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Analyzing the Change and Development of Simulation Self-Efficacy Among Practical Nursing Students

by

Moulay Abdelkarim Moukrime

August 2015

A Dissertation submitted to the Education Faculty of Lindenwood University in partial fulfillment of the requirements for the degree of

Doctor of Education

School of Education

Analyzing the Change and

Development of Simulation Self-Efficacy

Among Practical Nursing Students

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This dissertation has been approved in partial fulfillment

of the requirements for the degree of

Doctor of Education

Lindenwood University, School of Education

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

The goal of this dissertation was to contribute to research on practical nursing students' self-efficacy and the sources that build self-efficacy including mastery experience, vicarious learning, social persuasion, and physiological and affective states (Bandura, 1986). Specifically, the focus in this study was on students' self-efficacy change and development through the measurement of students' confidence in ability to engage in medical surgical simulations during the last semester of a practical nursing program. The results of this study revealed perceived self-efficacy did not change, but participants indicated an overall strong sense of efficacy to engage in medical surgical simulations. Additionally, students relied on all four sources that build self-efficacy (Bandura, 1986). In other words, students relied on personal perseverance in facing obstacles, sought the nursing faculty's assistance and encouragement to perform well, observed and modeled their teachers' behaviors, and successfully managed their physiological and emotional states. Strong self-efficacy was concluded to be a key factor in the success of practical nursing students. Thus, there is a need for future experimental and theory-driven studies that utilize the self-efficacy approach to reduce student attrition and contribute to academic and professional accomplishment of practical nursing students.

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Chapter One: Introduction

Student success is the goal of almost every institution, which can be the direct result of adequate curriculum, high-quality teaching, and effective institutional leadership (Hlinka, 2013; McClenney, 2013). Teachers are role models to be emulated (Shein & Chiou, 2011), and students can be positively or negatively influenced by their teachers (Bandura, 1986). Therefore, imitating a teacher's behavior can be a contributor to a student's sense of self-efficacy; that is, the student's belief about his or her ability to perform a task or behavior (Bandura, 1977).

Curriculum can also affect students' learning, performance, and attrition (Black, Daughtrey, & Lewis, 2014; Tešija et al., 2013). For example, simulation is a teaching method used in many nursing programs (Negrão Baptista, Amado Martins, Carneiro Ribeiro Pereira, & Mazzo, 2014). Simulation is defined as the imitation of the characteristics of a specific clinical condition to prepare students for true clinical performance (Negrão Baptista et al., 2014).

Researchers have found simulation can be a useful method to improve learning in the field of nursing (Anderson & Warren, 2011; Blum, Borglund, & Parcells, 2010; Meyer, Connors, Hou, & Gajewski, 2011; Sears, Goldsworthy, & Goodman, 2010; Sinclair & Ferguson, 2009; Wagner, Bear, & Sander, 2009). Simulated learning environments can help students acquire skills in a protected medical setting (Sears et al., 2010). Simulation activities can also aid students in acquiring clinical capabilities and execution (Anderson & Warren, 2011; Meyer et al., 2011). Furthermore, positive self-efficacy can be promoted through the use of high-fidelity simulation (HFS) (Blum et al., 2010; Sinclair & Ferguson, 2009; Wagner et al., 2009). Elfrink, Kirkpatrick, Nininger

and Schubert (2010) and Kaddoura (2010) found a nurse's critical thinking and cognitive abilities can be enhanced with clinical simulation.

Many college and university leaders make graduates' employability a priority, and students should be provided the needed skills to prepare them for the workforce (Ellenbecker, 2010). The Bureau of Labor Statistics (2014) noted:

> Employment of licensed practical [LPNs] and licensed vocational nurses [LVNs] is projected to grow 25% [percentage symbol added] from 2012 to 2022, much faster than the average for all occupations. As the baby-boom population ages, the overall need for healthcare services is expected to increase. LPNs and LVNs will be needed in residential care facilities and in home health environments to care for geriatric patients. (para. 5)

Since the employment outlook of practical nursing (PN) looks promising, it is important to prepare nurses who have strong self-efficacy; one way to enhance this is through HFS (Kuiper, Murdock, & Grant, 2010). Kameg, Howard, Clochesy, Mitchell, and Suresky (2010) concluded simulation in nursing education improves students' self-efficacy in interacting with patients who suffer from mental health issues. As a result, simulation is a practice that can improve students' confidence and communication with patients before entering the mental health working environment (Kameg et al., 2010).

In the nursing career, "Nurse managers may want to provide opportunities for enhancing self-efficacy, such as role modeling and verbal persuasion, recognizing that through improved self-efficacy, practice behaviors may improve" (Manojlovich, 2005, p. 271). Institutions should focus on ensuring graduates have a strong belief in their abilities to fulfill tasks and reach their goals (Porter, Morphet, Missen, & Raymond,

2013). The sources students rely on to develop their self-efficacy include mastery experience, vicarious learning, social persuasion, and physiological and affective states (Bandura, 1986). For instance, Porter et al. (2013) specified mastery experience increases a student's self-efficacy (Pike & O'Donnell, 2010; Sinclair & Ferguson, 2009). In this study, ratings of the sources students rely on to create their self-efficacy were compared and analyzed.

Background of the Study

Efforts should be made to invite as many students as possible to pursue nursing as a career choice (Fitzpatrick, 2014). However, there are many challenges nursing educators have to face (Ackerman, 2012). According to the American Association of Colleges of Nursing (2014), more than 53,000 qualified applicants to entry-level nursing programs were not admitted although nursing student enrollment edged forward in 2013. This student turn-away was due to the shortage of nursing faculty, lack of clinical education, and constraints of resources (American Association of Colleges of Nursing, 2014).

The relationship between self-efficacy in nursing education and attrition of nursing students has been investigated in many studies (Peterson, 2009; Peterson-Graziose, Bryer, & Nikolaidou, 2013). Also, the increase in the number of non-traditional students entering nursing programs has also presented a challenge to include various educational programs to respond to the needs of those students (Ackerman, 2012). Several factors noted in research have led to high attrition rates among nursing students (Jeffreys, 2012). Demographics and academic history variables were found to be correlated with the attrition of first semester PN students (Urrutia, 2014).

Moreover, due to different factors, such as personal life occurrences and financial problems, non-traditional PN students can experience high levels of stress in nursing school, causing them to withdraw from the nursing program (Wiens, 2010). A helpful resource which can increase students' self-efficacy and reduce stress is the HFS experience (Sinclair & Ferguson, 2009; Weaver, 2011). High-fidelity simulators are manikins nursing students work with in a simulation center (Seropian, Brown, Gavilanes, & Driggers, 2004). A manikin is "a model of the human body for teaching anatomy, demonstrating surgical operations, etc." (Manikin, 2014).

Putting it differently, "Clinical simulation offers students rich, authentic clinical experiences in a safe, nonthreatening environment" (Jeffries, 2009, p. 71). The simulation center experience mimics the interaction nurses have with real patients without the danger of harming patients (Weaver, 2011). According to Dr. Bishop, "Using the mannequin allows instructors to adjust the difficulty level for students to improve their critical-thinking skills, give students a wide range of patient care situations and give students extremely realistic practice in a safe environment" (as cited in Koehler, 2010, para. 7).

The survey of this study focused only on medical surgical nursing scenarios. Bandura (2006) recommended that "scales of perceived self-efficacy must be tailored to the particular domain of functioning that is the object of interest" (p. 308). Therefore, items on the Simulation Self-Efficacy Survey (SSES), in this study, reflected and addressed the PN students' beliefs about their abilities to execute and engage in medical surgical simulations.

The simulation center at the Midwestern community college, where the participants of this study attended the scenarios, has many characteristics similar to an actual hospital. Four rooms contain different simulators. Manikins, intravenous (IV) supplies, medication, birthing manikins, chest tubes, and infant simulators are example equipment students use when taking care of simulated patients (M. Howard, personal communication, July 7, 2014). The center also provides real people as actors to make the experience more realistic for the students. The simulation activities at the Midwestern community college incorporate low, medium, and high-fidelity based simulations. The medical surgical simulation activities students performed in this study included Compartment Syndrome, Post-Operative Chest Pain, Pulmonary Edema, Post-Operative Bleeding, Respiratory Distress, Code Blue, Cerebrovascular Accident (CVA) with Aspiration, Transfusion Reaction, and Allergic Reaction (A. Messner, personal communication, May 6, 2015).

Practical nursing students at the Midwestern community college engaged in medical scenarios such as pediatrics, end-of-life, mental illness, obstetrics, and medical surgical tasks. Discussion with nursing instructors at this Midwestern community college culminated in the decision to measure perceived self-efficacy based on students' experiences in medical surgical nursing simulation scenarios (M. Crum, personal communication, October 21, 2014). PN students spend more time learning about medical surgical nursing; thus, the simulations can truly help evaluate what students know about different medical situations (M. Crum, personal communication, October 21, 2014). Furthermore, instructors do not participate in the simulations, but observe and evaluate (M. Crum, personal communication, October 21, 2014).

On the contrary, students only spend half as much time in all specialties, including pediatrics, obstetrics, and end-of-life, than they do when learning about the medical surgical domain (M. Crum, personal communication, October 21, 2014). As a result, background knowledge is not as extensive and expectations are not as high (M. Crum, personal communication, October 21, 2014). The simulation scenarios in pediatrics, obstetrics, and end-of-life focus more on learning than evaluation and in some simulation specialties, the instructor leads or participates in the simulation with the students to enhance the learning experiences of the students (M. Crum, personal communication, October 21, 2014).

Theoretical Framework

This study was guided by the framework of the work of Bandura (1994) in social cognitive theory, which includes the theory of self-efficacy. Bandura has contributed to personality theory and therapy, providing a three-way interaction among behavior, psychological processes, and the environment (Pajares, 2002). Social cognitive theory offers explanations about the development of self-efficacy beliefs (Pajares, 2002). In addition, the use of social cognitive theory as a framework assists teachers in correcting their students' mistaken self-beliefs or ways of thinking, promotes academic capacities and self-control, and improves the structures of institutions (Pajares, 2002).

Robb (2012) pinpointed people choose specific courses of action based on the abilities and skills they have. However, elements in a person's surroundings can impact behavior as well (Patterson, Meyer, Beaujean, & Bowden, 2014). Human behavior is active and can be motivated by the individual's intrapersonal and external factors (Heydari, Dashtgard, & Moghadam, 2014; Taştan, 2014). The self-efficacy of a

university student can change over time, and this change is related to increases and decreases in cognition, motivation, and behavior (Le Blanc, Ouweneel, & Schaufeli, 2013).

The person's belief of his or her ability to execute certain behaviors is developed through four sources: mastery experience, vicarious learning, social persuasions, and physiological and affective states (Bandura, 1986, 1997; Pajares, 2002). As far as mastery experience is concerned, people interpret the results of their experiences differently, and such interpretation is used to create beliefs about executing future actions (Pajares, 2002). Some people interpret previous actions as failures, which lower self-efficacy, while others interpret the outcomes of their actions as successes, which increase self-efficacy (Pajares, 2002).

Vicarious learning refers to people's experiences of observing the achievements and failures of other individuals perceived as models (Pajares, 2002). An observer might attempt to model a successful individual because if this latter is capable of doing something successfully, then so is the observer (Pajares, 2002). On the contrary, observing the failures of models having the same sensed traits or qualities might weaken the observer's self-efficacy (Pajares, 2002).

Social persuasion involves positive and negative feedback. Honest encouragement can motivate individuals to perform better and gain a strong sense of self-efficacy, while negative feedback weakens self-efficacy (Pajares, 2002). Pajares (2002) explained physiological and affective states are related to aches or pains, and fear or anxiety. For example, a person who is apprehensive about executing an action might feel

more stressed than an individual who is not (Pajares, 2002). Therefore, having fear or anxiety can weaken confidence in the ability to complete certain tasks (Pajares, 2002).

Statement of the Problem

Many nursing students end up dropping classes or leaving the practical nursing program (Barra, 2013). Jeffreys' (2012) Nursing Undergraduate Retention and Success (NURS) model emphasizes several factors influencing student retention. Environmental dynamics, such as family emotional nourishment and personal family responsibilities, can influence the student's academic performance (Jeffreys, 2012). The NURS model also includes student profile features, outside surrounding causes, academic outcomes, and academic factors (Jeffreys, 2012). A factor in the NURS model that can influence student retention relates to the students' affective factors (Jeffreys, 2012). Jeffreys (2012) defined affective factors as "students' attitudes, values, and beliefs about learning and their ability to learn and perform the necessary tasks required for course and program success, including cultural values and beliefs, self-efficacy, and motivation" (p. 13).

Developing a solid student self-efficacy could mitigate enrollment and retention problems (Jeffreys, 2012). This study can contribute to the body of research on simulation in nursing education, which is not extensive (American Sentinel University, 2012). Simulation can be an essential teaching tool in nursing education, and these hands-on activities may help increase students' perceptions of their capacity for performing well (Sinclair & Ferguson, 2009). Although simulation cannot replace real-life interaction between a nurse and a patient, it can bridge the gap between theory and practice (American Sentinel University, 2012). Additionally, increasing students'

perceived self-efficacy can also help to narrow the theory-practice gap in nursing (Robb, 2012).

In addition, more evidence is needed "about how students at various ages, academic levels, or grades use the diverse sources of efficacy information in developing self-efficacy beliefs" (Pajares, 1997, p. 27). Age and educational level are variables affecting nursing student retention and the nursing career (Jeffreys, 2012). That is to say, those variables can be associated with students' early departures from the PN program, and these factors are described and investigated in this study.

Purpose Statement

The researcher had three main goals in conducting this study. First, to measure and compare the strength of nursing students' self-efficacy before and after engaging in medical surgical simulations. Second, to measure and compare sources students rely on to develop their self-efficacy before and after engaging in medical surgical simulations. Third, to investigate the effects of age and educational level of PN students on the use of each source of self-efficacy (Mertler & Vannatta, 2013).

Research questions. The following research questions guided the study:

1. What difference exists, if any, in the strength of perceived self-efficacy in nursing students before and after engaging in the medical surgical simulation activities?

$H1_0$: There is no statistically significant difference in students' strength of perceived self-efficacy before and after engaging in the medical surgical simulation center activities.

$H1_a$: There is a statistically significant difference in students' strength of perceived self-efficacy before and after engaging in the medical surgical simulation center activities.

2. What difference exists, if any, in the scores of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities?

$H2_0$: There is no statistically significant difference in the scores of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities.

$H2_a$: There is a statistically significant difference in the scores of sources of self-efficacy of nursing students before and after engaging in the medical surgical center activities.

3. Are there significant mean differences for each of the four sources of self-efficacy by age category among students; and by educational level of students?

$H3_0$: There is not a significant mean difference for at least one source of self-efficacy by age category among students; and by the educational level of the students.

$H3_a$: There is a significant mean difference for at least one source of self-efficacy by age category among students; and by the educational level of the students.

Definitions of Key Terms

For the purposes of this study, the following terms were defined:

High-fidelity simulators. High-fidelity simulators are manikins used in a simulation laboratory or center; these simulators can breathe, deliver babies, speak, and have eye movements and other characteristics that resemble bodily features of real

patients (Seropian et al., 2004). They are the most true-to-life tools in both external form and their lifelike responses (Seropian et al., 2004).

Medical surgical nurses. Medical surgical nurses provide medical treatment for individuals in many environments, such as clinics, hospitals, and nursing centers (Academy of Medical Surgical Nursing, 2014). Medical surgical nurses are educated in all facets of adult wellbeing and have outstanding assessment, technical, and administrative competences (Academy of Medical Surgical Nursing, 2014).

Medical surgical nursing. Medical surgical nursing is a specialty domain, which "requires the essential characteristics of prioritization and organization, critical thinking, and innovative problem solving" (White, Duncan, & Baumle, 2012, p. 4). These characteristics can help a nurse provide the needed care for patients with different medical states and surgical processes (White et al., 2012).

Self-efficacy. Self-efficacy is the student's belief in his or her ability for acquiring knowledge or performing particular assignments to attain a specific objective (Jeffreys, 2012). Self-efficacy, perception of competence, belief or judgment about ability to execute tasks, and personal efficacy are terms that are used interchangeably throughout this study.

Simulation. A simulation is an individual tool or an array of situations which make an attempt to deliver learning and assessment challenges genuinely (McGaghie, 1999). In a simulation, the student or trainee is required to react to the challenges as he or she would under normal conditions (McGaghie, 1999). What is more, "this technique uses an artificial environment, by recreating a real situation for the purpose of practicing, learning, evaluating, testing or gaining understanding of systems or human actions"

(Negrão Baptista et al., 2014, p. 132). The words mock-ups and simulation are used interchangeably in this study.

Social cognitive theory. Social cognitive theory is "based around the concept of reciprocal determinism, suggesting that humans constantly interact with their environments, which leads to individual and social change. It explains that human behavior is the interplay of personal, behavioral, and environmental influences" (Patterson et al., 2014, p. 279).

Sources of self-efficacy. According to Bandura (1986, 1997), there are four sources of self-efficacy: mastery experience, vicarious learning or modeling, social persuasion, and physiological and affective states.

Limitations and Assumptions

The following limitations were defined in this study:

Sample demographics. This study focused only on PN students attending a Midwestern college, and the population of this study was relatively small ($N = 60$). There is a vast rise in nursing programs implementing simulation into nursing curriculum (University of Southern Mississippi, 2014). The simulation center at the Midwestern community college where the study was conducted has state-of-the-art medical manikins (Kuiper & Zabriskie, 2012).

Since it would be difficult to collect data from the target population of all students at U.S. community colleges and universities using the simulation devices in the PN program, only the students attending a Midwestern community college were used as a sample. The results of this study may not generalize to all students attending nursing programs in the United States. Students can be different in terms of socioeconomic

background, ethnicity and race, work-family-school conditions, family's educational background, and language (Jeffreys, 2012).

Nevertheless, personal background and identity demographics of age and educational level of the accessible population were detailed in this study. All PN students at the Midwestern community college have to attend the simulation center scenarios in the PN program (Course Syllabus). Consequently, the results of the study are only applicable and generalizable to the present and future PN students attending this Midwestern community college. Generalizing the findings of this study to other PN students in the Midwest may be possible if researchers are aware of differences and similarities across Midwestern regions in the United States.

Variables. Students' self-efficacy can be associated with other factors, such as cultural and social background and ethnicity (Huang, 2013; Zhao, Lei, He, Gu, & Li, 2014).

Instrumentation. The Simulation Self-Efficacy Survey (SSES) was developed by the researcher based on foundational theoretical constructs proposed by Bandura (2006). The statements or items used to measure the strength and the sources of self-efficacy beliefs may be insufficient to measure the student's sense of self-efficacy (Gloudemans, Schalk, Reynaert, & Braeken, 2013). Due to time constraints, the survey was conducted only two times, before and after engaging in the simulation center activities.

The following assumptions were accepted:

1. Students were instructed to offer honest and unbiased responses and were not pressured to participate in the study.

2. The structure, curriculum, and presentation of the medical surgical nursing courses were similar across the groups of students who participated in this study.

3. The simulation activities or scenarios students engaged in were also similar.

4. The instructors who taught the PN students had equal competencies to teach and guide the students.

5. It was assumed differences in students' age groups and educational level groups might influence the use of self-efficacy sources.

Summary

Previous literature in nursing education has indicated educators face the problem of offering educational and clinical opportunities that aid apprentice nursing students in acquiring clinical appraisal and strengthening self-efficacy (Pierce, 2011). Additionally, there are many factors contributing to attrition of nursing students such as age, ethnicity, gender, language, and educational knowledge (Jeffreys, 2012). This study was conducted to determine if there is a significant difference between the strength of self-efficacy beliefs before and after engaging in simulation center scenarios. Differences among the sources of self-efficacy were investigated as well. This study involved a one-way analysis of variance (ANOVA) technique to determine potential group differences created by two factors: age and educational level. The statistical technique of ANOVA was used to reveal the effect of those two factors on the four sources of self-efficacy which served as the dependent variables in this study (Mertler &Vannatta, 2013).

