the U.S. (Eau Claire, Wisconsin) and have worked with simulation training for nursing students for the past few years. I conducted a study on students’ perceptions of the simulation training and found students were satisfied with the training and felt it enhanced their skills and competency. Now, I would like to further this research in evaluating for measurable change in self-efficacy.

If allowed to use the scales, I will provide you with my results and give you and Valerie Harvey full credit for your work. Please let me know if you have any other questions for me.

Thank you for considering my request,

Kathleen Kuznar, MSN, RN
Doctoral Student
University of Minnesota
St. Paul, MN USA
kuzna004@umn.edu
### APPENDIX D – MOTIVATED STRATEGIES FOR LEARNING

#### QUESTIONNAIRE

<table>
<thead>
<tr>
<th>MSLQ Subscale</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value: Intrinsic Goal Orientation</strong></td>
<td>In a class like this, I prefer course material that really challenges me so I can learn new things.</td>
</tr>
<tr>
<td></td>
<td>In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.</td>
</tr>
<tr>
<td></td>
<td>The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.</td>
</tr>
<tr>
<td></td>
<td>When I have the opportunity in this class, I choose course assignments that I can learn from even if they don’t guarantee a good grade.</td>
</tr>
<tr>
<td><strong>Value: Extrinsic Goal Orientation</strong></td>
<td>Getting a good grade in this class is the most satisfying thing for me right now.</td>
</tr>
<tr>
<td></td>
<td>The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.</td>
</tr>
<tr>
<td></td>
<td>If I can, I want to get better grades in this class than most of the other students.</td>
</tr>
<tr>
<td></td>
<td>I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.</td>
</tr>
<tr>
<td><strong>Value: Task Value</strong></td>
<td>I think I will be able to use what I learn in this course in other courses.</td>
</tr>
<tr>
<td></td>
<td>It is important for me to learn the course material in this class.</td>
</tr>
</tbody>
</table>
I am very interested in the content area of this course.

I think the course material in this class is useful for me to learn.

I like the subject matter of this course.

Understanding the subject matter of this course is very important to me.

Expectancy: Self-Efficacy for Learning

I believe I will receive an excellent grade in this class.

I’m certain I can understand the most difficult material.

I’m confident I can understand the basic concepts taught in this course.

I’m confident I can understand the most complex material presented by the instructor in this course.

I’m confident I can do an excellent job on the assignments and tests in this course.

I expect to do well in this class.

I’m certain I can master the skills being taught in this class.

Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Expectancy: Control of Learning Beliefs

If I study in appropriate ways, then I will be able to learn the material in this course.

It is my own fault if I don’t learn the material in this course.

If I try hard enough, then I will understand
If I don’t understand the course material, it is because I didn’t try hard enough.

Cognitive and Metacognitive Strategies:

Critical Thinking

I often find myself questioning things I hear or read in this course to decide if I find them convincing.

When a theory, interpretation or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.

I treat the course material as a starting point and try to develop my own ideas about it.

I try to play around with ideas of my own related to what I am learning in this course.

Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
APPENDIX E – MOTIVATED STRATEGIES FOR LEARNING

QUESTIONNAIRE (MSLQ)

Motivation

The following questions ask about your motivation for and attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If your think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1  2  3  4  5  6  7
Not at all true of me

1. In a class like this, I prefer course material that really challenges me so I can learn new things.  

2. If I study in appropriate ways, then I will be able to learn the material in this course.  

3. I think I will be able to use what I learn in this course in other courses.  

4. I believe I will receive an excellent grade in this class.  

5. I am certain I can understand the most difficult material.  

6. Getting a good grade in this class is the most satisfying thing for me right now.  

7. It is my own fault if I don’t learn the material in this course.  

8. It is important for me to learn the course material in this class.
9. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.

10. I’m confident I can understand the basic concepts taught in this course.

11. If I can, I want to get better grades in this class than most of the other students.

12. I am confident I can understand the most complex material presented by the instructor in this course.

13. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.

14. I am very interested in the content area of this course.

15. If I try hard enough, then I will understand the course material.

16. I’m confident I can do an excellent job on the assignments and tests in this course.

17. I expect to do well in this class.

18. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.