Nursing students' self-efficacy, in this study, referred to their confidence in executing tasks of the medical surgical simulation scenarios. According to Bandura (1986, 1997), there are four sources contributing to the creation and development of self-

efficacy beliefs. The SSES used those four sources as subscales. The mastery experience subscale addressed students' interpretations of their experiences handling and executing medical surgical scenarios.

The vicarious learning subscale referred to students' beliefs about their abilities to model peers and teachers when executing the tasks of the simulation scenarios. The social persuasion subscale reflected factors such as verbal encouragement of teachers and helping students develop their self-efficacy beliefs. The physiological and affective states subscale denoted students' confidence in their capabilities to manage situations of stress and anxiety when engaging in the medical surgical simulation center activities.

In Chapter Two, a review of self-efficacy as a theoretical framework is offered. The significance of the sources of self-efficacy to this study and the variables of age, gender, and educational level are explained. Next, the use of self-efficacy construct in education and nursing education are reviewed. The last part of the literature review addresses the relationship between self-efficacy construct and simulation in nursing education.

Chapter Two: Review of Literature

Many reasons exist as to why studying self-efficacy in nursing students is appropriate and therefore provided the backbone for conducting this study. There is a dearth in research that addresses the development of self-efficacy among practical nursing students before and after engaging in medical surgical simulations. Jeffreys (2012) suggested developing new measurements of self-efficacy in particular nursing domains is a necessity. Therefore, the SSES was developed for this study to address this need. Furthermore, strengthening student self-efficacy is a priority for many nursing programs (Pierce, 2011) to reduce the high rates of attrition among practical nursing students (Peterson, 2009; Peterson-Graziose et al., 2013).

Although the belief in one's ability to execute tasks or behaviors has frequently been applied to nursing practice, few studies have focused on its application to academic performance in nursing, particularly in clinical performance (Andrew, 1998). It is also unclear how nursing students rely on the sources of self-efficacy to develop their self-efficacy (Gloudemans et al., 2013). These sources include mastery experience, social persuasion, vicarious learning, and physiological and affective states (Gloudemans et al., 2013).

The first goal of this study was to measure and compare the strength of PN students' self-efficacy before and after engaging in medical surgical simulations. The second goal was to discover if there is a significant difference in the sources of self-efficacy before and after engaging in medical surgical simulations. The third objective was to identify if there are significant mean differences for each of the four sources of

self-efficacy between male and female students, by age category among students, and by educational level of students.

The theoretical framework of this study is comprised of two main theoretical concepts: social cognitive theory and self-efficacy theory. The relationship between self-efficacy theory and education is explained, and the role self-efficacy construct plays in providing students with motivation and confidence is described in the following section (Pike & O'Donnell, 2010). Then, a review of simulation in nursing education clarifies the function of simulation in developing self-efficacy among practical nursing students (Fabro, Schaffer, & Scharton, 2014; Lewis & Ciak, 2011; Wagner et al., 2009).

Theoretical Framework

Social cognitive theory and self-efficacy are prominent theories that can explain phenomena in various fields of study, such as health, education, and psychology (Pajares, 2002). Self-efficacy theory served as the theoretical framework of this study, and it refers to the perceptions of students in regards to their abilities to execute medical surgical simulation scenarios. Self-efficacy beliefs influence three elements: behavior management, the extent to which an individual can handle difficult tasks or the amount of exertion, and the length of time utilized in facing such obstacles (Bandura, 1977). Persistence in individuals who are challenged by difficult tasks can lead to an improvement of personal efficacy (Bandura, 1977).

Social cognitive theory. According to Greer, Grover, and Fowler as cited in Thomas, Franklin, and Crow (2011), social cognitive theory is among "a wide range of theories necessary for the most accurate information needs diagnosis" (p. 92). Bandura, the developer of social learning theory, later known as social cognitive theory, is

regarded by some as the father of behavioral psychology (International Encyclopedia of the Social Sciences, 2008). Bandura's contribution to personality theory and therapy offers a three-way interaction among behavior, psychological processes, and the environment (Pajares, 2002).

The use of social cognitive theory as a theoretical framework allowed the researcher to explore the development of students' self-efficacy beliefs. According to Pajares (2002), social cognitive theory enables educators to help their students in many ways. Social cognitive theory roles are to enhance "students' emotional states and correct their faulty self-beliefs and habits of thinking (personal factors), improve their academic skills and self-regulatory practices (behavior), and alter the school and classroom structures that may work to undermine student success (environmental factors)" (Pajares, 2002, para. 3).

Social cognitive theory explains human behavior as dynamic and subject to being stimulated by a person's intrapersonal and external factors (Heydari et al., 2014; Taştan, 2014). Changes in self-efficacy sources, which are factors in this study, may have an impact on students' changes in engagement and performance (Le Blanc et al., 2013). Self-efficacy change affects the students' changes in cognition, motivation, and behavior as well (Le Blanc et al., 2013). An individual's behavior is influenced by many factors, such as personal thoughts and beliefs and the surrounding environment (Patterson et al., 2014).

Self-efficacy theory. Self-efficacy refers to people's beliefs of their abilities to perform a particular task or behavior (Karabacak, Serbest, Kan Öntürk, Eti Aslan, & Olgun, 2013). Self-efficacy construct plays a crucial role in an individual's affective and

cognitive processes, and this individual opts for certain courses of actions based on the abilities and skills he or she has (Robb, 2012). Self-efficacy construct is a byproduct of social cognitive-learning theory, which postulates individuals learn from each other through modeling, observation and imitation, witnessing people's conduct, dispositions, and from the results of those behaviors (Pajares & Schunk, 2001).

Self-efficacy beliefs are developed through four sources of information: mastery experience, vicarious learning, social persuasion, and physiological and affective states (Bandura, 1977). Mastery experience refers to the individual's previous performances; it is a factor individuals can use to increase their personal efficacy beliefs (Arslan, 2013; Bandura, 1994; Pajares, 2002). Arslan (2013) further explained mastery experience provides people with the most practical information on being capable of handling new encounters, as well as clarifying students' past successful experiences that increase their self-efficacy.

Vicarious learning refers to observing others perform behaviors or tasks and becoming influenced by those behaviors (Arslan, 2013; Bandura, 1994, 1997). Students who observe their models performing successfully have high self-efficacy beliefs (Warner, Schüz, Knittle, Ziegelmann, & Wurm, 2011). On the other hand, students' observations of unsuccessful peers or friends who are considered models can cause students to believe they are unsuccessful, which leads to low self-efficacy beliefs (Arslan, 2012; Pajares, 2002; Warner et al., 2011).

Vicarious learning can increase students' self-efficacy through the observation of their peers and teachers. According to Wise and Trunnell (2001), vicarious learning is a very strong source of self-efficacy, because it provides individuals with strategies to

achieve their desired goals. Vicarious learning is the second-most powerful predictor of self-efficacy behind mastery experience (Wise & Trunnell, 2001).

Social persuasion is another way to strengthen individuals' beliefs by convincing them they possess the necessary abilities to succeed in certain tasks (Arslan, 2012). Verbal positive feedback, such as encouragement, can motivate students to perform better (Bandura, 1994; Pajares, 2002). Social persuasion is considered to be a source for either strong or weak self-efficacy (Bandura, 1994). Verbal persuasion is considered both theoretically and empirically the least strong source of self-efficacy, even though it is used frequently in the health care field (Ashford, Edmunds, & French, 2010). Conversely, Robb (2012) explained a persuader can verbally influence an individual's belief in her or his abilities to execute specific situations. Individuals are likely to make a greater effort to achieve desired goals when they are convinced they have the capability to master a behavior (Bandura, 1994).

Self-efficacy is also influenced and developed through physiological and affective states (Pajares, 2002). Affective or emotional states, such as nervousness, tension, and arousal, influence self-efficacy (Larsen & Zahner, 2011). Creating a comfortable and stress-free environment raises self-efficacy, while a stressful environment lowers it (Arslan, 2013; Jeffreys, 2012). Environments which do not encourage collaboration and support learning decrease students' self-efficacy (Arslan, 2013; Bandura, 1994).

Physical symptoms are indicators of processing taking place internally. A student's elevated pulse rate and sweating during a clinical activity may be signs of anxiety and fear, which can be indicative of a student's self-efficacy being lowered (Jeffreys, 2012). The student would show such emotional reaction even though he or she

possesses the psychomotor and cognitive abilities to perform an assignment (Jeffreys, 2012). Anxiety and fear can adversely affect the student's performance, motivation, retention, persistence, and learning (Jeffreys, 2012). Furthermore, students can gain high levels of self-efficacy when their brains are challenged appropriately; students function better when they are less anxious (Bandura, 1997; Brown, 1999). High levels of self-efficacy lead to better performance, while low levels of self-efficacy reduce performance (Morrissey & Callaghan, 2011).

Bandura differentiated between two kinds of beliefs or expectations: outcome expectation and efficacy expectation (Bandura, 1986, 1997; Pajares, 2002). Outcome expectation is the individual's appraisal that a certain conduct will produce specific results (Bandura, 1977). Efficacy expectation is a person's level of certainty that he or she can master the behavior needed to create certain outcomes. Efficacy expectations differ on three aspects: magnitude, generality, and strength (Bandura, 1977). Magnitude dimension denotes the degree of difficulty of an activity an individual thinks is needed to carry out a certain undertaking (Bandura, 1977). Some people might have efficacy expectations restricted to the performance of easier tasks only, while others can have efficacy expectations to engage in somewhat difficult tasks or even the most problematic duties (Bandura, 1977).

According to Bandura (1977) and Lenz and Shortridge-Baggett (2002), generality is about the extent to which efficacy expectations are positively connected. Self-efficacy beliefs can be formed as a result of an experience in either a specific behavior domain, in multiple domains, or throughout time (Bandura, 1977; Lenz & Shortridge-Baggett, 2002).

In addition, an efficacy belief formed in a certain situation might be transferred to another scenario (Bandura, 1977).

Strength of efficacy expectation denotes individuals with a feeble sense of self-efficacy will stop trying because of previous failures (Bandura, 1977; Betz, 2004). In contrast, a person who holds a strong perceived self-efficacy perseveres in spite of the challenges or letdowns from the past (Bandura, 1977; Betz, 2004). The strength dimension is the most influential efficacy expectation when compared to the other two dimensions (Bandura, 1997). The focus of this study was on the measurement of perceived self-efficacy strength.

Self-Efficacy in Education

Perception of self-efficacy is a critical characteristic in education research and plays an important role in educational settings (Brady-Amoon & Fuertes, 2011; Kleitman & Gibson, 2011; Van Dinther, Dochy, & Segers, 2010). A person's judgment of his or her own abilities to perform tasks has turned out to be an extensive field of scientific study, especially in higher education (Flowers, Moore, Flowers, & Clarke, 2011). In education and psychology, the belief in one's competence to execute particular duties has been found to be a consistent predictor of behavioral outcomes (Le Blanc et al., 2013).

Brady-Amoon and Fuertes (2011) noted counselors are encouraged to pay attention to the effect self-efficacy has on student adjustment to college life, employment preparation, and performance. Likewise, Brady-Amoon and Fuertes (2011) added Self-Directed Search and Strong Interest are inventories that can be used in advising students about employment. These measurements should be analyzed and reviewed carefully by advisors, because they can be interpreted differently by students based on the level of

their self-efficacy (Brady-Amoon & Fuertes, 2011). As far as academic and career functioning, educators can initiate mediating programs such as educational and counseling groups to improve self-efficacy and academic performance of students (Brady-Amoon & Fuertes, 2011).

By the same token, teachers can help students improve their self-efficacy beliefs, because teachers play an important role in influencing student self-efficacy and persistence (Riconscente, 2014; Williams, 2010). For example, "Results from several cross-sectional studies suggest that the role of teachers is positively associated with students' self-efficacy in academic tasks" (Riconscente & Seli, 2012, p. 34). An increase in self-efficacy can yield better student performance (Morrissey & Callaghan, 2011).

Making an effort to assist students in acquiring the necessary knowledge and abilities is one of the critical goals of colleges and universities (Van Dinther et al., 2010). Even though proficient behavior relies on learning information and competencies, it is also evident self-efficacy is crucial in envisioning students' academic attainment, stimulus, and scholarship (Van Dinther et al., 2010). In addition, the awareness of the ways in which students build their self-efficacy can provide support to educational organizations in forming programs that increase and improve students' self-efficacy (Van Dinther et al., 2010).

Perceptions of competence contribute to a student's success (Aguayo, Herman, Ojeda, & Flores, 2011; Vuong, Brown-Welty, & Tracz, 2010), and a relationship exists between perceived self-efficacy and academic performance or success (Choi, 2005). Vuong et al. (2010) uncovered the relationship between academic success and students' self-efficacy as measured by grade point average (GPA) and persistence. The results of

their study revealed a significant relationship (Vuong et al., 2010). Sophomore students' GPAs and persistence were affected by self-efficacy beliefs (Vuong et al., 2010). Not surprisingly, first-generation students' GPAs were lower than those of second-generation students (Davis, 2012; Vuong et al., 2010). Vuong et al. (2010) emphasized students can be positively influenced by beliefs of competence, which heartens them to work steadfastly despite obstacles. Thus, self-efficacy helps students succeed (DeWitz, Woolsey, & Walsh, 2009; Vuong et al., 2010).

Perception of ability can predict a student's academic achievement and clinical competence and can lead to student success (DeWitz et al., 2009). A student's perception of capability can immensely affect the way in which success or failure of his or her present efforts will be interpreted, resulting in a tendency to repeat similar behaviors in the future (Rutherford-Hemming, 2012). Furthermore, "Any external or internal factor influencing students' academic success depends on the core belief of having the power to achieve their personal goals by their own actions" (Le Blanc et al., 2013, p. 226).

Perception of competence impacts attainment and learning, and institutions can support student achievement through well-crafted teaching methodologies which strengthen self-efficacy (Schunk & Pajares, 2002). Students who believe they are equipped with tools to execute tasks successfully are able to accomplish them (Le Blanc et al., 2013; Schunk & Pajares, 2002). As students perform a task and use the method, they observe their improvement, which raises their self-efficacy (Schunk & Pajares, 2002).

As stated by Morton, Mergler, and Boman (2014), "Self-efficacy and depression had a significant relationship with adaptation to university" (p. 90). Morton et al. (2014)

concluded students who possess high levels of self-efficacy and lower levels of depression will experience less stress in their first year of attending a university. Individuals who feel capable and skillful perform at a higher level while attending college (Landis, Altman, & Cavin, 2007). When students are self-efficacious, their conduct will create the anticipated outcomes, and they will probably make an effort to perform well (Landis et al., 2007). Landis et al. (2007) further elucidated self-efficacy is a substructure and a key criterion contributing to academic accomplishment.

Clayton, Blumberg, and Auld (2010) discovered people who think they have the ability to overcome challenges are more likely to make every effort to achieve their goals. Students who selected online courses tended to believe they were capable of performing successfully more than those who chose traditional class environments (Clayton et al., 2010). Self-efficacy beliefs improved especially when students had positive experiences in online classes; therefore, it is important to offer students a chance to take online courses to improve their confidence in taking non-traditional classes (Clayton et al., 2010).

Research on self-efficacy is not limited to just elementary-aged children, high school pupils, or undergraduate college students; self-efficacy has also been analyzed at the post-graduate level in higher education. To illustrate, research on the topics of self-efficacy of Ph.D. students, students' curiosity in research, and students' know-how of research were investigated (Lambie, Hayes, Griffith, Limberg, & Mullen, 2014). At different stages of Ph.D. programs, relationships among those variables were examined (Lambie et al., 2014). The results of the study signified students in their third year had more advanced levels in the skills of research knowledge and research self-efficacy than

did the first- and second-year students (Lambie et al., 2014). Nevertheless, the number of years students spent in the program did not affect inquisitiveness in research (Lambie et al., 2014). The scores indicating advanced inquisitiveness in research and research skills forecast superior levels of research self-efficacy (Lambie et al., 2014). Hence, education Ph.D. programs ought to incorporate didactic methods to improve students' inquisitiveness in research and research skills (Lambie et al., 2014).

Vicarious learning is one of the sources that influence doctoral students' self-efficacy (Bandura, 1986; Luckin et al., 2013). Lambie et al. (2014) urged Ph.D. educational programs to set their instructional faculty as models for the students to observe and mimic. In other words, for doctoral students to be engaged in research, learn the skills of research, and develop research self-efficacy, an encouraging research environment has to be present and provided for the students (Lambie et al., 2014; Lambie & Vaccaro, 2011).

Effective research behavior can be passed from faculty to students when professors demonstrate solid skills and interest in research (Bandura, 1986; Lambie et al., 2014). Equally important, academic support is what Bandura (1986) pointed to in his theory of self-efficacy as social persuasion. Due to the academic support professors provide their doctoral students, higher levels of students' research self-efficacy can be achieved (Overall, Deane, & Peterson, 2011).

In terms of the relationship between stress and self-efficacy, Changxiu and Xiaojun (2014) examined the influence of college students' coping styles on perceived self-efficacy in managing inferiority. The study results indicated, in general, students' perceptions of their competence reduced stress and had some mediating effects between

perceived self-efficacy in managing inferiority and problem-solving coping style (Changxiu & Xiaojun, 2014). The results of Changxiu and Xiaojun's (2014) study are aligned with previous findings by Nedeljkovic, Wepfer, Ausfeld-Hafter, Wirtz, and Streitberger (2013) and Parto and Besharat (2011).

DeWitz et al. (2009) confirmed perception of competence is a feasible predictor of students who could be in danger of departing from school. DeWitz et al.'s (2009) study "lends support to the idea of creating interventions based on self-efficacy theory in order to positively influence students' subjective sense of purpose in life for the purpose of improving college student retention" (p. 19). Indeed, academic self-efficacy can be critical to student retention and academic success (Lourens, 2014; Raelin et al., 2014).

Wernersbach, Crowley, Bates, and Rosenthal (2014) explored the effects of study skills on student self-efficacy. Wernersbach et al. (2014) compared two groups of students in a pretest-posttest analysis. One group took a study skills class, while the other group was registered in a general education class (Wernersbach et al., 2014). Significant differences were found between the two groups, and the results demonstrated a change in self-efficacy (Wernersbach et al., 2014). During the seven-week timeframe between the pretest and the posttest (Wernersbach et al., 2014), students who took the study skills class were not as academically efficacious but had stronger self-efficacy after the posttest than did the control or general education group (Wernersbach et al., 2014). Wernersbach et al. (2014) concluded good quality study skills accompanied by enhanced confidence can lead to student retention and success.

Multiple studies have shown positive self-efficacy has crucial advantages for students from multiracial backgrounds (Aguayo et al., 2011; Vuong et al., 2010). Wood,

Hilton, and Johnson (2014) explored the relationship between students' self-efficacy and their academic integration in the community college environment. Findings from this study showed English and math self-efficacy, throughout racial and ethnic groups, had varied and distinctive effects on degrees of integration (Wood et al., 2014). However, Wood et al. (2014) found self-efficacy does not have a positive effect regarding multiracial students, has no influence for African American students, and "has advanced the literature in this area by showing the importance of understanding differences. Specifically, this research has shown *that different* types of self-efficacy *have different* effects on integration, for *different* racial/ethnic groups" (p. 17).

Furthermore, self-efficacy has been researched and analyzed in relation to students' demographics and retention (Changxiu & Xiaojun, 2014; Raelin et al., 2014). Specifically in novice students, gender dissimilarities in academic self-efficacy can impact the involvement of women in science, technology, engineering, and math (STEM) fields (American Association of University Women, 2010; Raelin et al., 2014). As a result, this subordination creates an absence of women in the labor force (Raelin et al., 2014).

On the word of Cech, Rubineau, Silbey, and Seron (2011), female students who lack the confidence and persistence in fulfilling the requirements of a task are at the risk of attrition in engineering programs. Women's academic self-efficacy can be enhanced through mentoring programs that support and engage individuals in underrepresented majors of STEM (MacPhee, Farro, & Canetto, 2013). Supporting the STEM fields with mentoring programs has had a positive effect on academic self-efficacy of women,

students from different ethnicities, and socially underprivileged individuals (MacPhee et al., 2013).

Cech et al. (2011) argued based on the findings of their study, class presentations, lab activities, and class exercises are not sufficient for women and men to gain "professional role confidence—individuals' confidence in their ability to successfully fulfill the roles, competencies, and identity features of a profession" (p. 641). In fact, those activities might exacerbate gender inconsistencies in confidence (Cech et al., 2011). Professional role confidence is achieved through an organized and straightforward discussion about professional responsibilities, skills, and career readiness (Cech et al., 2011).

Correspondingly, Mould, White, and Gallagher (2011) reported the variable of age can also be related to student-gained benefit as a result of engaging in simulation activities; for instance, younger students profit more from simulation than older nursing students. People who grew up in the age with computers tend to welcome and accept the use of technology in education (Gardener & Eng, 2005). In addition, the gender of a student can impact the benefit he or she gains when engaged in simulation activities in educational settings (Mould et al., 2011). Female students reported more improvement in confidence than did male students as a result of engaging in simulation scenarios (Mould et al., 2011).

Another important student profile variable in nursing education is the educational history of students, such as high school and post-secondary education (Jeffreys, 2012). Higher rates of attrition are recorded among students who are underprepared academically (Jeffreys, 2012). Jeffreys (2012) accentuated prior educational experience

can be an advantage, which improves and develops the nursing occupation. Sarafis and Malliarou (2013) also highlighted students' self-efficacy can be influenced by their educational levels. Senior nursing students were culturally more competent and had higher self-efficacy than freshmen nursing students (Sarafis & Malliarou, 2013).

Self-Efficacy in Nursing Education

Nursing education is a science and art that provides students with attitudes, knowledge, and skills in affective, cognitive, and psychomotor domains (Karabacak et al., 2013). According to Jeffreys (2012), self-evaluation of personal capabilities refers to a student's confidence appraisal for learning, or executing, certain duties in order to attain a specific goal. Self-efficacy is a student's belief he or she can succeed through performance regardless of adversities or obstacles, and he or she will do anything to achieve his or her goals (Jeffreys, 2012).

Given these points, Jeffreys (2012) distinguished among three types of individuals when describing a nursing student's belief in his or her ability to execute certain actions: the inefficacious student, the efficacious student, and the supremely efficacious student. First is the inefficacious student who has low confidence and low self-efficacy and who can be academically irresolute (Jeffreys, 2012). The inefficacious student appraises new tasks as blocking hurdles, lacks motivation, and spends little energy towards completing a task (Jeffreys, 2012; Katz, 2015). An inefficacious student might also become discouraged and indecisive about task execution (Jeffreys, 2012). Therefore, he or she spends less time doing homework or assignments (Jeffreys, 2012). This often leads to higher levels of stress (Maier & Curtin, 2005) and poor performance, such as obtaining lower grades or failing classes (Jeffreys, 2012).

Efficacious students, on the other hand, are stronger and have medium to high levels of confidence (Jeffreys, 2012). Self-efficacious individuals picture new obstacles as challenges not as roadblocks, prepare accordingly when faced with academic difficulties, and commit to persistence (Jeffreys, 2012; Katz, 2015). Self-efficacious students face difficulty with a degree of uncertainty and do not doubt themselves or feel unable to achieve their goals, which helps them make an effort to perform better (Jeffreys, 2012). Nursing students with a strong self-efficacy ask for help, spend more energy in preparing for and executing activities, and persist in the face of challenging tasks (Jeffreys, 2012; Zimmerman, 2000).

The supremely efficacious student has high self-efficacy, or high self-confidence (Jeffreys, 2012). In other words, highly efficacious students overestimate their abilities in executing tasks (Bandura, 1989). Therefore, students who are highly efficacious feel stupefied or astounded whenever they fail or underperform academically (Jeffreys, 2012). A supremely efficacious student thinks he or she does not need assistance to manage tasks, nor should he or she seek help to prepare for academic activities (Jeffreys, 2012). Like the inefficacious student, the supremely efficacious student utilizes little or no vigor at all, is uncommitted to completing tasks, and is not motivated (Jeffreys, 2012). This kind of student is effortless in fulfilling his or her academic requirements (Jeffreys, 2012).

Attrition of supremely efficacious students is influenced by reduced satisfaction, stress, and weak performance (Jeffreys, 2012). At-risk students are supremely efficacious because they are identified as incorrect in appraising their capabilities and skills when managing academic activities in nursing (Jeffreys, 1993). Jeffreys (2012)

recommended nurse educators be more vigilant by identifying supremely efficacious students early in nursing programs. This will help students realistically appraise their abilities and correctly manage nursing education tasks (Jeffreys, 2012).

Perceived self-efficacy can play an important role in learning. Katz (2015) reiterated teacher-student communication can improve students' cognitive abilities. Thus, students will be obliged to change the direction of their thoughts about their abilities and correct their appraisals to accomplish successful academic results (Katz, 2015).

The contribution to student satisfaction and improved faculty self-efficacy can be achieved through the professional development of nursing faculty (Crocetti, 2014; Nugent, Bradshaw, & Kito, 1999). Studies have concluded improving teachers' expertise in nursing can lead to students' contentment about their clinical teachers and to student accomplishment (Crocetti, 2014; Nugent et al., 1999). Crocetti (2014) stated lack of teacher preparation may have undesirable and adverse outcomes that negatively affect student performance and learning.

Further, self-efficacy of students can be influenced by curricular and instructional designs. By way of illustration, courses that involve professional communication skills are crucial in nursing education, because they can affect a student's belief or judgment about ability to execute medical tasks (Hagemeier, Hess, Hagen, & Sorah, 2014). There is a concern students who have low self-efficacy might be unable to effectively communicate with potential clients in clinical and professional settings (Hagemeier et al., 2014; Rogers & King, 2012). Because of this concern, it is recommended students engage, once every two weeks, in courses that enhance inter-personal and inter-

professional communication skills, which positively influences nursing students' self-efficacy (Hagemeier et al., 2014).

Along similar lines, Pike and O'Donnell (2010) recapitulated the degree perception of competence is linked to successful performance. Strong self-efficacy contributes to high motivation and confidence in providing care to patients during complex situations (Pike & O'Donnell, 2010). Students' judgment of the ability to execute nursing tasks can play an important role in influencing their performance and persistence (Stephens, 2013).

Resilience is one more significant variable researchers have defined and studied in the field of nursing education: "a concept that could prove useful in helping nursing students confidently face challenges and successfully move forward" (Stephens, 2013, p. 125). Undergraduate nursing students face many difficulties, and some students persist while others surrender (Jeffreys, 2012). Therefore, numerous researchers have proposed developing mediating strategies or interventions that will equip students with necessary tools to face future daunting problems (McAllister & Lowe, 2011).

All nursing students are susceptible to unanticipated difficulties in a nursing program, and a majority of these students will believe these specific encounters are stressful (Stephens, 2013). Individual features, social help, and optimistic feelings are considered "protective factors" (Stephens, 2013, p. 129). The afore-mentioned factors are means used to reduce the impact of stress, and such factors are the sheer quality of resilient individuals (Martin & Marsh, 2006; Stephens, 2013). Resilient students are determined to succeed and realize their goals regardless of adversities (Martin & Marsh, 2006).

Research shows resilience is a criterion for self-efficacy (Reich, Zautra, & Hall, 2010). Resilient people have the belief they can solve problems despite the complications, and they have an internal locus of control, which means situations are usually caused by the individual's behavior, not by hard luck (Reich et al., 2010). Thus, resilient people think problems are solvable if sufficient effort is made (Reich et al., 2010). Resilient individuals are hopeful even about the results of the most difficult situations, such as physical sickness or losing a loved one (Reich et al., 2010). Resistant individuals have increased levels of trait resilience and are inclined to possess a positive attitude toward life adversities (Li & Nishikawa, 2012).

If resilience is a prerequisite of self-efficacy, then strategies that help nursing students become more resilient warrant careful attention from educators. Stephens (2013) stated:

> Educators may choose to enlist students to self-identify their own protective factors and those they wish to enhance and/or develop. The faculty may be beneficial in assisting with these efforts, thus potentially increasing a source of social support and/or social connectedness with a caring adult. (p. 132)

If educators and students are cognizant of the implications of resilience, they might be able to establish a curriculum that enhances students' resilience to better travel through nursing's daunting and tight encounters (Stephens, 2013).

Esmaeili, Cheraghi, Salsali, and Ghiyasvandian (2014) investigated in a qualitative study nursing students' expectations of valuable clinical education. The main themes that emerged from this study reflecting students' expectations were effective communication between teachers and students, the inclusion of both theory and practical

clinical learning, and the influence of teachers' expertise on student learning (Esmaeili et al., 2014). The first theme revealed students learn better in a friendly environment that instructors are responsible for creating for the students, and when teachers give positive and constructive feedback privately to the students, students' self-confidence and motivation are increased (Esmaeili et al., 2014).

Effective interaction between teachers and students was implied in the theory of self-efficacy (Bandura, 1986, 1997; Pajares, 2002). Social persuasion is a source of self-efficacy (Bandura, 1986), and Pajares (2002) explained frank encouragement raises self-efficacy, while negative comments lower a student's belief in his or her ability to execute activities. The second theme manifests students' need to learn from theory and practice during clinical activities (Esmaeili et al., 2014). Students believe it is very important for a teacher to positively interact with students so skills are correctly learned, and they view the teacher as a role model (Esmaeili et al., 2014). The third theme reflects students' expectation of their mentors. Students reported instructors should be competent and knowledgeable about clinical education (Esmaeili et al., 2014). This motivates students to acquire knowledge and skills in nursing (Esmaeili et al., 2014).

Besides, the United States is a multicultural society (Silva, Campbell, & Wright, 2012). As a result, health care needs to be accessed by individuals from different cultures, ethnicities, and nationalities (Sungkyu & Sunha, 2009). Sarafis and Malliarou (2013) revealed Greek nursing students just beginning undergraduate studies in nursing lacked the confidence to ask patients from other cultural milieus questions about their beliefs and heritage.

Nurses who are aware of cultural components are able to execute nursing tasks appropriately and provide the necessary health care; this can lead to better interaction with patients (Sarafis & Malliarou, 2013). Hence, it is crucial for nurse educators to put transcultural nursing care at the center of their attention, through including it in the curriculum (Halter et al., 2014). The focus on transcultural nursing care can guarantee future clinical nurses are capable of delivering competent care and are qualified to respond to the needs of health care in a culturally diverse society (Sarafis & Malliarou, 2013).

Literature in nursing education has focused on how student self-efficacy is influenced by competence in nursing education, the role of self-efficacy in the course of learning, and students' lack of self-efficacy post-graduation (Chesser-Smyth & Long, 2013). However, very few researchers have investigated the actors and sources developing or hindering nursing students' self-efficacy (Chesser-Smyth & Long, 2013). Self-efficacy development can be impeded by factors such as stress, oppression, disempowerment, lack of communication with lecturers, and a student's feeling of being underestimated (Chesser-Smyth & Long, 2013). Chesser-Smyth and Long (2013) recommended, "It is important to educate nursing students and qualified practitioners about the use of the four sources of self-efficacy" (p. 154).

Professional integration and socialization of the nursing student are creative strategies to develop strong self-efficacy and motivation (Jeffreys, 2012). Nursing education programs that provide socialization opportunities, such as meetings and events held outside the classroom, help create an environment where nursing professionals and students meet and interact on a professional level (Gardner & Schmidt, 2007). In

addition, students' participation in conferences and workshops establishes a professional relationship between the nursing professionals and students (Jeffreys, 2012). Integration and socialization events help students validate the skills they have acquired in the classroom and also provide substantiation of the theoretical constructs students have already learned (Jeffreys, 2012). Shadowing a professional nurse in organized events needs to be a vital goal for educators, because observing and mimicking experts' behavior facilitates the building and development of students' self-efficacy (Jeffreys, 2012).

If educators know about their students' self-efficacy, curricular modifications can be made to improve the educational programs of nursing (Karabacak et al., 2013). The next section is more specific and includes a review of the impact of simulated nursing environments on nursing students' self-efficacy. In addition, the role of simulation as a curricular or learning methodology to improve self-efficacy in the learning process of nursing students is also discussed.

Simulation and Self-Efficacy in Nursing Education

McGaghie (1999) defined simulation as "a person, device, or set of conditions which attempts to present [education and] evaluation problems authentically. The student or trainee is required to respond to the problems as he or she would under natural circumstances" (p. 198). Simulation plays a key role in the history of nursing education, as a crucial method for learning and teaching technical nursing skills (Sanford, 2010). Through imitated situations, students can acquire skills in organized and safe settings where students are not jeopardizing a patient's life (Sanford, 2010).

Simulation in nursing education has been considerably utilized to instruct, correct behavior, and assess the clinical performances of nursing students (Simonelli & Gennaro, 2012). In addition, the inclusion of simulation in nursing education has contributed to the development of student confidence and provided chances for contemplation (Simonelli & Gennaro, 2012). However, the fact nursing students are not adequately provided the necessary clinical skills to prepare them for health practice (Brydges, Carnahan, Rose, & Dubrowski, 2010; Founds, Zewe, & Scheuer, 2011; Partin, Payne, & Slemmons 2011; Weaver, 2011; Wotton, Davis, Button, & Kelton, 2010) needs to be an area of caution for nurse educators and administrators (Richardson & Claman, 2014).

The current challenge in nursing education is to transfer the skills learned in a simulated laboratory environment to the hospital and other professional medical settings (Oetker-Black, Kreye, Underwood, Price, & DeMetro, 2014). This can be mitigated by helping nursing students develop positive perceptions of competence (Oetker-Black et al., 2014). Consequently, students can correctly learn how to transfer and apply those skills (Oetker-Black et al., 2014). Partin et al. (2011) explored nursing students' views of the role of high-fidelity simulations in learning about obstetrics, and three key themes emerged in their study: simulation offered a non-risky environment for students to practice obstetrics skills, enhanced students' knowledge in nursing education, and trained the students well for the practice (Partin et al., 2011).

Oetker-Black et al. (2014) developed a psychometric instrument called the Clinical Skills Self-Efficacy Scale to determine if nursing students' perceptions of clinical abilities could be measured. Oetker-Black et al. (2014) found augmented perception of competence could be an intervening variable to adequately convey the

skills learned in a simulation center into a clinical professional environment. Weak perceptions of one's personal competence to execute tasks should be corrected by using self-efficacy theory to improve the student's belief in his or her ability to complete specific duties (Oetker-Black et al., 2014).

Blum et al. (2010); Pike and O'Donnell (2010); Shepherd, McCunnis, and Brown (2010); and Hope, Garside, and Prescott (2011) found self-efficacy can be improved through the implementation of simulation approaches in nursing programs. Rutherford-Hemming (2012) wrote simulation is frequently used as a teaching method in nursing education. Social, cognitive, and constructivist theories support this teaching practice (Rutherford-Hemming, 2012). Nursing students engage in different types of simulation activities varying from low to HFS (Wane & Lotz, 2013).

Low-fidelity simulation includes performing certain roles or managing medication injection (Department of Health, 2011). Medium-fidelity simulation is more realistic because it contains activities such as breathing, which could be simulated through a coached performer or a manikin (Department of Health, 2011). Both low-fidelity and medium-fidelity simulations use cost-effective equipment to train students (Department of Health, 2011).

High-fidelity simulations are more technologically advanced; they use techniques that cannot be reproduced using the low- or medium-fidelity equipment (Department of Health, 2011). High-fidelity simulation involves surgical procedures that emulate real-life medical operations (Department of Health, 2011). However, the financial cost of high-fidelity equipment simulation is high, which can prevent educational programs from using it (Sharpnack & Madigan, 2012).

Despite the financial cost of HFS, quantitative and qualitative scholarly works denote HFS has many advantages for nursing students (Kameg et al., 2010; McCaughey & Traynor, 2010). Students acquire abilities, communicate better, and gain more confidence by using these tools (Kameg et al., 2010). HFS improves learners' skills, knowledge, and use of safety procedures (Kameg et al., 2010; McCaughey & Traynor, 2010). Mock-ups can measure the cognitive and clinical abilities of nursing students, which help them apply the theoretical concepts they learned in a clinical setting (Lewis & Ciak, 2011).

Blum et al. (2010) compared the effect of traditional simulation techniques (low- and medium-fidelity simulators) and high-fidelity simulations on students' self-confidence and clinical competence. To measure self-confidence and clinical competence of nursing students, Blum et al. (2010) used the Clinical Judgment Rubric of Lasater instrument. The results of this study indicated after interaction with simulations, significant increases were observed in the levels of self-confidence and clinical competence following mid-term and final assessments (Blum et al., 2010).

Nevertheless, Blum et al. (2010) found no statistically significant differences between the two methods, although traditional simulation revealed a greater increase in self-confidence from midterm to final assessments. It should be noted the group using high-fidelity simulation reflected the HFS method had more effect on problem-solving skills than did traditional simulation techniques. Effective learning and true imitation of real-life instances were also associated with the use of HFS techniques (Blum et al., 2010).

According to Dunn, Osborne, and Link (2014), HFS trainings can be implemented to raise students' certainty in their abilities to perform successfully. In particular, HFS plays a fundamental role in improving nurse communication with patients, in addition to responding to the requirements of the patient's physical health (Dunn et al., 2014). Nursing students who possess high self-efficacy might not be at the threat of clinical shortcomings (Dunn et al., 2014).

Some presuppose simulation will improve student self-efficacy for clinical activities, but studies on this issue are indecisive (Dunn et al., 2014). That is to say, simulation activities may not have a positive influence on students' self-efficacy. For example, Roh, Lee, Chung, and Park (2013) studied 18 nursing students and did not find a positive influence on self-efficacy as a result of engaging in simulation activities. The results of the study could have been due to the use of a single assessing item related to cardiac care (Roh et al., 2013). Relatedly, the conclusion there is a positive effect of simulation activities on self-efficacy could also be flawed because of methodological weaknesses when analyzing the relationship between self-efficacy and simulation. Goldenberg, Andrusyszyn, and Iwasiw (2005) found an increase in student's self-efficacy after attending simulation training, but the number of participants was not adequate (n = 66) and no use of quantitative procedures was noted, which weakened the validity of the study's results.

On the other hand, high-fidelity simulation has been found to improve nursing skills such as critical thinking and psychomotor skills (Garrett, MacPhee, & Jackson, 2010; Schlairet & Pollock, 2010; Sportsman, Schumacker, & Hamilton, 2011). The use or reliance on high-fidelity simulations might lead to students' competency in clinical

skills by the time they graduate (Sportsman et al., 2011). However, there is no agreement on the scope or magnitude of time that should be spent using HFS in the nursing curriculum (Sportsman et al., 2011).

Sportsman et al. (2011) deduced using simulation time in place of traditional clinical training in facilities such as hospitals did not adversely influence the results of standardized exit assessments (Sportsman et al., 2011). Sportsman et al. (2011) also concluded such substitutions did not result in any disparity in terms of students' perceptions of their own abilities to execute clinical tasks. On the other hand, the findings in Sportsman et al.'s (2011) study suggested replacing traditional clinical activities with simulation experiences is crucial to increasing the number of students who are admitted to nursing programs, especially when there are scarce clinical resources.

Leaders of nursing programs across the United States have requested from the boards of nursing to approve the use of simulation as a replacement for traditional clinical activities that do not involve simulation (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Richardson and Claman (2014) noted a specific percentage of the number of hours students spent in high-fidelity simulation activities was not known. Additionally, the state boards of nursing and national accreditation organizations did not offer parameters or evidence on such numbers (Richardson & Claman, 2014).