19. I think the course material in this class is useful for me to learn.

20. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don’t guarantee a good grade.

21. If I don’t understand the course material, it is because I didn’t try hard enough.

22. I like the subject matter of this course.
23. Understanding the subject matter of this course is very important to me.

24. I’m certain I can master the skills being taught in this class.

25. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.

26. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

27. I often find myself questioning things I hear or read in this course to decide if I find them convincing.

28. When a theory, interpretation or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.

29. I treat the course material as a starting point and try to develop my own ideas about it.

30. I try to play around with ideas of my own related to what I am learning in this course.

31. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
APPENDIX F – FUNDAMENTAL NURSING KNOWLEDGE EXAMINATION

First Semester. Quiz
Fall, 2008

Name: ____________________

Directions: This quiz consists of 30 items. Please read the items carefully and choose the best answer. Select the best response by circling the letter corresponding with that item. Also, please write your name in the space above. (Your name will later be removed to provide anonymity.) Thank you.

1. A neighbor knows you have had clinical at a local hospital and asks for information about a hospitalized friend’s condition. Your response should be influenced by:
   a. your lack of knowledge about the treatment plan.
   b. the patient’s right to confidentiality.
   c. your neighbor’s interest in her friend.
   d. your fear of legal involvement in the case.

2. If a nurse discovers a physician has ordered two times the normal dosage of a medication for a patient in his/her care, which of the following actions should the nurse take?
   a. Administer the medication as ordered and watch for side effects.
   b. Give the person the recommended dosage of the medication.
   c. Ask another nurse to assist in administering the medication.
   d. Question the order and clarify with the physician.

3. Which of the following is an example of the therapeutic technique of focusing?
   a. “I am not sure. Are you telling me you’d like to try again?”
   b. “Of all the things you told me about, which one would you like to talk about first?”
   c. “Your illness strikes one out of every three women.”
   d. “The doctor is a very busy man. He does the best he can.”

4. The nurse noted that the client has been crying. In order to help the client discuss his feelings, the nurse’s best response would be:
   a. “How are you feeling today?”
   b. “You seem upset. Is the pain worse today?”
   c. “Crying is good for you. I’m sure things will look brighter tomorrow.”
   d. “I see that you have been crying. Would you like to talk about it?”
5. A nurse asks a student nurse to place a client in a dorsal recumbent position for a procedure. How should the student nurse position this client?
   a. In a semi-sitting position with the head and trunk raised to 30 degrees and flexed.
   b. In a lying position on the abdomen with the head turned to one side.
   c. In a sitting position on the side of the bed with the overbed table across his lap.
   d. In a back-lying position with the head and shoulders slightly elevated on a small pillow.

6. The nurse writes the following in a client’s care plan: Nausea will be reduced within 20 to 40 minutes following the administration of prochlorperazine (Compazine). This statement is an example of a(n):
   a. Nursing diagnosis
   b. Patient outcome criteria
   c. Nursing intervention
   d. Evaluation

7. Twenty minutes after giving prochlorperazine (Compazine) to a client for nausea, the nurse assesses his response to the medication. This action would be included in which component of the nursing process?
   a. Assessment
   b. Diagnosis
   c. Implementation
   d. Evaluation

8. Which of the following questions is essential to include during the interview of a client reporting a symptom?
   a. What does it feel like?
   b. Have you told your doctor about it?
   c. What would you like us to do about it?
   d. Do you think this is a serious problem?

9. Which of the following nursing actions are appropriate when a goal has not been met?
   a. Notifying the physician.
   b. Discontinuing the care plan.
   c. Continuing current nursing strategies until the goal is met.
   d. Re-examine nursing strategies.
10. A nurse is unable to palpate a client’s pedal pulse. The nurse should:
   a. Report this as a normal finding.
   b. Document the pulse as +2.
   c. Obtain a Doppler and assess for the pulse using this method.
   d. Assess for modifiable risk factors for peripheral vascular disease.

11. Which of the following signs is most indicative of peripheral vascular problems?
   a. Increased hair on the lower extremities.
   b. Skin ulcers on lower extremities.
   c. Cool hands with brisk capillary refill.
   d. 2+ pedal pulses.