However, a recent breakthrough longitudinal study on simulation revealed significant results determining the number of hours of simulation that can be used in place of traditional clinical experiences (Hayden et al., 2014). Randomized data were collected from three study groups of students from across the United States (Hayden et al., 2014). The first group used 10% of clinical time in simulation, the second group used

25% of simulation instead of traditional clinical time, and the third group used 50% simulation replacing the time spent in traditional clinical activities (Hayden et al., 2014). Hayden et al. (2014) came to a strong conclusion espousing the use of simulation as an alternative for up to 50% of conventional clinical time and made a considerable contribution to research in simulation and nursing education.

Boards of nursing can now refer nursing program leaders to the implications of this national study (Hayden et al., 2014). In other words, nursing programs can be encouraged to supplement, if not partially substitute, traditional nursing clinical training with simulation activities or scenarios (Hayden et al., 2014). Simulation can be useful in improving self-efficacy among nurses (Franklin & Lee, 2014; Jayaraman, Feeney, Brautigam, Burns, & Jacobs, 2014). Using a pretest-posttest design, Roh (2014) measured the difference in assessments of self-efficacy simulation-based training and compared the differences in self-efficacy among nursing students who engaged in medium- and high-fidelity simulations. The results of the study indicated high-fidelity simulations were more helpful in increasing students' self-efficacy than medium-fidelity simulations (Roh, 2014).

The nursing profession involves stressful or depressing times, and professional nurses or nursing students can be entangled by this challenge. Bandura (1997) confirmed self-efficacy is an important dynamic in the course of stress. Having an increased self-efficacy contributes to less stress or depression, while low self-efficacy is associated with the threat of despair and unhappiness (Takagishi, Sakata, & Kitamura, 2013). Participation in simulation can decrease the amount of stress students experience as a result of engaging in these types of activities (Lewis & Ciak, 2011). Above all, educators

can achieve educational objectives through the use of simulated activities, which represent similar health care situations in real life (Jeffries, 2012; Weaver, 2011).

Physiological and affective states are the fourth source of self-efficacy (Bandura, 1986). Bandura (1994) explained people rely on their emotional states when they judge their abilities. A physiological or affective state is a source of information a student can manage to achieve his or her goals (Bandura, 1994). In terms of its role in nursing education, simulation can mitigate physiological and affective states such as stress (Khalaila, 2014). Khalaila (2014) uncovered that anxiety scores dwindled, while self-confidence and caring capability scores improved, after making use of simulations. Caring efficacy was negatively forecast by apprehension and positively forecast with self-confidence, caring skill, and contentment with simulation (Khalaila, 2014).

Another important source of self-efficacy is social persuasion (Bandura, 1994). This includes the teacher's feedback. In a mixed methods investigation, Cato (2013) studied nursing student anxiety in simulation settings, and he found providing feedback to students was a necessity. Not only did the students need feedback from clinical teachers but also wanted individual response following simulation activities (Cato, 2013). This implies recurrent feedback and debriefing is indispensable in nursing student learning (Crider & McNiesh, 2011; Kaddoura, 2010). Cato's findings suggested simulation activities can be less stressful when students are provided with constructive and positive feedback (Cato, 2013).

Fabro et al. (2014) assessed students' confidence in their abilities to deliver palliative health care in end-of-life situations. Following a simulation scenario, most participating students benefited from this activity and agreed activities such as these

prepared them better to be caregivers for end-of-life patients, because it raised their confidence in learning how to provide necessary care for dying patients (Fabro et al., 2014). Indeed, nursing education literature emphasizes clinical simulation increases a student's perceived self-efficacy and knowledge acquisition (Kuiper et al., 2010; Lewis & Ciak, 2011; Wagner et al., 2009).

Summary

Retaining nursing students is a concern in nursing education (Igbo et al., 2011; Raelin et al., 2014). It has been noted in current literature that students' mindfulness of their own growth and psychosocial dynamics influences retention (Williams, 2010). Jeffreys (2012) asserted judgment about ability to execute tasks plays a crucial role in student retention. Students who are not resilient and efficacious might surrender to the challenges they face (Jeffreys, 2012). As a result, they can be at the threat of attrition (Jeffreys, 2012).

There are few studies in the field of nursing education that involve investigation of student self-efficacy developed before and after engaging in medical surgical simulation. Jeffreys (2012) strongly recommended self-efficacy tools and instruments for specific situations in nursing programs should be developed. It should also be remarked that while research on change of self-efficacy of practical nursing students is scarce and difficult to find, some research has documented change in the self-efficacy of a college or university student can happen over a period of time (Le Blanc et al., 2013).

Self-efficacy change involving a decrease or increase in a student's belief in his or ability to execute academic tasks is also dependent on the student's process of learning and comprehension, drive and enthusiasm, behavior (Le Blanc et al., 2013), and study

skills (Wernersbach et al., 2014). Katz (2015) mentioned how perceived self-efficacy is prone to change based on student-teacher interaction. Teachers' guidance and support contribute to students' perceived beliefs about ability to execute tasks (Riconscente, 2014; Williams, 2010).

The literature reviewed in this chapter included research on the importance of social cognitive theory and self-efficacy as theoretical frameworks in higher education in general. Social cognitive theory is a framework supporting knowledge can be learned through observation, and learning by observation is a construct self-efficacy emphasizes as well (Pajares & Schunk, 2001). For example, vicarious learning means learning can occur by modeling the behavior of other individuals (Arslan, 2013; Bandura, 1994, 1997). Other sources that help students learn and build the belief they can do well include social persuasion, mastery experience, and the management of physiological cues (Bandura, 1994, 1997). The variables of age, gender, and educational level (Jeffreys, 2012; Mould et al., 2011) of nursing students were also examined in Chapter Two due to the crucial role they play in explaining student retention (Jeffreys, 2012), behavior, and self-efficacy (Sarafis & Malliarou, 2013).

The second main point in Chapter Two focused on the use of self-efficacy theory in education. As already noted, several educational domains, including the STEM fields, are impacted by student self-efficacy. Educational leaders can make a big difference in student academic life and careers by building solid instructional grounds shaped by effective curriculum design and employment advising to improve student self-confidence.

Nursing education and self-efficacy theory are interrelated, and nursing students' self-efficacy is an important variable previous nursing education researchers have

investigated (Chesser-Smyth, & Long, 2013; Jeffreys, 2012; Karabacak et al., 2013; Pike & O'Donnell, 2010; Reich et al., 2010; Stephens, 2013). Nursing students who have strong perceptions of competence view educational obstacles as challenges, possess internal strategies to overcome those difficulties, and therefore tend to stay and complete nursing programs (Jeffreys, 2012). Self-efficacious students will also do well in a nursing program that teaches students applicable and useful information, abilities and manners related to reasoning and emotional experiences, and psychomotor skills (Karabacak et al., 2013).

The three research questions in this study revolved around the use of simulation activities to measure students' self-efficacy. Therefore, the literature on the use of simulation in nursing education was worth a depiction in Chapter Two. The significant role simulation plays in nursing education can be summarized in the following statement:

> The electronically elaborate manikins represent the cutting edge in medical training that will eventually save lives. These manikins mimic a myriad of medical conditions that test the skills and abilities of emergency personnel. Each computer-driven manikin can bleed, sweat, speak and move. They can produce symptoms of everything from a heart attack to a drug overdose to a concussion. (Ozarks Technical Community College, 2015, paras. 1-2)

Indeed, the utility of simulation in nursing education is of great importance.

Although there were mixed results in the literature concerning the effectiveness of simulation in building nursing students' self-efficacy, it was important to mention the scholarly debate on substituting traditional clinical activities performed at a medical facility with simulation activities or scenarios. In Chapter Three, the quantitative

research design along with the reasons behind choosing it are presented. The pilot survey, population and sample, data collection method, as well as data analysis strategies are explained in detail.

Chapter Three: Methodology

The majority of literature regarding simulation in nursing education has revealed simulation is valuable in generating a learning setting which furthers the understanding, abilities, well-being, and self-assurance of nursing students (Norman, 2012). Nevertheless, according to Onello and Regan (2013), "Undergraduate nursing programs are looking for evidence that will support the use of high fidelity simulation and guide best practices in the use of simulation to improve learner outcomes" (para. 1). A quantitative research design was crucial for this study, because very few quantitative studies have attempted to advance query related to simulation in nursing education (Onello & Regan, 2013).

In order to understand this study, the research design chosen is discussed in depth in this chapter. The population and sampling technique that were used to conduct the research are identified, and details are discussed. The data collection is explained in terms of the procedure, and ethical considerations and an explanation of how the data were analyzed are also offered.

Problem and Purpose Overview

The research studies that have been conducted in nursing education demonstrate educators acknowledge concerns in the ability to offer educational and clinical opportunities aiding apprentice nursing students in acquiring clinical appraisal skills that strengthen self-efficacy (Pierce, 2011). One of the challenges for colleges is to find ways to reduce attrition rates and recruit the most qualified contenders to their programs (Peterson-Graziose et al., 2013). Within the first three courses taken, almost half of the

students enrolled in PN programs are removed or withdraw because of failing grades (Barra, 2013).

Research on simulation in nursing education is scarce; therefore, this study contributed to this component of training in nursing education (American Sentinel University, 2012). Identifying and measuring sources of self-efficacy was a key factor in this study, because self-efficacy can influence persistence and performance of nursing students (Jeffreys, 2012). Furthermore, the comparison of the students' use of sources of self-efficacy before and after engaging in the simulation center activities helped determine if there is a change in the means of the sources of self-efficacy.

It is anticipated results will assist educators and students in recognizing the utility of self-efficacy construct and its sources that develop and create self-efficacy. Results of this study suggest certain sources of personal efficacy could be rated higher before engaging in the simulation center activities, while the same sources might be rated lower after engaging in those activities (Sunjin, 2010). Assisting nursing students in developing reasonably strong perceived self-efficacy should be a primary concern in nursing education (Jeffreys, 2012; Onello & Regan, 2013). This will help students become more successful in performing emergency clinical situations despite the challenges (Onello & Regan, 2013).

Research questions. The following research questions guided the study:

1. What difference exists, if any, in the strength of perceived self-efficacy in nursing students before and after engaging in the medical surgical simulation activities?

$H1_0$: There is no statistically significant difference in students' strength of perceived self-efficacy before and after engaging in the medical surgical simulation center activities.

$H1_a$: There is a statistically significant difference in students' strength of perceived self-efficacy before and after engaging in the medical surgical simulation center activities.

2. What difference exists, if any, in the scores of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities?

$H2_0$: There is no statistically significant difference in the scores of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities.

$H2_a$: There is a statistically significant difference in the scores of sources of self-efficacy of nursing students before and after engaging in the medical surgical center activities

3. Are there significant mean differences for each of the four sources of self-efficacy by age category among students and by educational level of students?

$H3_0$: There is not a significant mean difference for at least one source of self-efficacy by age category among students; and by the educational level of the students.

$H3_a$: There is a significant mean difference for at least one source of self-efficacy by age category among students; and by the educational level of the students.

Research Design

A quantitative approach was used to collect data in this study. Approaches to research design can be divided into three major categories: quantitative, mixed methods, and qualitative (Kalaian, 2008). Weimer (2013) explained more quantitative research in the fields of learning and teaching is needed. Likewise, Creswell (2013) added a quantitative method is one in which the researcher mainly uses post-positivist claims for creating knowledge by measuring variables and investigating through methods such as tests and surveys to gather data on encoded instruments that produce numerical figures.

There are four major categories of quantitative research design: experimental, non-experimental, quasi-experimental, and pre-experimental (Kalaian, 2008). Muijs (2010) clarified the experimental research design, or the scientific method, stems from scientific research. Mujis (2010) and Brink, Van, and Van (2012) explained non-experimental designs are different in the sense they do not use experimental manipulation of the independent variable by controlling the conditions under which the test is administered. Brink et al. (2012) added the main goal of non-experimental design is to explain phenomena and investigate the relationships among variables.

This study involved a pre-experimental research design to measure the construct of self-efficacy and its sources (Kalaian, 2008). A survey instrument was used to collect data, because it was less costly and helpful in gathering data more quickly (Creswell, 2013; Fraenkel, Wallen, & Hyun, 2014). Pre-experimental research designs are straightforward and do not implement control groups (Kalaian, 2008). To accurately use the pre-experimental design, a researcher should explore a phenomenon or pre-examine a problem (Kalaian, 2008).

The pre-experimental design was chosen for this study, because only one group of students participated in this study (Creswell, 2013). The one-group pretest-posttest design was used to compare the scores of self-efficacy strength as well as the scores of the sources of self-efficacy (Grove, Burns, & Gray, 2012). Creswell (2013) illustrated the one-group pretest-posttest approach contains a pretest measurement pursued by a treatment and then a posttest for that group.

According to Patten (2013), there are many threats to the internal validity of the one-group pretest-posttest design. For instance, maturation is a threat (Patten, 2013). Some of the nursing students might mature during the data collection period (Patten, 2013). To respond to this threat, Creswell (2013) recommended, "The researcher can select participants who mature or change at the same rate during the experiment" (p. 174). Testing can be a threat, too (Creswell, 2013). It is possible students remember how they answered or completed the pretest, so they might provide similar answers for the posttest (Creswell, 2013). To respond to this threat, a longer time interval of two months between surveys was given (Creswell, 2013).

A pre-experimental design is not a true experimental design (Patten, 2013), and the participants were not randomly chosen in this study (Robbins, 2008). Therefore, the results of the study cannot be generalized to all other students in PN programs using simulation in the United States (Robbins, 2008). However, it is important to emphasize this study was designed to be a preliminary study which can be replicated using a true experimental design to investigate if the simulation experience in fact causes a strong or weak self-efficacy (Patten, 2013).

This researcher attempted to investigate if there is a change in the strength of perceived self-efficacy before and after the simulation experience and to determine if there is a change in the scores of the sources of perceived self-efficacy before and after engaging in the simulation center activities. Students' use of sources of perceived self-efficacy based on the differences in age and educational level were also examined. The gain scores for the pretest and posttest were used to analyze the third research question (Dimitrov & Rumrill, 2003).

Furthermore, an instrument's validity and reliability of scores can induce a significant understanding of the data (Creswell, 2013). According to Phillips, Phillips, and Aaron (2013), it is important to ensure the validity and reliability of a survey. An effective survey instrument with high reliability yields steady results throughout time (Phillips et al., 2013). Survey validity refers to gauging what the survey is expected to quantify (Phillips et al., 2013). A survey can be assessed in terms of content validity (Phillips et al., 2013), which is important for the survey used for this study. Specifically, content validity represents the degree to which the items in an instrument stand for the subject matter that the test is intended to measure (Gall, Gall, & Borg, 2006).

In order to ensure content validity and to have a clear measurement of self-efficacy surveys, Bandura (1997) recommended using the words *can do* rather than *will do*. *Can do* is a judgment of capability; *will do* is measurement of intention (Bandura, 1997). The SSES items reflect the students' strength of confidence in their judgment of capability for performing various levels of task demands (Bandura, 1997) required in the simulation scenarios.

The variables of this study included the following: perceived self-efficacy; the sources of self-efficacy including mastery experience, vicarious learning, social persuasion, and physiological and affective states; age; and the student's educational level. The participants in this study were hypothesized to have different strengths of perceived self-efficacy, and it was anticipated participants' scores of sources contributing to their self-efficacy would be different. Age and educational level were the independent variables. The sources of self-efficacy were the dependent variables.

Population and Sample

The participants were PN students at a Midwestern community college. Two classes of licensed PN students were involved in the simulation center activities in the spring of 2014, and those students were the invited participants for this study. The population size of the study consisted of 60 students enrolled in the PN program classes. Due to time and money constraints, a random sampling was not used (Fraenkel et al., 2014). The sample was already small, and implementing a sampling method would have limited it further. Instead, convenience sampling was selected for this study.

The use of convenience sampling is not recommended, as it is not considered a good method to represent a certain population (Creswell, 2013; Fraenkel et al., 2014; Phillips et al., 2013). However, implementing the method of convenience sampling was necessary for this study since PN students at the Midwestern community college were available to participate in this study from January through June 2015; convenience sampling is adequate for a specific program with a limited number of participants (Phillips et al., 2013). Fraenkel et al. (2014) stressed the great bulk of research studies in

education have not used random sampling. In addition, most behavioral research uses convenience sampling rather than random sampling (Nolan & Heinzen, 2011).

Instrumentation

The 20-item SSES of this study included a practice example that "familiarizes the respondents with the scale gauging strength of efficacy beliefs and reveals any misunderstanding about how to use it" (Bandura, 1997, p. 44) (see Appendix A). This practice survey captured students' current confidence in their ability to run certain distances. The purpose of the SSES was to reveal nursing students' strength of their self-efficacy beliefs (Bandura, 2006) before and after the simulation experience. The SSES items addressed medical surgical tasks students were expected to complete in a simulation activity (Course Syllabus). Items were worded so sources of self-efficacy that are responsible for either strengthening or weakening students' beliefs in executing the simulation scenarios could be revealed. The type of the scale used to measure the items is continuous, which means the survey was recorded on a 100-point scale, extending in 10-unit intervals (Bandura, 2006).

Bandura's (2006) definition of self-efficacy revolves around four major points: "sources of self-efficacy, efficacy activated processes, adaptive benefits of optimistic self-efficacy beliefs, development and exercise of self-efficacy over the life span" (para. 1). Self-efficacy theory guided the construction of the items reflecting the sources of self-efficacy and the designated tasks students were required to complete (Bandura, 1994; Keating, 2014). The survey contained four major categories or sources. Each source had a number of items that fit under the category being measured.

Bandura's (2006) guidelines for constructing self-efficacy scales were followed to develop the survey for this study. To ensure the reliability of the survey, the SSES was piloted and a factor analysis was run on the survey items. Creswell (2013) recommended piloting or field testing a survey because this process is "important to establish the content validity of the scores on an instrument and to improve questions, format, and scales" (p. 161).

Pilot survey. The SSES originally contained 30 items and was piloted with 27 PN students one academic semester prior to conducting it with the main participants of the study (see Appendix B). Piloting an instrument is one of the optimum methods to make sure it is correctly constructed and that the items have clarity for the participants; such refinement of the survey encourages respondents to complete the survey (Phillips et al., 2013). The students who completed the pilot SSES attended courses and medical surgical simulation activities similar to the ones the actual participants of the study experienced. During the pilot, students were also instructed to write comments on the survey if they did not understand certain words or items. Creswell (2013) encouraged researchers to incorporate those comments into the corrections of the instrument.

The pilot PN students were given the SSES, and they rated the degree of certainty in their abilities to execute the simulation tasks. Then, each student's answers were inserted into an excel spreadsheet to compute self-efficacy strength, and "the efficacy strength scores were summed and divided by the total number of items to indicate the strength of the perceived self-efficacy for the activity domain" (Bandura, 1997, p. 44). The same mathematical process was followed to compute the scores of each source of

self-efficacy. This allowed for an observation of an individual mean score for each source of self-efficacy.

Factor and principal component analysis. In order to assess an instrument that intends to measure psychosocial concepts or variables, arrangements of correlation and variation amid reports to the items reflecting every variable are usually analyzed through the use of factor analysis (Swisher, Beckstead, & Bebeau, 2004). According to Bandura (1997), "Factor analysis can help to verify the multifaceted structure of efficacy beliefs" (p. 45). The use of factor analysis ensures the homogeneity of the items under each source (factor) of self-efficacy (Bandura, 2006). The higher or stronger the correlation, the better the items fit together under the variable the items are supposed to measure. All 30 survey items were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The survey was divided into four subscales, and a principal component principal analysis was run on each variable or subscale (see Table 1).

It should be noted a principal component analysis was conducted first, which is a preliminary process in factor analysis focusing mainly on loadings under each factor (Starkweather, 2014). A more detailed exploratory factor analysis of the SSES instrument is outlined in Chapter Four. The first subscale (mastery experience) contained 13 items. The communalities of those items were between 0.62 and 0.91. Guion (2011) defined "communality as the proportion of the total variance in a distribution of scores on a test or variable explained by the factors identified in the matrix studied" (p. 201).

To ensure satisfactory factorability, only the items that loaded with a coefficient $\geq$ 0.6 were kept. All the items of the first subscale were above the coefficient 0.6. The reliability coefficient of mastery experience was 0.73, which was above the

recommended coefficient of 0.6. Principal component analysis extraction was performed on the SPSS software for data reduction and helped compute and cut the number of components. The 30-item SSES was reduced to 20 items.

Table 1

Principal Component Analysis for the Items of the Simulation Self-Efficacy Survey

	ME	VL	SP	PAS
RIC	between 0.62 and 0.91	between .15 and 0.90	between 0.21 and 0.74	between 0.24 and 0.82
PCA	7 components extracted	2 components extracted	1 component extracted	2 components extracted
RC	0.73	0.79	0.61	0.91

Note. All 30 survey items were analyzed using SPSS v21 software. RIC refers to range of item communalities. PCA refers to principal component analysis. RC is reliability coefficient. ME: mastery experience, VL: vicarious learning, SP: social persuasion, and PAS: physiological and affective states.

This technique loaded seven components, but they were reduced to only two components. Component 1 contained three items above a 0.6 coefficient. Component 2 contained four items above 0.6. However, only one component that reflects mastery experience variable was used for this study. The items of mastery experience were edited and reduced to five items.

The second variable or subscale (vicarious learning) contained six items. The communalities of those items were between .15 and 0.90. Five items loaded a coefficient ≥ 0.6. Item 15 did not meet the requirement and was removed from the final data. The

reliability coefficient of vicarious learning was 0.79. Principal component analysis extraction method helped compute the number of components under vicarious learning, and two components were extracted. However, only Component 1 met the requirements, so Component 2 was removed. The items of vicarious learning were edited to comprise five items.

The third variable or subscale (social persuasion) contained four items. The communalities of those items ranged between 0.21 and 0.74. Item 21 was removed since it did not meet the above statistical requirement nor did it fit with the other items. Principal component analysis extraction method helped compute the number of components under social persuasion. As a result, only one component was extracted. This component consisted of three items above 0.6. The reliability coefficient of social persuasion was 0.61. The items of social persuasion were edited to comprise five items.

The fourth variable or subscale (physiological and affective states) comprised seven items. The communalities of those items ranged between 0.24 and 0.82. Item 24 was removed because it did not meet the statistical requirement nor did it fit with the other items measuring physiological and affective states. Two components were extracted and only Component 1 was kept. Three items loaded a coefficient ≥ 0.6. The reliability coefficient of physiological and affective states was 0.91. The items of vicarious learning were edited and reduced to five items.

Data Collection

In this study, the surveys were completed twice by students, at the same time and in the same place. Fraenkel et al. (2014) emphasized the main benefit of gathering students to complete surveys is the high degree of response. After the Institutional

Review Board of Lindenwood University approved the study (see Appendix C), and the allied health dean at the Midwestern community college gave permission to conduct the study (see Appendix D), the teachers of the two LPN classes were contacted to schedule a time to distribute the informed consent forms for the students to read and sign (see Appendix E) before completing the surveys. The main purpose of the study and the survey was explained to the participants. The teachers were responsible for distributing and collecting the surveys.

Data Analysis

A *t*-test is commonly used in analysis of data gathered from research involving the before-and-after design (Johnson, 2014). To answer Research Question One, the strength of self-efficacy beliefs was measured twice, both before and after engaging in the simulation activities. A paired samples *t*-test was used to determine if there was a significant change in the scores of each student indicating the before-and-after strength of self-efficacy (Tavakoli, 2013). To answer Research Question Two, the paired samples *t*-test was also used to compare the scores of the self-efficacy sources before and after engaging in the simulation activities. To answer Research Question Three, a one-way analysis of variance (ANOVA) was used (Mertler & Vannatta, 2013). The goal of ANOVA was to examine the differences in the means of the independent variables, or factors of age and educational level, with respect to the dependent variables, the sources of self-efficacy (Mertler & Vannatta, 2013).

Ethical Considerations

Participation in this study was completely voluntary, and students were informed they could stop answering the questions at any time. On the other hand,

teachers were instructed to explain to students that the study would not cause any harm, which was a criterion the informed consent emphasized as well. There were no risks associated with participation in this study. The identities of the participants remained anonymous, and students' answers to the surveys were confidential (Fraenkel et al., 2014).

Before administering the survey, the instruments and consent forms were numbered from 1 to 60. The informed consent and the pretest survey instrument were stapled together. Each student had a specific identification number, which was not repeated (1-60). The researcher wrote this identification number by the blank space, where students also wrote the last four digits of their student ID numbers on the informed consent form. The same number (1-60) was written on the pretest survey instrument already stapled to the informed consent, but no participant's last four ID digits were written on the pretest survey instrument.

On the day of survey administration, the main researcher went to the classroom and gave the teacher instructions about how students should complete the informed consent and answer the survey questions. Each student had to write the last four digits of his or her student ID on the informed consent document next to the identification number (1-60) already written on the informed consent. The students were asked then to complete the survey after signing the informed consent. After completing the survey, the researcher collected the surveys from the teacher. Then, the main researcher wrote the last four digits of each participant's ID along with the corresponding identification numbers (1-60) on a list. The informed consent forms

were detached from the surveys and kept in a locked and secured filing cabinet. The surveys and the list were also kept in a locked cabinet.

To administer the posttest survey, the same survey was completed by the same participants. Each survey was organized and numbered 1 through 60. The list already created was used in the posttest survey administration. The last four digits were written on the list to match the numbers already assigned for each participant in the pretest. This time, each student was called by his or her last four ID digits and was given the numbered blank posttest survey. This method helped ensure anonymity and the matching process of the data. Only the main researcher had access to the surveys, the informed consent forms, and the list. They were all kept in a locked filing cabinet at the principal investigator's house. Only the main researcher could open and close this cabinet.

Summary

This study involved a quantitative methodology to investigate if a difference exists in self-efficacy strength and in the scores of the sources of information contributing to self-efficacy beliefs before and after engaging in simulation activities. Practical nursing students at a Midwestern community college served as the sample for this study. The purpose of using the one-group pretest-posttest design was not to determine if simulation causes high or low self-efficacy beliefs among nursing students, but rather to observe the change in self-efficacy beliefs.

When a change or difference between the before and after self-efficacy beliefs is found as a result of engaging in simulation activities, it can be recommended to conduct further quantitative studies involving a true experimental design (Salkind, 2010; Thyer,

2009). The one-way ANOVA technique helped determine if the scores on each source of self-efficacy were different for students of different educational levels and different ages. Therefore, conclusions about students' differences in their use of those sources were made.

The results of this study may help researchers and educators use self-efficacy theory as a guiding construct to observe and understand the development of PN students' personal efficacy when engaging in medical surgical nursing simulations. This study's findings are presented in the form of quantitative data to analyze and answer the three research questions of the study. The demographics are also defined in detail in Chapter Four.

Chapter Four: Analysis of Data

Clinical simulation offers nursing students a rewarding and safe environment where they can practice skills without harming patients (Jeffries, 2009; Weaver, 2011). The lack of studies on simulation in practical nursing was one reason for conducting this study. In this chapter, the main goals of the study as well as the problem are revisited. The demographics and population in this study are analyzed to understand the diversity of the student body in practical nursing at this Midwestern community college. Moreover, an analysis of the developed instrumentation and data collection is provided, and the research questions are also addressed in terms of the methodology in which they were framed and tested. Descriptive and inferential statistics were computed and are reported for each research question.

Problem and Purpose Overview

High rates of student attrition are a problem in nursing education (Barra, 2013). In addition, research involving nursing simulation topics is rare (American Sentinel University, 2012). Because the nursing profession requires high levels of confidence, it is pertinent for leaders in the allied health field to create more opportunities that improve students' self-efficacy (Jeffreys, 2012; Onello & Regan, 2013).

The purpose of this study was to measure and compare the strength of practical nursing students' self-efficacy before and after engaging in medical surgical simulations. Since there are four sources that contribute to an individual's self-efficacy (Bandura, 1986), the subgroup means of mastery experience, social persuasion, vicarious learning, and physiological and affective states were also measured and compared. The four

subgroups in this survey reflected students' use of or dependence on the above-mentioned sources. Each part or source was measured through five items.

Another goal of this study was to determine the effects of the variables of age and educational levels of the practical nursing students on their use or choice of each self-efficacy source. By investigating these goals, the study's main purpose was to help practical nursing students, as well as educational leaders in nursing programs, realize if there is a shift or change in student self-efficacy. This can create awareness of self-efficacy as a crucial concept and a practical component in nursing education.

In the following sections, the results of the survey data are analyzed. The first section comprises a report of the demographics of the study. The next sections depict the analysis of the instrumentation including the reliability and validity of the instrument, as well as present findings of the study in the form of descriptive and inferential statistical examinations based on each research question.

Respondent Demographics

The target population of this study included the practical nursing students attending a Midwestern community college. The results of the study can only be generalized to this Midwestern community college and possibly other community colleges in the United States if demographic variables are similar to the ones described in this study. This study was conducted with 60 practical nursing students during the final semester of their PN program.

Only 50 students responded to both the pretest and posttest surveys. Ten students responded to the pretest but not the posttest because they were no longer in the nursing program. The reasons for leaving the program were varied but mainly because of lower

academic performance according to a nursing instructor. Therefore, the final sample size consisted of $N = 50$ students.

Some of the survey variables were categorical questions students were requested to answer. Therefore, frequencies and percentages of gender, age, and educational level were analyzed and are reported next. In the SPSS, the variables were coded for gender (1 for male and 2 for female), for age (1 for 18-29, 2 for 30-39, 3 for 40-49, and 4 for 50+), and for educational level (1 for high school, 2 for junior college, 3 for bachelor's degree, and 4 for graduate level) (Mertler & Vannatta, 2013). Eighty-two percent of the participants in this study were females. The male participants constituted 18% based on gender (see Figure 1).

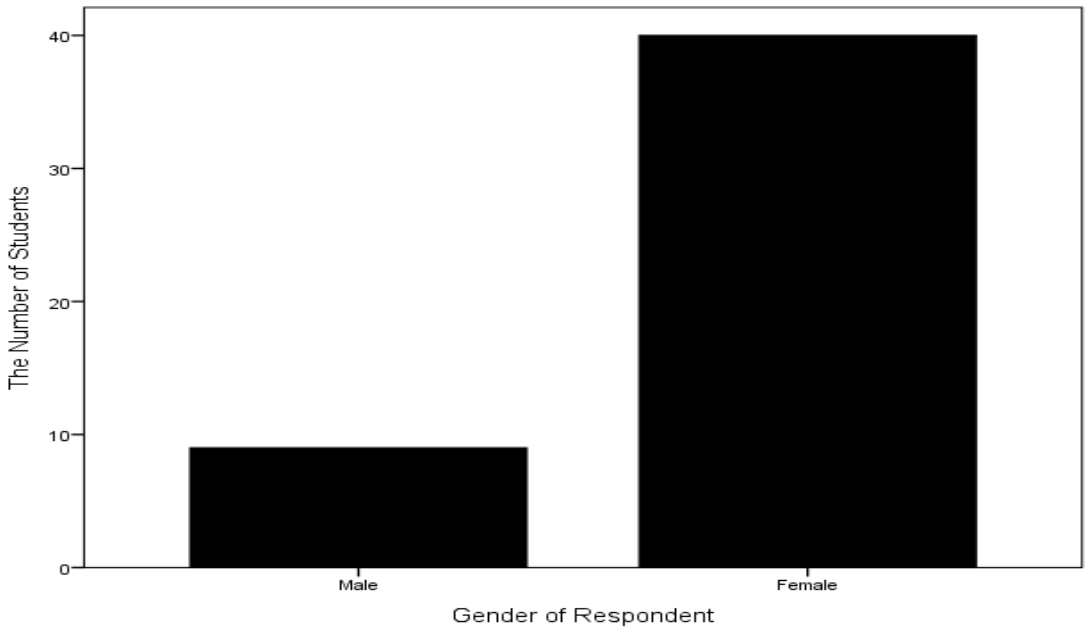

Figure 1. The number of subjects based on gender. $N = 50$.

In terms of age, there were 23 students between ages 18 and 29 comprising 46% of the sample, followed by 18 students who were between the ages of 30-39 (36%). Nine students were ages 40 to 49 constituting 16% of the sample. In the last age group, 50 and older, there was one student representative of 2% of the sample (see Figure 2).

In regards to the highest educational level obtained, only 4% of the participants possessed a graduate degree, 4% had earned a bachelor's degree, 66% had attended higher education at the junior college level, and 26% had finished only a high school level of education (see Figure 3).

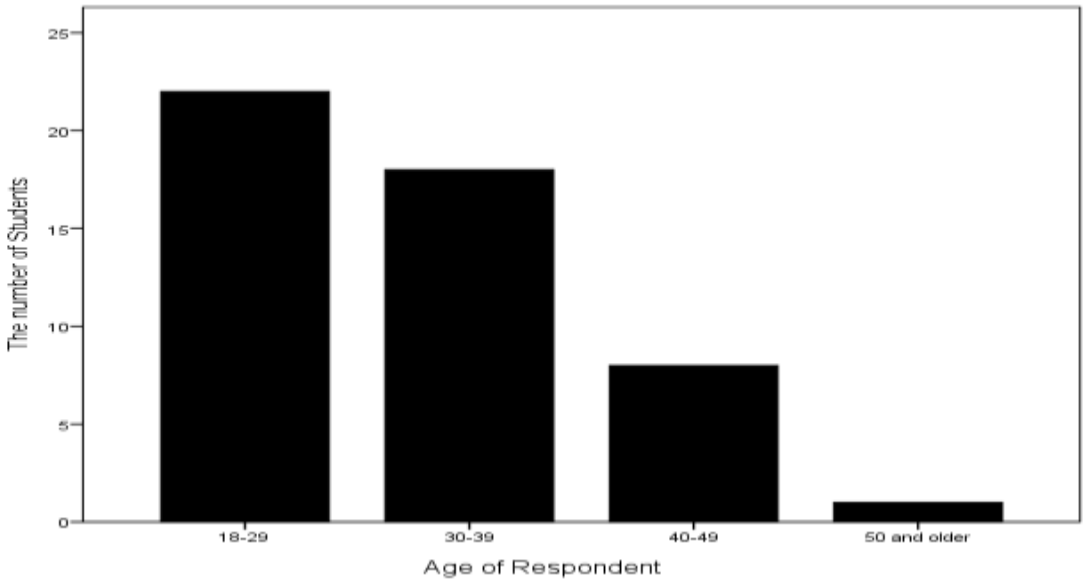

Figure 2. The number of participants based on age.

Data Collection and Analysis of Instrumentation

A paper-pencil survey research method was conducted to collect data (Rogers, Sharp, & Preece, 2015). The main researcher was responsible for distributing and collecting the surveys from the instructors who administered the surveys in class. The

pretest and posttest surveys were completed in less than 30 minutes at the beginning of the spring 2015 semester and at the conclusion of the same semester.

The survey consisted of 20 items, which were grouped by sources of self-efficacy. The first five items were phrased to denote students' use of mastery experience as a source they rely on to build their self-efficacy (Bandura, 1986). The second set of five items (Items 6-10) were formulated to reflect students' reliance on the second source of self-efficacy, vicarious learning (Bandura, 1986). The third group of five items (Items 11-15) emphasized students' dependence on the self-efficacy source of social persuasion (Bandura, 1986). The goal of the fourth category of five items (Items 16-20) was to reveal a nursing student's belief in his or her ability to manage physiological and affective states, which is also a source for self-efficacy building (Bandura, 1986).

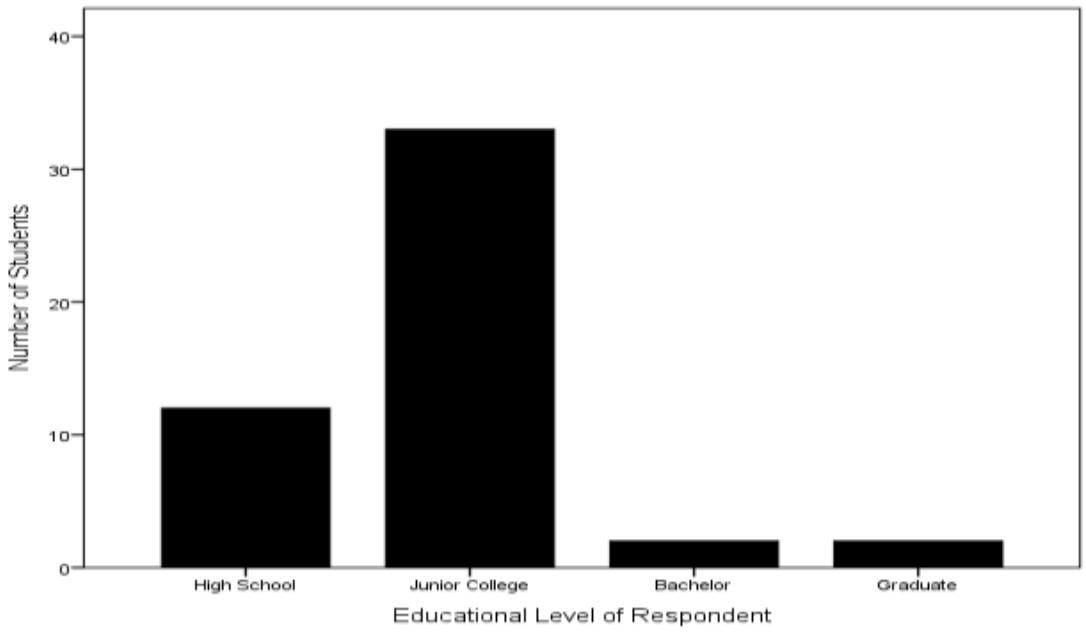

Figure 3. The number of subjects based on educational level.

The simulation self-efficacy survey utilized a continuous scale ranging from a score of 0 to 100, with 10-unit intervals to measure nursing students' perceived self-efficacy (Bandura, 2006). In addition, student demographics were measured categorically; gender was measured as a nominal variable, while age and educational level were presented as ordinal variables (Mertler & Vannatta, 2013). In the present study, a measure of self-efficacy was obtained by asking participants to report their beliefs about being certain to perform medical surgical simulation activities. This means students were asked to rate how confident they were in their abilities to perform those activities (Bandura, 1986). Responses were coded on a scale of 0 (cannot do at all) to 100 (highly certain can do) (Bandura, 2006).

The means of strength of self-efficacy were calculated in SPSS for both the pretest and posttest surveys. In addition, the means for each source of self-efficacy were also counted to use scores in the data screening step (Mertler & Vannatta, 2013). The statistical analysis, using SPSS, was implemented to assess the shared variance among the four variables or sources of self-efficacy through the use of factor analysis technique (Mertler & Vannatta, 2013).

Reliability and Validity of the Results

Before analyzing the reliability and validity of the instrument, a pre-analysis screening of missing data and normality checks was implemented. Data screening is a crucial statistical requirement before conducting any factor analysis (Mertler & Vannatta, 2013). Each student's physical survey answers were proofread twice by the researcher against the original data for accuracy. Using the functions of Descriptives and Explore in SPSS, data were also analyzed using the List-wise option to delete any missing subjects

with missing values (Mertler & Vannatta, 2013). Data were screened for missing information; none were found in the 50 surveys.