12. The aortic area is:
   a. At the left 2nd intercostal space, lateral to the sternum.
   b. In the right intercostal space below the 5th rib.
   c. At the left 4th intercostal space, lateral to the sternum.
   d. At the right 2nd intercostal space, lateral to the sternum.

13. In which abdominal quadrant is the spleen located?
   a. Right upper quadrant
   b. Right lower quadrant
   c. Left upper quadrant
   d. Left lower quadrant

14. The nurse is to administer a client’s morning medications which include Lanoxin (digoxin). The nurse must first do which of the following?
   a. Assess the patient for peripheral edema.
   b. Assess the patient’s apical pulse rate.
   c. Assess the patient’s level of pain.
   d. Assess the patient’s history for gastric ulcers.

15. When administering medications to a client, the nurse must always:
   a. Check the patient’s allergies.
   b. Crush large tablets to avoid choking.
   c. Give medications with meals.
   d. Verify intake and output amounts.
16. A 16-year-old client has a sore throat, aching muscles and fever of 102.5 F. A nurse recommends which of the following medications to be taken to lower the temperature?
   a. Aspirin
   b. Enteric-coated aspirin
   c. Tylenol
   d. Maalox

17. To promote oxygenation, the nurse should ensure client position changes at least every:
   a. 30 minutes
   b. 1 hour
   c. 2 hours
   d. 3 hours

18. A nurse prepares medications for a client but is called away to an emergency. What should the nurse do?
   a. Have another nurse guard the preparations.
   b. Have another nurse finish the preparing and administering of the medications.
   c. Put the medications back in their containers.
   d. Lock the medications in the medication cart and finish them when he/she returns.

19. A patient is to receive his morning medications: Lopressor (metoprolol) 25 mg orally at 0800, docusate sodium 100 mg orally at 0800, a multivitamin at 0800, and Pepcid (famotidine) 20 mg orally at 0800. His vital signs are: T 37.1 C, pulse 50/minute, respirations 16/minute, and BP 144/82. Which of the following nursing actions are most appropriate?
   a. Administer the medications as ordered.
   b. Provide the patient with breakfast prior to administration of medications.
   c. Recheck the patient’s blood pressure.
   d. Hold the patient’s metoprolol and recheck the pulse.

20. The nurse has administered a client’s morning medications that included metoprolol 75 mg orally, aspirin 325 mg orally, calcium carbonate 600 mg orally, and insulin 70/30 mix 35 units SQ. Which of the following actions should the nurse take next?
   a. Check the client’s allergies.
   b. Provide the client with a bath or shower.
   c. Assist the client with breakfast.
   d. Encourage the client to ambulate in the hall.
21. The nurse receives an order to administer Lanoxin 0.125 mg orally now. The pharmacy has Lanoxin 0.25 mg tablets on hand. Which of the following would be the correct dosage?
   a. ¼ tablet
   b. ½ tablet
   c. 1 tablet
   d. 1 ½ tablet
   e. 2 tablets

22. When placing an indwelling urinary catheter, which of the following steps should be taken first?
   a. Insert the catheter tip into the meatus 7 to 10 cm or until urine flows.
   b. Don sterile gloves.
   c. Cleanse the periurethral area with betadine-soaked cotton balls.
   d. Prepare the contents of the catheter kit including testing the balloon.

23. A patient with an indwelling catheter complains of the need to empty his bladder. What should the nurse’s first action be?
   a. Assist the client to the bathroom.
   b. Explain to the client that this is an expected sensation with a catheter.
   c. Inform the client that you will remove the catheter immediately.
   d. Ensure the catheter tubing is not kinked and the urine is draining freely.

24. What is the single most important method of preventing the spread of infection?
   a. Proper sterile technique.
   b. Diligent use of gloves, gowns and masks.
   c. Placing infected clients in isolation.
   d. Proper handwashing practices.

25. Which of the following actions by the nurse changing a sterile dressing indicates a break in sterile technique?
   a. The nurse prevents items of the sterile field from coming within 1 inch of the edge of the sterile field.
   b. When opening sterile supplies, the nurse selects a work area at waist level or higher.
   c. The nurse drops sterile items onto the sterile field or adds items from the side.
   d. The nurse turns away from the sterile field as he/she walks by it.
26. A client is to receive heparin sodium 5000 units subcutaneously. Which of the following needles would be appropriate for this injection?
   b. A 23-gauge 1 inch needle.
   c. A 21-gauge 1 ½ inch needle.
   d. A 20-gauge ½ inch needle.