Outliers. In order to detect subjects or cases with extreme values, appropriate steps were followed in SPSS to check for univariate and multivariate outliers (Mertler & Vannatta, 2013; Tabachnick & Fidell, 2013). Univariate outliers are cases with extreme values on one variable, while multivariate outliers are cases with a mixture of odd values on more than two variables (Mertler & Vannatta, 2013). Any *z*-score greater than 3.29 or less than -3.29 is an outlier for larger samples (Mertler & Vannatta, 2013). In smaller samples, a case is considered an outlier if its *z*-score is greater than 2.5 or less than -2.5 (Mertler & Vannatta, 2013). In the self-efficacy strength pretest, one extreme case with a value of -2.60 was detected, and this very same case was found to be an outlier in the posttest mean score of self-efficacy strength with a *z*-score of -3.57. A box plot was generated in SPSS to detect outliers in the pretest and posttest means of self-efficacy. This confirmed the existence of the same outlier in both the pretest and posttest as detected by *z*-score analysis (Mertler & Vannatta, 2013).

Since the instrument used in this study contained four subscales or sources that can develop self-efficacy, the data were checked for multivariate outliers because this analysis helps avoid biased results (Wittig, 2015). Therefore, a Mahalanobis test was performed in SPSS to check for multivariate outliers (Mertler & Vannatta, 2013). The pretest means of mastery experience, social persuasion, vicarious learning, and physiological and affective states were all analyzed. A linear regression option was selected in SPSS to examine if multivariate outliers existed for the pretest four sources of self-efficacy.

The Mahalanobis test helped create a new variable on the SPSS data sheet to determine if there were any multivariate outliers. The scores of this new variable (Mah_1) were reflected on the data view sheet and the output in SPSS. As a result, cases with a Mahalanobis distance greater than 18.467 were regarded as multivariate outliers. An Extreme Values table was generated in SPSS to find out which cases had greater values than 18.467. The highest value was 16.73, which was below 18.467. Thus, it was concluded no multivariate outliers existed for the pretest means of the four sources of self-efficacy.

The same quantitative procedure, the Mahalanobis test, was followed to analyze the posttest means of the four sources of self-efficacy, and a new variable (Mah_2) was created. Only one case was identified as a multivariate outlier (21.167), since it exceeded the critical value of 18.467. This outlier was deleted, because it appeared in both the univariate and multivariate outliers. In addition, a close examination of this case revealed his or her scores were very different from all other participants' scores. Therefore, this case was most appropriately deleted. At this point, 49 of 50 cases were left for further analysis. The assumption of normality is investigated in the next section to assess the adequacy of the data.

Normality. To identify the normality of the data, two steps were taken. First, all observations were analyzed on the basis of the overall variable of self-efficacy strength. Second, self-efficacy strength was tested for normality by groups based on the factors of age and education level. If the data are normally or approximately normally distributed, then a researcher can feel confident about the interpretation of the results and can provide

an honest and valid analysis when making conclusions about the results (Mertler & Vannatta, 2013).

Using the Explore command in SPSS, a Shapiro-Wilk test of normality indicated the variable of self-efficacy strength was normally distributed (*S-W* = 0.97, *df* = 49, *p* = .328). The significance, or *p*-value = .328 not less than .05, was a strong indicator the sample data of this study were normally distributed. Another way to assess normality is to use kurtosis and skewness coefficients (Mertler & Vannatta, 2013). Skewness refers to the level of evenness or regularity of a distribution of the mean, while kurtosis is the peak of frequency or distribution (Mertler & Vannatta, 2013). Perfect symmetrical normal distributions are indicated by values of kurtosis and skewness that are equal to zero (Mertler & Vannatta, 2013). The kurtosis was divided by the standard error of kurtosis, and the skewness was divided by the standard error of skewness to determine if the data distribution was normal (Hinton, McMurray, & Brownlow, 2014). The skewness of self-efficacy strength was -.041, *SE* = 0.34, and kurtosis was -0.81, *SE* = 0.67. Kurtosis and skewness scores were within the acceptable range of -2 and +2 (George & Mallery, 2010).

A visual examination of the histogram with a reasonably bell-shaped distribution and the Q-Q plot with dots clinging to the diagonal line also implied the proof of normality. These indications alluded the normality assumption was met for the variable of self-efficacy strength. Self-efficacy strength was also tested for normality by groups based on the responses for age and education level categories. The assumption of normality was generally met for all factors except the factor of age whose subcategory (30-39) had a *p*-value of .005 on the Shapiro-Wilk test of normality.

All other factors including their subcategories were in general approximately normally distributed in regard to self-efficacy strength. It should be noted normality tests were conducted on both the pretest and the posttest surveys. The posttest data appeared to have a more normal distribution. Thus, the post survey was used in factor analysis.

Item and Factor Analyses of the SSES

After reverse scoring some of the negatively worded items (13, 16, 17, 18, 19, 20) of the 20-item SSES, item analysis reliability procedures were followed to omit items having negative or low positive correlations (Green & Salkind, 2013). Item analysis procedures are performed on an instrument that attempts to measure one or more constructs (Green & Salkind, 2013). The SSES attempted to measure four constructs or subscales: mastery experience, social persuasion, vicarious learning, and physiological and affective states.

Each subscale was analyzed using reliability analysis function on SPSS. For example, five items measuring mastery experience were analyzed, and three of those items were deleted since their corrected item total correlation was very low. The Cronbach's Alpha of mastery experience was .80 (Green & Salkind, 2013). After deleting all the items that did not strongly correlate with the corrected total score for the other three subscales, vicarious learning consisted of two items with an Alpha of .87, social persuasion consisted of two items with an Alpha of .82, and physiological and affective states consisted of four items with an Alpha of .91. Alphas ranging between 0.7 and 0.9 are acceptable; "a high value of alpha (> 0.90) may suggest redundancies and show that the test length should be shortened" (Tavakol & Dennick, 2011, p. 54).

The deletion of the items 1, 2, 3, 8, 9, 10, 13, 14, 15, 16 was not based solely on the item analysis procedure, but also on the assessment of discriminant validity where factor items must relate to their own factor rather than relating to other factors or subscales (Green & Salkind, 2013). In order to assess discriminant validity, a factor analysis procedure was performed on the factors or subscales of the SSES to confirm the deletion of the above-mentioned items. Thus, all 20 items were analyzed in SPSS, and items were iterated until a clean pattern matrix was achieved (Mertler & Vannatta, 2013).

Factor analysis aims at reducing the number of variables that measure certain constructs within an instrumentation (Mertler & Vannatta, 2013). The fundamental objective of factor analysis is to determine if measurements for different variables or factors are, in fact, gauging something in common within an instrument (Mertler & Vannatta, 2013). In factor analysis, correlation between factors or constructs needs to be lower than 0.85 to mean the measure has discriminant validity (Harrington, 2008). The correlations of the SSES, after items were reduced, were all lower than 0.85.

Table 2 shows correlations among factors. The factors are distinct because the correlations are low (Mertler & Vannatta, 2013). For instance, factor one correlates with factors two, three, and four very weakly. The strongest correlations are between factors three and four, but it is not unreasonably high. Since the factors did not correlate highly, then it should be concluded those factors are not overlapping and do not measure the same thing.

Table 2

Factor Correlation Matrix

Factor	1	2	3	4
1	1.000	.144	.117	.283
2	.144	1.000	.586	.583
3	.117	.586	1.000	.619
4	.283	.583	.619	1.000

Note. Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.

The following paragraphs contain a detailed explanation of how factor analysis was conducted to clarify the set of variables that were retained and the process of data reduction.

Factor analysis was conducted using maximum likelihood extraction method to determine what, if any, underlying structures exist for measures on the SSES survey variables (Green & Salkind, 2013; Mertler &Vannatta, 2013). Moreover, the lowest-loading items and the cross-loading items were eliminated from the survey, and the survey contained 10 items at the end (see Table 3).

The appropriateness of factor analysis was determined by investigating the values on the Kaiser-Meyer-Olkin measure of sampling adequacy, which met the minimum criteria with a value of .784. A score between .7 and .8 is considered middling and suitable for factor analysis (Kaiser & Rice, 1974). The significance on Bartlett's Test of Sphericity was high .000, which is also an acceptable value to conclude there are appropriate correlations in the data set suitable for conducting a factor analysis (Qi, Shen, & Dou, 2015). Most of the communalities' extractions were above .7, which is an

acceptable level to meet the Eigenvalue criteria in the communalities table (Mertler & Vannatta, 2013).

Table 3

Pattern Matrix: Factor Extraction and Rotation

	Factor			
	PAS	VL	SP	ME
Physiological and affective states Item 18	.965			
Physiological and affective states Item 17	.934			
Physiological and affective states Item 19	.794			
Physiological and affective states Item 20	.738			
Vicarious Learning Item 7		.917		
Vicarious Learning Item 6		.872		
Social Persuasion Item 12			.951	
Social Persuasion Item 11			.637	
Mastery Experience Item 5				.962
Mastery Experience Item 4				.520

Note. Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.

In order to decide which factors to retain, the eigenvalue in the table describing total variance was examined. In other words, three of the four extracted factors exceeded 1.0 (3.1, 2.6, 1.3), and only one had less than 1.0 (.60). It seemed reasonable to retain

just three factors at this point, but all four factors were retained. The decision to retain four factors was based on the Promax rotation method, which yielded factors that appeared to be more evenly distributed (3.1, 2.9, 2.8, and 2.9).

Factor solution produced four factors, as clearly observed in Table 3. What is more, Table 3 presents the loadings for each factor, which are high enough to be considered convergent. Convergence means that loadings load high on each factor when averaged to .7, which all factors do (Rummel, 1988). After factor analysis was conducted, the overall reliability of the SSES instrument was .83. To emphasize, "The scientific community views values of Cronbach Alpha above .80 as acceptable and reliable" (Weiner & Craighead, 2010, p. 1449).

Prior to analyzing the research questions of this study, the participants' scores on the SSES and the sources of self-efficacy subscales were averaged to answer the first and the second research questions (Bandura, 1997). Gain scores of the sources of self-efficacy were computed to answer the third research question (Bonate, 2000; Mertler & Vannatta, 2013). The research questions are discussed in two steps. First, descriptive statistics are provided for each research question. Second, inferential statistics which were performed to test the hypotheses are then discussed.

Research Question Analysis

The three research questions in this study were quantitative and warranted a statistical analysis that was both descriptive and inferential. All statistical analyses were carried out at an alpha level of 0.05, which is a frequently reported statistical level in many studies (Bluman, 2010; Fraenkel et al., 2014). The analyses are reported next question by question.

Findings from research question 1. What difference exists, if any, in the strength of perceived self-efficacy in nursing students before and after engaging in the medical surgical simulation activities?

To answer research question one, the mean score of self-efficacy strength for each participant or case was computed in SPSS (Bandura, 1997). Then, efficacy strength scores were summed and divided by the total number of items to indicate the strength of the perceived self-efficacy (Bandura, 1997). The pretest and posttest descriptive statistics are shown in Table 4.

Table 4

Pre and Post Perceived Self-Efficacy Strength Scores

	N	*M*	*SE*	*SD*
Pre strength	49	80.58	1.61	11.30
Post strength	49	79.63	1.82	12.76

Note. Descriptive statistics of both the pretest and the posttest assessments of perceived self-efficacy strength before and after engaging in medical surgical simulations.

To conclude whether there is a statistically significant difference between the pretest and posttest means of perceived self-efficacy strength, a two-tailed paired samples *t*-test was conducted in SPSS. A mean score of 0.48 with a standard deviation of 11.61 was obtained. The results of the *t*-test garnered a score of 0.29 at $p = 0.76$ indicating no statistically significant difference between the pretest and posttest means of perceived self-efficacy strength. Therefore, the null hypothesis of equal strength was not rejected.

Findings from research question 2. What difference exists, if any, in the scores of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities?

The null hypothesis expressed there was no statistically significant difference in the scores or means of sources of perceived self-efficacy of nursing students before and after engaging in the medical surgical simulation center activities. The descriptive statistics are mentioned first for all four sources of perceived self-efficacy (see Table 5). Second, the inferential statistics are presented.

Table 5

Pre and Post Sources of Perceived Self-Efficacy Scores

Pairs		*M*	*N*	*SD*
Pair 1	MEPR	78.57	49	14.21
	MEPO	85.51	49	10.56
Pair 2	VLPR	87.14	49	12.45
	VLPO	88.57	49	12.54
Pair 3	SPPR	91.12	49	7.51
	SPPO	89.69	49	11.10
Pair 4	PASPR	71.88	49	21.25
	PASPO	67.19	49	25.51

Note. The acronyms represent pretest and posttest scores of mastery experience, vicarious learning, social persuasion, and physiological and affective states.

Mastery experience. To determine if there was a statistically significant difference between the pretest and posttest means of mastery experience, a two-tailed paired samples *t*-test was run in SPSS. This test generated a mean score of 6.93 with a standard deviation of 14.24. The results of the paired samples *t*-test yielded a score of 3.41 at a *p*-value of 0.001 indicating a highly statistically significant difference between the pretest and posttest means of mastery experience. Therefore, the null hypothesis was rejected.

Vicarious learning. To verify the statistical significant difference between the pretest and posttest means of vicarious learning, a two-tailed paired samples *t*-test was run in SPSS. This test was used to analyze the data, and a mean score of 1.42 with a standard deviation of 12.24 was obtained. The results of the *t*-test yielded a score of 0.81 at $p = 0.41$ revealing no statistically significant difference between the pretest and posttest means of vicarious learning. Therefore, the null hypothesis was not rejected.

Social persuasion. A paired samples *t*-test was performed in SPSS to reveal whether there was statistically significant difference between the pretest and posttest means of social persuasion. A two-tailed paired samples *t*-test was used to analyze the data, and a mean score of 1.42 with a standard deviation of 11.03 was obtained. The results of the *t*-test yielded a score of 0.90 at $p = 0.37$ revealing no statistically significant difference between the pretest and posttest means of social persuasion. Therefore, the null hypothesis was not rejected.

Physiological and affective states. A two-tailed paired samples *t*-test was also used to determine if there was a statistically significant difference in the pretest and posttest means of physiological and affective states. This test helped calculate a mean

score of 4.69 with a standard deviation of 23.32. The results of the *t*-test yielded a score of 1.40 at $p = 0.16$ revealing no statistically significant difference between the pretest and posttest means of social persuasion. Therefore, the null hypothesis was not rejected.

Findings from research question 3. Are there significant mean differences for each of the four sources of self-efficacy by age category among students and by educational level of students?

The goal of the third research question was to assess if means of the dependent variables or sources of self-efficacy are significantly different among groups of the independent variables of age and educational levels of nursing students (Green & Salkind, 2013). The statistical analysis method used to analyze the third research question was a one-way analysis of variance (ANOVA). The ANOVA technique requires three assumptions to be satisfied (Green & Salkind, 2013). First, the dependent variable must be normally distributed for each of the samples as defined by the levels of the independent variable (Green & Salkind, 2013). Normality assumption of the data was met to conduct an ANOVA. Second, the variances of the dependent variable need to be similar across the samples, because the validity of the results becomes questionable when unequal variances exist (Green & Salkind, 2013). Variances assumption is discussed for each dependent variable in the subsequent sections. The third assumption concerns independence of cases that should be randomly selected from the population. This assumption was not met, because only a convenience sampling method was used in this study (Green & Salkind, 2013).

The reason behind choosing a one-way ANOVA for the third research question was contingent upon the number of the categories of the independent variables

investigated in this study (Green & Salkind, 2013). At least two categories should be available in each independent variable to conduct an ANOVA (Green & Salkind, 2013). To determine if there are any mean differences among age groups and to check for mean differences between educational level categories, a one-way ANOVA was selected to analyze the third research question.

It is also noteworthy the independent variable of gender was dropped from all data analyses in this study because 82 % the participants were females. A group comparison based on gender would have been biased if this variable was included in the analysis; "a one-way analysis of variance on gender is heavily influenced by the difference in sample sizes" (Osborne, 2008, p. 348). Additionally, the age variable initially contained four levels: 18-29, 30-39, 40-49, and 50+. However, the 50+ level was automatically dropped from the ANOVA analyses since it was the only existing case representing one group in the whole dataset. Robust tests of equality of means cannot be performed in SPSS for the dependent variables when one group has the sum of case weights less than or equal to 1.

Due to unequal sample size and the small numbers of observations, participants with bachelor's and graduate degrees were not included in the analysis. The next sections comprise multiple one-way ANOVAs; that is, two one-way ANOVAs were conducted for each dependent variable or source of self-efficacy. Exploratory analyses including descriptive statistics are presented first, followed by inferential statistics for each dependent variable. The gain scores of the dependent variables, or sources of self-efficacy, were used in the ANOVA.

Age and mastery experience. A one-way analysis of variance was conducted to evaluate whether the age group mean scores on mastery experience differ significantly from each other (Mertler & Vannatta, 2013). Descriptive statistics associated with mastery experience's gain score are reported in Table 6. It can be noticed the age group of 30-39 is associated with the numerically lowest mean of mastery experience (M = 4.16), while the 40-49 age group is associated with the highest mean of mastery experience (M = 14.12).

The assumption of homogeneity of variances was examined and satisfied based on the Levene's F test, F (2, 45) = 0.009, p = 0.99. The p-value has to be above 0.05 to indicate homogeneity of variance is not violated (Hinton et al., 2014). The between-groups ANOVA revealed the overall F test was not significant at a p = 0.34, indicating mastery experience mean scores among groups were equal. Therefore, the null hypothesis of no mean differences for age groups was not rejected.

Educational level and mastery experience. An ANOVA was performed to evaluate whether the educational level group means on mastery experience differ significantly from each other. Descriptive statistics of the educational level linked to mastery experience mean scores are reported in Table 6. It can be seen the educational level of high school had a statistically lower mean of mastery experience (M = 9.58) than the junior college mean of mastery experience (M = 6.66).

In order to determine if the educational level groups had significant mean differences on mastery experience, a between-groups one-way ANOVA was conducted (Mertler & Vannatta, 2013). The assumption of homogeneity of variances was examined and found to be not satisfied based on the Levene's F test, F(2, 42) = 7.32, p = 0.01. This

assumption was violated since the *p*-value was below 0.05. For this reason, robust tests for equality of means procedure were conducted in SPSS.

The Brown-Forsythe procedure (*F*= 0.24, *df = 1, df2* = 14.47, *p* = 0.62*)* and the Welch procedure (*F* = 0.24, *df =1, df2* = 14.47, *p* = 0.62) were run in SPSS, and they both indicated non-statistically significant results. Therefore, the group variances were equal, providing support homogeneity of variances assumption was met. The between-groups ANOVA yielded a *p*-value of 0.54, reflecting mastery experience's mean scores among groups were equal. Therefore, the null hypothesis of no mean differences for the educational level groups was not rejected.

Age and vicarious learning. To find out whether scores on vicarious learning differ significantly from each other based on the variable of age (Mertler & Vannatta, 2013), an ANOVA was chosen. Descriptive statistics of vicarious learning are included in Table 6. The age group of 18-29 recorded the numerically highest mean of vicarious learning (*M* = 3.63), while the 40-49 age group was linked with the lowest mean of vicarious learning (*M* = -1.87). The assumption of homogeneity of variances was also examined and met.

The *F* value for Levene's test was 0.63 with a *p*-value of 0.43 (> 0.05). The between-groups ANOVA showed the overall *F* test was not significant at a *p*-value of 0.67. This indicated vicarious learning experience mean scores among groups were not distinct. Thus, the null hypothesis of no mean differences for age groups was not rejected.

Educational level and vicarious learning. The variable of educational level was analyzed statistically to determine whether group scores on vicarious learning differ

significantly from each other. To do this, an ANOVA was performed in SPSS (Mertler & Vannatta, 2013). Descriptive statistics of vicarious learning are included in Table 6. The mean score of high school students was numerically higher (*M* = 3.33*)* than junior college students' mean on vicarious learning (*M*= 1.56).

The assumption of homogeneity of variances was also explored using SPSS, and it was satisfied based on the results of the Levene's *F* test: $F(1, 42) = 0.63$, $p = 0.43$. A between-groups ANOVA was run on SPSS and showed the overall *F* test was not significant at a *p*-value of 0.67. This indicated vicarious learning experience mean scores among groups were not dissimilar. As a result, the null hypothesis of no mean differences for the educational level groups was not rejected.

Age and social persuasion. A one-way ANOVA was performed in SPSS to assess whether the age group mean scores on social persuasion differ significantly from each other (Mertler & Vannatta, 2013). Descriptive statistics linked to social persuasion variable are reported in Table 6. It can be noted the age group of 18-29 had the highest mean on social persuasion (*M* = 0.68), while the 40-49 age group was associated with the lowest mean of (*M* = -9.37). The results of the Levene's *F* test, $F(2, 45) = 4.80$, $p = 0.01$ showed the homogeneity of variances was violated. However, the Brown-Forsythe procedure (*F*= 1.60, *df* = 2, *df2* = 11.35, *p* = 0.24) and the Welch procedure (*F*= 1.04, *df* =2, *df2*=16.29, *p* = 0.37) were run in SPSS, and they both indicated non-statistically significant results. In addition, the between-groups ANOVA showed the overall *F* test was not significant at a *p*-value of 0.08. This means social persuasion scores among age groups were not distinct. Therefore, the null hypothesis of no mean differences for age groups was not rejected.

Table 6

Descriptive Statistics for Self-Efficacy Sources Across Age and Educational Level Groups

Source of Self-Efficacy	Age/EL	Gain Score	*SD*
Mastery Experience			
	18-29	6.81	13.67
	30-39	4.16	14.87
	40-49	13.12	15.10
	High School	9.58	19.70
	Junior College	6.56	12.53
Vicarious Learning			
	18-29	3.63	12.45
	30-39	0.27	13.00
	40-49	-1.87	10.99
	High School	3.33	12.49
	Junior College	1.56	12.07
Social Persuasion			
	18-29	0.68	7.91
	30-39	-0.55	9.05
	40-49	-9.37	18.98
	High School	0.00	13.31
	Junior College	-1.71	10.59
Physiological and Affective States			
	18-29	-10.56	24.75
	30-39	1.80	17.42
	40-49	-2.50	30.44
	High School	2.91	24.39
	Junior College	-7.89	23.03

Note. Gain is the difference between the posttest and the pretest scores. EL is the educational level.

Educational level and social persuasion. A one-way ANOVA was performed in SPSS to assess whether the educational level group means on social persuasion differ significantly from each other (Mertler & Vannatta, 2013). Descriptive statistics of the social persuasion variable are detailed in Table 6. It can be noted the high school students group had a higher mean (M = 0.00) on social persuasion than the junior college group of students who were associated with a slightly lower mean (M = -1.71).

The results of the Levene's F test, $F(1, 42) = 1.21$, $p = 0.73$ confirmed the homogeneity of variances was not violated. Above all, the between-groups ANOVA showed the overall F test is not significant at a p-value of 0.65. This means social persuasion scores among groups were not distinct. Therefore, the null hypothesis of no mean differences for educational level groups was not rejected.

Age and physiological and affective states. To find out if means on physiological and affective states differ significantly from each other based on the variable of age (Mertler & Vannatta, 2013), a one-way ANOVA was selected. Descriptive statistics of physiological and affective states are included in Table 6. The age group of 30-39 recorded the numerically highest mean on physiological and affective states (M = 1.80), while the 18-29 age group was linked with the lowest mean of physiological and affective states (M = -10.56).

The assumption of homogeneity of variances was also examined and met according to the results of the Levene's F test, $F(2, 40) = 4.56$, $p = 0.63$. The between-groups ANOVA showed the F test was not significant at a p-value of 0.56. This means physiological and affective states experience mean scores among groups were not

distinct. Thus, the null hypothesis of no mean differences for age groups was not rejected.

Educational level and physiological and affective states. A one-way ANOVA was selected to find out if means on physiological and affective states differ significantly from each other based on the variable of the educational level (Mertler & Vannatta, 2013). Descriptive statistics of physiological and affective states are included in Table 6. The mean scores for high school students and junior college students were $M = 2.91$ and $M = -7.89$, respectively.

The assumption of homogeneity of variances was met according to the following results of the Levene's F test: $F(1, 42) = 0.09$, $p = 0.75$. The between-groups ANOVA showed the F test was not significant at a p-value of 0.18. This means physiological and affective states mean scores among groups were not different. Thus, the null hypothesis of no mean differences for the educational level groups was not rejected.

Summary

The main purpose of this study was to address the need for research of simulation and self-efficacy in practical nursing education. The analysis of the data culminated in two outcomes. First, a simulation self-efficacy survey was developed using a factor analysis to ensure the validity and the reliability of the SSES instrument is met. The final survey consisted of 10 items (see Appendix F). Second, research questions were analyzed quantitatively using paired samples t-tests for research questions one and two, and one-way ANOVAs for research question three. For each research question, exploratory and descriptive statistics were provided. Then, inferential statistics were employed to investigate the hypotheses of the study.

Research question one revealed no statistically significant difference or change in students' self-efficacy, but the overall means for both the pretest and posttest results indicated a strong self-efficacy among practical nursing students. Research question two yielded significant differences between pretest and posttest results of mastery experience indicating an overall increase in students' use of mastery experience as a source of information to build their self-efficacy. There were no statistically significant differences for social persuasion, vicarious learning, and physiological and affective states, although the high scores on both the pretest and posttest surveys indicated students' continuation to rely on these sources to build their self-efficacy.

Multiple one-way ANOVAs were used to investigate the differences among groups' means of the independent variables of age and educational levels when relying on the four sources of self-efficacy. All null hypotheses were not rejected, suggesting no differences in the means of the groups of age and the groups of educational levels on the sources of self-efficacy. Observing descriptive statistics suggested both an increase and decrease in students' use of the four sources of self-efficacy based on age and educational levels, but inferential statistics determined no statistically significant differences in the groups' means. That is to say, regardless of age or educational level differences, students tended to score similarly on all four sources of self-efficacy.

In Chapter Five, conclusions and implications of the study's results are presented. Specifically, recommendations to conduct further studies in the field of simulation and self-efficacy are made. The researcher also specifies how the research results might help nursing leaders, instructors, and students focus on self-efficacy in the field of nursing

education to achieve academic and professional goals in nursing. What is more, suggestions to modify the research design as well as the data collection methods in this study are offered.

Chapter Five: Conclusions and Recommendations

The change in students' perceptions about self-efficacy was the focal point of this study. The goal of this study was to determine if self-efficacy strength in practical nursing students is different before and after engaging in medical surgical simulations. Another goal of the study was to investigate students' use of sources of self-efficacy (Bandura, 1986) when engaging in medical surgical simulations (Patten, 2013; Salkind, 2010; Thyer, 2009). The ages and educational levels of the practical nursing students were also explored to have a better understanding if differences in the use of the sources of self-efficacy were based on demographic variables. In this chapter, these goals are detailed in light of the findings that emerged from the statistical analysis of the three research questions.

In Chapter Five, a review of the study's main points is included followed by a brief description of the results detailed in Chapter Four. Then, conclusions drawn from the study results are presented, supported by previous research findings which either affirm or provide an opposing perspective to the evidence found in this study. The final sections of this chapter include implications for practice and recommendations for future research. The section on implications emphasizes suggestions for the practical nursing education domain. The section on future research includes recommendations based on gaps in nursing education and the results of this study.

Review of the Study

It is crucial to reemphasize there is a lack of research on medical surgical simulation in regards to self-efficacy change and development in the practical nursing field, and this domain has not been given enough attention (American Sentinel

University, 2012). The theory of self-efficacy was chosen as a guiding framework for this study in order to further the understanding of practical nursing students' beliefs in the ability to engage in medical surgical simulations. The self-efficacy variable was also selected, because it helps predict the problem of student attrition (DeWitz et al., 2009). In other words, being aware of personal capabilities and acting upon confident beliefs can improve student retention in nursing education and in the profession of nursing (DeWitz et al., 2009; Jeffreys, 2012; Lourens, 2014; Raelin et al., 2014).

In order to measure students' perceptions of their abilities to execute medical surgical simulations, a pre-experimental quantitative research method was selected for this study (Creswell, 2013). All students participated in the same medical surgical simulations in the spring semester of 2015 at a Midwestern community college. The one-group pretest-posttest design (Creswell, 2013) was used to determine if differences exist in the scores of self-efficacy strength as well as in the scores of the sources of self-efficacy among practical nursing students (Grove et al., 2012).

The use of a convenience sampling method was important, because practical nursing students were obtainable to participate in this study (Phillips et al., 2013). What is more, convenience sampling was appropriate and acceptable for a practical nursing program that contains a limited number of students (Phillips et al., 2013). Data collection was executed at the beginning and at the conclusion of the 2015 spring semester. Sixty students participated, but only 50 students completed the pretest and posttest surveys, which is an 83% total response rate. In addition, the SSES was used to collect and analyze the data. The use of factor analysis helped reduce the number of items on the survey resulting in a 10-item instrument (Mertler & Vannatta, 2013). The analysis of the

instrument's results was obtained with the use of SPSS software. Paired samples *t*-tests and one-way ANOVAs were the main statistical analyses implemented to answer the research questions. Both descriptive and inferential statistics were offered in Chapter Four.

Findings

The first research question was explored using descriptive and inferential statistics. The paired samples *t*-test showed no significant differences between the pretest mean (M=80.58) and the posttest mean (M=79.63) of perceived self-efficacy strength. The *p*-value obtained was 0.76, which did not reach the .05 probability level of being statistically significant.

The second research question was posed to inquire if a significant difference existed in the means of the pretest and posttest mean scores of self-efficacy sources. Only one source of self-efficacy, mastery experience, was revealed to have a significant difference between the pretest and posttest means at a *p*-value of 0.001. The remaining three sources (vicarious learning, social persuasion, and physiological and affective states) showed no significant mean differences with *p*-values at 0.41, 0.37, and 0.16, respectively.

The third research question aimed at discerning mean differences among the levels or groups of each independent variable of age and educational level on each dependent variable or source of self-efficacy. An ANOVA statistical technique (Green & Salkind, 2013; Mertler & Vannatta, 2013) was performed, and no significant differences among the groups of age and among the groups of educational level on mastery

experience, vicarious learning, social persuasion, and physiological and affective states were found to be statistically significant with α set at 0.05.

Conclusions

Conclusions made in this section are based on assumptions underlying all statistical techniques (Green & Salkind, 2013). These statistical assumptions will be briefly discussed for every statistical test run in this study before stating the results (Green & Salkind, 2013). As discussed in Chapter Three, the use of convenience sampling is not encouraged when conducting a study (Creswell, 2013; Fraenkel et al., 2014; Phillips et al., 2013). However, convenience sampling is sometimes the only option available to the researcher when it is extremely difficult to select a random sample (Wallen & Fraenkel, 2011). Conclusions are made to represent mainly the students at this Midwestern community college and possibly students at other Midwestern community colleges with the same demographic characteristics analyzed in this study.

RQ1. The results of research question one indicated no significant difference in students' perceived self-efficacy strength before and after engaging in medical surgical simulations. According to Creswell (2013), the one-group pretest-posttest approach is a pre-measurement pursued by a treatment and then a post-measurement for that group. The paired samples *t*-test compared the means of both tests, and it was concluded no change occurred from the pretest to the posttest (Bonate, 2000; Dimitrov & Rumrill, 2003; Le Blanc et al., 2013). Before conducting the two-tailed paired samples *t*-test, statistical assumptions were met to avoid bias and to make valid conclusions about the results (Mertler & Vannatta, 2013). The dependent variable of self-efficacy strength was

measured on a continuous scale, and scores of the sample were normally distributed and independent from each other (Green & Salkind, 2013).

It was hypothesized in this study that student scores were going to be distinct between the pretest and posttest time intervals, but the researcher saw no shift or change in mean scores of self-efficacy strength based on a *p*-value result that was greater than 0.05. The time interval between the beginning and the end of the spring semester did not have an effect on the change of students' perceptions of their abilities to engage in medical surgical simulations.

Conversely, self-efficacy of a college student can change over time. Previous studies revealed change in self-efficacy strength is plausible because students are constantly learning new skills, interacting with teachers, motivating themselves, and attempting to perform better academically (Le Blanc et al., 2013; Katz, 2015; Riconscente, 2014; Wernersbach et al., 2014; Williams, 2010). Such change is linked to increases and decreases in knowledge, motivation, and behavior (Le Blanc et al., 2013).

Most importantly, even though the *p*-value of 0.76 did not indicate a statistically significant difference between the pretest and posttest measures of perceived self-efficacy strength, mean scores of both measurements showed students had strong perceptions of their abilities before and after engaging in medical surgical simulations, which means students continued to confidently believe they are able to do well in medical surgical simulations despite the academic challenges (Bandura, 1977; Betz, 2004). This is an important finding because none of the students scored below 50; a score of 50 represents moderate self-efficacy. Figure 4 compares the pretest and posttest scores.

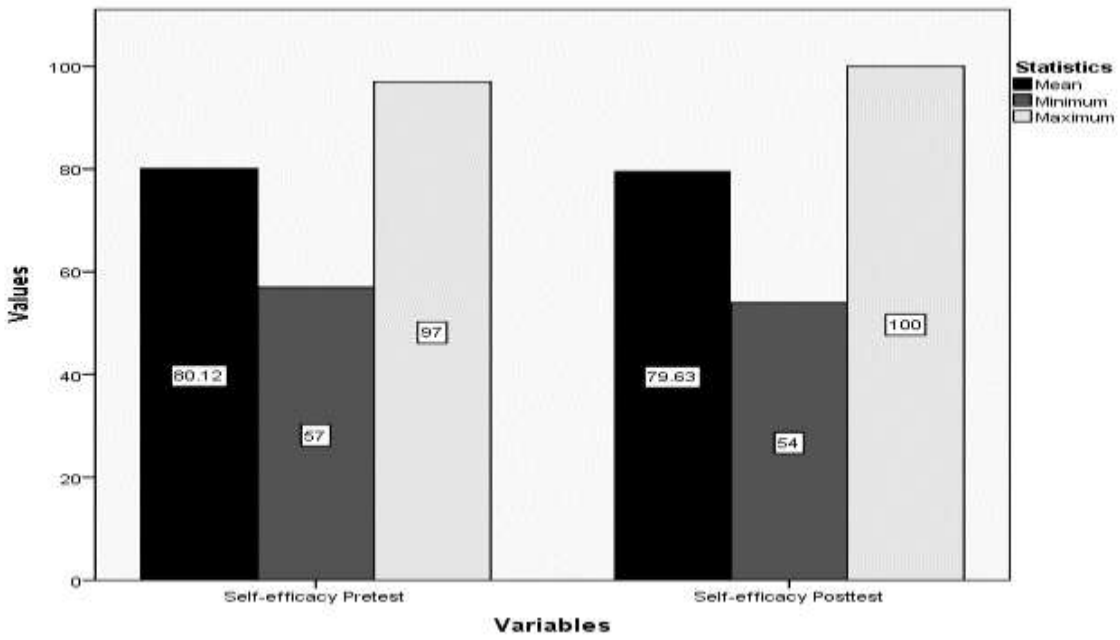

Figure 4. The pretest and posttest self-efficacy mean, minimum, and maximum scores.

Bandura (2006) pointed out perceived self-efficacy differs in strength. Weak self-efficacy perceptions are annulled by unsettled encounters, while strong self-efficacy is the attribute of perseverant people who will persist in their struggles in spite of the challenges (Bandura, 2006). The results of survey items four and five reflected this tenacious behavior in nursing students. That is, students were confident to adequately handle medical surgical simulations based on past successful experiences. In addition, students also perceived persistence as crucial when they are challenged and rapidly recover from obstacles they face in the medical surgical simulations. Bandura (2006) corroborated, "The stronger the sense of personal efficacy, however, the greater the perseverance and the higher the likelihood that the chosen activity will be performed successfully" (p. 314).

RQ2. Research question two's analysis focused on determining the difference in means between pretest and posttest sources of self-efficacy (Bandura, 1986). A lack of studies investigating the sources developing or hindering nursing students' self-efficacy was a sound reason to explore those sources (Chesser-Smyth & Long, 2013; Gloudemans et al., 2013). Before examining each source of self-efficacy, it is worth mentioning the statistical analysis employed to answer the second research question was based on important assumptions. That is, each dependent variable or source of self-efficacy was measured on a continuous subscale, and scores of the sample were normally distributed and independent from each other (Green & Salkind, 2013). A paired samples *t*-test was run to analyze the four sources of mastery experience, vicarious learning, social persuasion, and physiological and affective states.

Mastery experience. Mastery experience was the only source and variable among the four sources of self-efficacy to yield statistically significant results (*p*-value = 0.001). Put differently, the mean scores of mastery experience were distinct, and a mean difference score was recorded at 6.93. Pretest mastery experience mean score was 78.57, but the posttest score was 85.51. The difference between pretest and posttest mastery experience means insinuated the change in mean scores was likely not due to chance (Nestor & Schutt, 2014).

The increase in mastery experience mean score suggests students realized the importance of mastery experience as an effective and strong source of information to perform better in future medical surgical simulations (Keating, 2014). This reliance can be justified by the students' need to seek the most practical information to be able to manage new situations (Arslan, 2013). It is possible practical nursing students' past

successful experiences in medical surgical simulations helped increase the strength of their self-efficacy (Arslan, 2013).

If practical nursing students had undergone disconfirming experiences in medical surgical simulation between the pretest and the posttest, their reliance on mastery experience could have been decreased, which was not the case here. The overall increase in mastery experience score implies students were tenacious, persistent, capable, and confident in handling medical surgical tasks after engaging in medical surgical simulations, which helped them build a stronger sense of self-efficacy (Pike & O'Donnell, 2010; Sinclair & Ferguson, 2009).

Successes in the simulation activities developed a resilient belief in nursing students' personal efficacy (Bandura, 1994). What is more, mastery experience is the strongest predictor of self-efficacy development when compared to the other three sources (Wise & Trunnell, 2001). In fact, the most valuable way of creating a strong perceived self-efficacy is via mastery experiences (Bandura, 1994).

Vicarious learning. The vicarious learning subscale was also analyzed. Vicarious learning mean scores were not statistically different based on the pretest and posttest results. The paired samples *t*-test did not detect a change in students' use of vicarious learning based on the *p*-value that was higher than 0.05. However, the pretest mean score of 87.14 and the posttest mean score of 88.57 were high enough to imply students did perceive this source to be important to rely on when building self-efficacy.

The practical nursing students at the community college in the study did not seem to be influenced by the failures of others, but rather attempted to observe and imitate the successes of their peers and teachers. The practical nurses in this study compared their

capabilities to other students and to the teachers' abilities (Arslan, 2013; Bandura, 1994, 1997). Moreover, the participants in this study initially scored highly on vicarious learning. A score above 50 indicates students are confident to imitate their peers and teachers to be able to perform at a high level when engaging in medical surgical simulations.

Warner et al. (2011) found students who observe their models perform tasks successfully tend to have strong and high efficacy beliefs. Vicarious learning is a strong source influencing students' self-efficacy (Bandura, 1986; Lambie et al., 2014; Luckin et al., 2013). In this study, students reported higher scores on vicarious learning, which could also be justified by the effective leadership of the instructional faculty members who were perceived as models for the students to observe and mimic (Lambie et al., 2014; Lambie & Vaccaro, 2011).

Social persuasion. Social persuasion is another important source of efficacy beliefs analyzed. Lack of statistical significance; that is, $\alpha > 0.05$ was also a reason to not reject the null hypothesis of social persuasion's equal means. The paired samples *t*-test yielded a pretest and posttest social persuasion mean score of 1.42. Although this mean score denoted a difference, the paired samples *t*-test *p*-value confirmed that the difference was likely due to chance (Nestor & Schutt, 2014; Tavakoli, 2013).

To emphasize, the pretest and posttest mean scores of 89.69 and 91.12 conveyed practical nursing students' perception that social persuasion is a vital source to build their self-efficacy. The high scores of the pretest and the posttest social persuasion means were obtained by asking the students to report how certain they are in learning nursing skills through the teachers' feedback and through the evaluation of their performance in

the medical surgical simulations. Practical nursing students in this study were also requested to rate how certain they are to perform the medical surgical simulations based on peers' and teachers' positive appraisals of their capabilities.