27. A client is ordered to receive cefazolin (Ancef) 250 mg IM prior to a procedure. Using a 1 gram/ml vial, how many milliliters should the nurse administer?
   a. 0.25 ml
   b. 0.5 ml
   c. 0.75 ml
   d. 1.0 ml

28. The student nurse assesses a client’s blood pressure at 76/42. Which of the following actions should the student nurse take first?
   a. Document the blood pressure in the client’s chart.
   b. Recheck the client’s blood pressure.
   c. Report the blood pressure to the R.N.
   d. Assess the client’s pulse rate and temperature.

29. The nurse is suctioning a client through a tracheostomy tube. During the suctioning procedure, the nurse notes cardiac irregularities. Which of the following is the most appropriate nursing intervention?
   a. Continue to suction.
   b. Stop the procedure and reoxygenate the client.
   c. Ensure that the suction is limited to 10 seconds.
   d. Notify the physician immediately.

30. What actions must be taken by the nurse when preparing a medication that is to be reconstituted?
   a. Inject the powder into the vial of diluent.
   b. Use normal saline as the diluent for all reconstituted medications.
   c. Shake the vial after the fluid is injected into the vial to mix it well.
   d. Evaluate the medication’s concentration after the diluent and powder are mixed.
APPENDIX G -- CONSENT FORM

CONSENT FORM

Effects of High-Fidelity Human Patient Simulation Training on Self-Efficacy, Motivation and Performance of First Semester Associate Degree Nursing Students Consent Form

You are invited to be in a research study looking at the effects of first semester nursing courses with and without human patient simulation experiences on feelings of competence, motivation and learning. We ask that you read this document and ask any questions you may have before agreeing to be in the study.

You were selected as a possible participant because of your placement in the first semester nursing courses at one of the WTCS nursing programs in either La Crosse or Eau Claire. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Kathy Kuznar, MSN, RN, a nursing instructor at Chippewa Valley Technical College in Eau Claire and graduate student at the University of Minnesota

Background Information

The purpose of this study is to evaluate the effects of simulation on nursing education. Some of the Wisconsin Technical College System nursing programs have implemented simulation in their first semester nursing courses. The method is relatively new in nursing, however, and research on its effectiveness is needed to determine its best use. The study intends to evaluate the effects of simulation on first semester nursing students’ feelings of competence, motivation and knowledge.

Procedures:

If you agree to be in this study, we would ask you to do the following things: complete two surveys and a quiz during the semester related to your feelings of competence, motivation, and knowledge in relation to nursing. The surveys and quiz should take no longer than 15-20 minutes to complete and will be taken during class time. You will also be asked to participate in a short interview focusing on your experiences in the first semester of the nursing program, your clinical experience, and your simulation experience, if this was included in your first semester education.

Risks and Benefits of being in the Study

The study has no expected risks to you. There are no direct benefits to participation.
**Compensation:**

There will be no compensation for participation.

**Confidentiality:**

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

**Voluntary Nature of the Study:**

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or your nursing program. Participation will not affect your course grades. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

**Contacts and Questions:**

The researcher conducting this study is Kathy Kuznar. You may ask any questions you have now. If you have questions later, you are encouraged to contact the researcher or her advisor at:

Investigator: Kathleen A. Kuznar, MSN, RN  
Nursing Instructor and Graduate Student  
Health Education Center, Office 216  
Chippewa Valley Technical College  
620 West Clairemont Avenue  
Eau Claire, WI 54701  
715.833.6421  
kkuznar@cvtc.edu

Advisor: Dr. Theodore Lewis  
Professor  
Work and Human Resource Education  
University of Minnesota  
1954 Buford Avenue  
St. Paul, MN 55108  
612.624.4707  
lewis007@umn.edu

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the Research Subjects’ Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.
You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature:_________________________ Date: __________

Signature of Investigator:_________________________ Date: Oct 1, 2008