The vicarious learning scores are not between 0 and 50 to conclude social persuasion is a weak source of self-efficacy. Instead, an initial mean score of 89.69 and a final mean score of 91.12 might be a sign of strong social persuasion, which means students possessed a strong belief in their ability to engage in medical surgical simulations when benefiting from teachers' and peers' encouragement and constructive feedback before the study ever began. The lack of significant change at the high levels obtained on the pretests and posttests was not indicative of vicarious learning not being an important source; rather, the already high mean scores could denote the value in this source. This finding is in line with the literature on the positive role social persuasion plays in building strong self-efficacy (Arslan, 2012; Bandura, 1986; Cato, 2013; Crider & McNiesh, 2011; Kaddoura, 2010; Pajares, 2002; Riconscente, 2014; Williams, 2010).

Physiological and affective states. The fourth source of self-efficacy, physiological and affective states, was also analyzed using a paired samples *t*-test. Although there was a drop in the mean scores of physiological and affective states, there was no statistically significant difference between the pretest and post means, $p = 0.16$. However, the mean scores of both pretest 71.88 and posttest 67.19 of physiological and affective states were not below the score of 50, which indicates a moderate to strong score for physiological and affective states despite the decrease in the mean score of the posttest.

The mean scores of physiological and affective states were the lowest scores compared to all other three sources mentioned earlier. This means students relied less on this source to build their self-efficacy, but their confidence to manage aching, moodiness, stress, and anxiety when engaging in medical surgical simulation was still somewhat strong. Since the change in the mean score was probably due to chance, it is not conclusive to claim such decrease was due to medical surgical simulations especially in that the change was not statistically significant. In addition, the participants of this study were not randomly sampled or were part of a true experimental study.

Despite the absence of statistically significant difference in the mean scores, the source of physiological and affective states was worth analysis because nursing students do experience stress and anxiety (Pajares, 2002). A nursing student who is nervous about executing an action might feel more stressed. Emotional distress and anxiety can weaken confidence in the ability to complete required tasks (Jeffreys, 2012; Larsen & Zahner, 2011; Pajares, 2002). The literature emphasizes strong management of stress depends on the environment where the student functions (Arslan, 2013; Jeffreys, 2012). An environment loaded with stressful tasks negatively influences self-efficacy (Arslan, 2013; Bandura, 1994).

One way to know if students are distressed or anxious is to observe their physical symptoms, such as raised pulse rate and sweating (Jeffreys, 2012). These symptoms are usually signs to watch for when students engage in medical or clinical tasks (Jeffreys, 2012). Appropriately challenging students and calming students who experience high amounts of stress and anxiety can increase student performance, motivation, retention,

persistence, and learning (Bandura, 1997; Brown, 1999; Jeffreys, 2012; Morrissey & Callaghan, 2011).

Mastery experience was the only source of self-efficacy that showed a statistically significant difference between the pretest and posttest means. The mean scores of vicarious learning, social persuasion, and physiological and affective states were descriptively different but not inferentially. For example, line number one in Figure 5 refers to mastery experience, which clearly shows a significant increase in mastery experience mean score towards the conclusion of the spring semester.

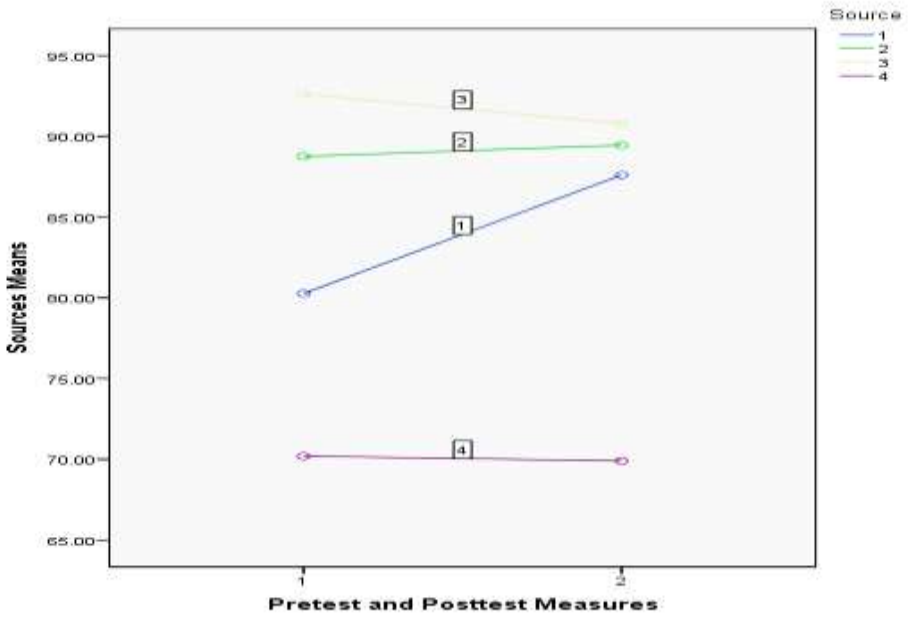

Figure 5. The change in the use of self-efficacy sources. Mastery experience: Line 1; Vicarious Learning: Line 2; Social Persuasion: Line 3; Physiological and affective states: Line 4.

RQ 3. Using an ANOVA, no differences among the groups of age and the groups of educational level for mastery experience, vicarious learning, social persuasion, and physiological and affective states were found to be statistically significant at an alpha level of 0.05. In other words, the difference in age or educational level of the nursing

student did not have any influence on the use of sources of self-efficacy. Generally, the gain scores of mastery experience source were high among all age groups and educational level groups, followed by vicarious learning and social persuasion gain scores. Physiological and affective states gain scores were the lowest. These gain scores confirmed the finding from the first research question that the statistically significant increase in students' use of mastery experience builds their self-efficacy regardless of the differences in age or educational level groups.

The researcher expected to see a difference among the groups of age and educational level to understand the use of each source of self-efficacy, but the analysis showed no statistically significant differences between groups, which was probably due to the small sample size of practical nursing students (Gall et al., 2006). What is more, statistical significance is influenced by statistical power, which refers to the likelihood that a specific test of statistical significance will guide the researcher towards rejecting the false null hypothesis (Gall et al., 2006). Statistical power increases with larger sample sizes while taking into consideration the influence of other factors including the level of significance, directionality, and effect size on statistical power (Gall et al., 2006).

According to Jeffreys (2012), the enrollment of older nursing students, over 27 years old, has grown in the United States in the last 10 years and such increases in enrollment will continue in the near future. For this reason, age as a variable in nursing education is a predictor for graduation, persistence, and performance (Jeffreys, 2012). However, older students have been stereotyped as incompetent and not able to perform at the level of traditional students, who are perceived to be better at meeting the challenges of higher education (Richardson, 1995). This current study found different results. There

was no difference in using the sources of information to build self-efficacy among younger and older students. The equal means of sources of self-efficacy based on age in this study suggest practical nursing students have the same capabilities in meeting the nursing academic requirements regardless of their age differences (Jeffreys, 2012).

Furthermore, nursing students should not be labeled as homogenous based on their age group only (Jeffreys, 2012). While the results of this study did not reveal any difference among age groups, nurse educators should evaluate all demographic variables to assess nursing students' self-efficacy, persistence, and retention (Jeffreys, 2012). There are mixed results on how the differences between age groups influence the persistence and performance of students (DeFelice, 1989; Manifold & Rambur, 2001; Murtaugh, Burns, & Schuster, 1999), and this is why it is important to study as many student profile characteristics as possible to make sense of student retention (Jeffreys, 2012).

Jeffreys (2012) wrote nursing literature has appraised the importance of a student's prior education, which can contribute to better performance for nursing students. Prior educational experience is a predictor of student retention, because students who attend college courses before enrolling in a nursing program are more familiar with college requirements (Jeffreys, 2012; Scott, Burns, & Cooney, 1998). In this study, the majority of students (66.67 %) had junior college experience before enrolling in the nursing program, but no differences were discerned between high school and junior college levels in regards to students' use of sources of self-efficacy. Students seemed to score positively and similarly on those sources. Nevertheless, it can be generalized predictors such as previous college degrees, grades, certificates, and other

required documents should be scrutinized in the application screening process of nursing students, although there have been studies pointing out there are other predictors of student retention (Jeffreys, 2012). For example, discrimination, lack of teacher expectations, discouragement of peers, and poor secondary school programs negatively affect nursing student success (Jeffreys, 2012; Vaquera & Maestas, 2009).

In addition to students' personal demographics, the psychosocial characteristics including critical thinking ability, self-determination, self-efficacy, and stress have to be considered to retain nursing students (Smith, Carpenter, & Fitzpatrick, 2015). The third research question attempted to tap the differences between age groups and educational groups to explore how students depend on the sources of self-efficacy. High mean scores reflected students' reliance on all sources of self-efficacy. That is to say, students persevered and persisted to succeed, relied on their mentors and teachers, modeled their instructors, and managed their physiological states and stress and anxiety when engaged in medical surgical simulations. All of these behaviors predict student success, reduce attrition, and contribute to higher retention rates (Smith et al., 2015).

Implications for Practice

The implications in this study are numerous. There are theory implications, instrumentation implications, and implications for the field of nursing education based on the findings of this study. The theory of self-efficacy was beneficial in understanding how students believe in their abilities to engage in medical surgical simulations. Many demographic, academic, and curricular variables that add to the success of a nursing student have been investigated in literature, but self-efficacy theory has not been

researched or applied sufficiently in the field of practical nursing to understand attrition and predict student success (Jeffreys, 2012; Smith et al., 2015).

Bandura (2006) and Jeffreys (2012) emphasized the use and development of instruments that measure the variable of self-efficacy can help educators assess student success and retention. Based on pretest and posttest scores of self-efficacy in this study, practical nursing students demonstrated resilient and efficacious behavior. A self-efficacious student is not discouraged by occasional failure, but is determined to prove that such failure is only a minor setback and will do his or her best to achieve better results in future tasks (Jeffreys, 2012).

Demonstrating a commitment to overcome challenges is what differentiates strong self-efficacy from weak self-efficacy. Bandura (1986) and Pajares (2002) highlighted an efficacious student models others who are perceived to be competent and efficient. In addition, self-efficacy can also be strengthened by encouragement and constructive feedback, which the participants of this study seemed to rely on to perform well in the medical surgical simulations.

An efficacious student is equipped to handle stress and is not negatively influenced by it. In fact, small amounts of stress can help students seek more help, become more vigilant to details, and exert more effort in managing tasks (Jeffreys, 2012). According to Trockel, Barnes, and Egget (2000), nursing students experience more stress than students in medical, social work, and pharmacy programs. The students in this study showed moderate to high amounts of certainty, which indicates decreased stress and a motivation to handle anxiety (Jeffreys, 2012).

One of the goals of this study was to develop an instrument that measured practical nursing students' perceived self-efficacy. Since there is no one-size-fits-all instrument (Bandura, 2006), the researcher contacted the nursing department at the Midwestern community college and sought help from instructors and from the nursing simulation director to construct the SSES. As a result, self-efficacy of handling medical surgical simulations was measured and analyzed.

Understanding and reading about the practical nursing domain and instructional goals of the medical surgical simulation activities contributed to the composition of the items of the survey. At the beginning of the fall semester 2014, a 30-item instrument was developed for piloting purposes. The SSES was piloted with practical nursing students in the fall of 2014 to ensure the internal validity of the survey (Creswell, 2013). Based on the nursing instructors' comments on the items and students' feedback, some items were rewritten and others were deleted. The 30-item survey was reduced to 20 items using a principal component analysis on SPSS.

The 20-item SSES was conducted twice before and after engaging in medical surgical simulations; that is, at the beginning and at the conclusion of the spring 2015 semester. Internal validity of the instrument was satisfied by giving a two-month interval between the pretest and the posttest, so students did not memorize the items on the survey (Creswell, 2013). A factor analysis of the survey items helped minimize the survey into 10 items.

Content validity was also satisfied since the SSES focused on a specific domain (medical surgical simulation) (Bandura 2006). In addition, construct validity was met based on the analysis of convergent and discriminant validity (Green & Salkind, 2013).

The overall reliability of the SSES instrument was .83. Developing a survey for this study was crucial to answer the three research questions, but it is recommended a test-retest reliability must be determined before using the SSES again in future studies (Fraenkel et al., 2014).

In terms of the practical implications for the findings of this study, the nursing leaders at this institution can use the 10-item instrument SSES with practical nursing students. The 10-item SSES could gauge the new students' perceptions of their abilities in engaging in medical surgical simulations. As a result, nursing educators and instructors can have an idea about how students appraise the tasks of simulation activities.

The scores on the 10-item SSES could also help detect three types of perceived self-efficacy among students: inefficacy, efficacy, and supreme efficacy (Jeffreys, 2012). If a majority of students score 100 on each item, then certain students might be overly confident or supremely efficacious, and they would require attention to address misperceptions of their abilities. If students score below 50, then students might feel unsure about their abilities (Pajares & Urdan, 2006) and could be considered inefficacious. Therefore, close attention should be given to support the students in improving their perceptions of self-efficacy (Jeffreys, 2012).

If the students score between 50 and 100, these students can be regarded as efficacious, because they are quite certain they can perform the medical surgical simulations (Pajares & Urdan, 2006), which reduces the probability of being at the risk of attrition (Jeffreys, 2012). To reduce attrition and retain students more effectively, students should be supported to correct some of the misperceptions they have about their

abilities when handling medical surgical simulation tasks; thus, students can be steered by their instructors or advisors towards the right direction (Jeffreys, 2012).

Recommendations for Future Research

One of the ends of this study was to contribute to research in nursing education by providing a new instrument that measures practical nursing students' self-efficacy. However, future studies are needed to confirm the validity and reliability of the instrument used in this study. In addition, methodological and sample size concerns should be improved for future research. The next sections provide some practical solutions that could be implemented to improve the sampling methods, the methodology, and the instrumentation of the current study.

Methodology. This study involved a pre-experimental research design where a control group was not included and was aimed at exploring the variables of self-efficacy and its sources in practical nursing students (Kalaian, 2008). The pre-experimental design was selected due to the fact there was only one group of students to survey (Creswell, 2013). Therefore, it is highly recommended to replicate this study to discover whether or not the findings of this study were only a one-time occurrence (Wallen & Fraenkel, 2011).

An important suggestion for future research targeting the change in self-efficacy strength and the development of self-efficacy is to include both control and experimental groups. In this study, only one source of self-efficacy was found to significantly increase after engaging medical surgical simulations. Therefore, it is crucial to use a true experimental research design to investigate if the simulation experience in fact will lead to an increased mastery experience (Patten, 2013; Salkind, 2010; Thyer, 2009).

This study was analyzed quantitatively. If a mixed methods analysis was considered, then interviews could have been conducted next to have a deeper understanding of students' perceived self-efficacy (Creswell, 2013). The students could have provided either confirming or opposing output to the quantitative analysis results. Therefore, it is proposed to conduct a mixed methods study involving quantitative and qualitative analyses. The reason why a mixed methods study would be interesting and preferable to a one-method approach is due the fact mixed methods design is more practical (Creswell & Clark, 2011). Mixed methods paradigm allows the researcher to analyze and interpret results based on observing individuals qualitatively and measuring their behavior quantitatively (Creswell & Clark, 2011).

Sampling. The total number of students who participated in this study was 60, but only 50 students completed the pretest and the posttest surveys. Since there is an increase in nursing programs using simulation in practical nursing programs in the United States (University of Southern Mississippi, 2014), it is advisable to survey a larger pool of students (Gall et al., 2006). The small number of students or observations was a limitation in this study, because it likely influenced the statistical analyses and the conclusions made about the obtained results (Gall et al., 2006).

Selecting a larger sample and conducting random sampling techniques can help generalize the results not only to an accessible population but to an entire target population as well (Gall et al., 2006). The results of this study should not be generalized to all students attending practical nursing programs in the United States, since students can have distinct socioeconomic backgrounds, different ethnicity and race, and other diverse characteristics (Jeffreys, 2012). Careful attention should be paid when comparing

the results of this study to other works whose demographic variables were not explored in this study (Gall et al., 2006).

Instrumentation. The number of items used to measure the perceived self-efficacy strength and the sources of self-efficacy beliefs might have been insufficient to assess the student's sense of efficacy beliefs (Gloudemans et al., 2013). It might be necessary to add or delete some items or to replace them with other statements that better measure the construct of self-efficacy and the sources of self-efficacy for future studies. Due to time constraints, the survey was conducted only two times, before and after engaging in the simulation center activities. For this reason, it is advisable to conduct the survey more than two times during the semester or the academic year to understand the effect of time on self-efficacy perceptions (Myers, Well, & Lorch, 2010). Also, a randomized repeated measures design could reveal different results (Myers et al., 2010).

Summary

Practical nursing students showed high levels of self-efficacy strength in this study. The mean scores of the sources of self-efficacy also indicated students' reliance on all four sources of information to build their self-efficacy. The only change from the pretest to the posttest was noticed in the mastery experience variable. A highly statistically significant difference in the mastery experience mean scores allude the medical surgical simulation might have been responsible for the increase in mastery experience. However, such conclusion should be verified by replicating this study or using a true experimental design. In general, it can be concluded students' self-efficacy strength and the reliance on the four sources was reasonably high and remained relatively the same throughout the semester.

Practical nursing students were the focus and unit of analysis in this study (Strang, 2015). Simulation and student self-efficacy in nursing education were also the central topics of discussion and analysis. This study will hopefully contribute to the training of nursing students to be aware of the role and effect of self-efficacy in nursing programs (American Sentinel University, 2012). Moreover, nursing leaders could use the results of this study to prepare students for medical surgical simulations. In other words, students can be advised to complete the SSES at the beginning of the academic year to have a better understanding of how novice students appraise their capabilities.

Jeffreys (2012) stressed both inefficacious and supremely efficacious students are in danger of attrition. To understand the effect of self-efficacy on student retention and attrition, self-efficacy in students should be explored and measured (Williams, 2010). Academic self-efficacy is critical to student retention and academic success (Lourens, 2014; Raelin et al., 2014).

Effective leaders in nursing education will want to monitor student self-efficacy appraisal, because students who have a reasonable high self-efficacy are strong, resilient, highly motivated, persistent, and above all, successful (Jeffreys, 2012). Effective leadership is the ability to listen to students' needs. Listening can be the biggest challenge in leading a program or an institution. Thus, communication among the leaders, instructors, and students is key to effective student performance. Leaders who listen tend to make informed, wise, and better decisions. If students are to perform better, then effective communication has to be present (Connaughton, Shuffler, & Goodwin, 2011).

The aim of this study was to contribute to research and to student success. Most students go to college with the belief they can make it and become successful, but the college experience can be a journey containing good and bad times. One piece of advice is not to surrender to challenges and problems that rise on the way. Road blocks should be viewed as temporary setbacks; that is, persistence is the secret to succeeding during the college years and beyond. If students reasonably weigh their abilities and understand the difference between what they can certainly do and what they certainly cannot do, then they are more likely to succeed and reach their goals. It is about understanding strengths and accepting weaknesses, but not to succumb to challenges. Abraham Lincoln once said: "That some achieve great success is proof to all that others can achieve it as well" (as cited in Chinunda, 2014, p. 104). Indeed, strong self-efficacy can be a powerful means to reaching even the most difficult goals.

Appendix A

The Simulation Self-Efficacy Survey

Thank you very much for your help participating in this study.

Please circle one of the options below to indicate your age, gender, and educational level:

Age: 18-29 30-39 40-49 50+

Gender: Male Female

Educational level: High School Junior College Bachelor Graduate

Practice Rating

To familiarize yourself with the rating form, please complete this practice item first.
If you were asked to run **right now**, how certain are you that you can run each of the minutes or distances described below?

Rate your degree of confidence by recording a number from 0 to 100 using the scale given:

1. Run 5 minutes = 1/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

2. Run 10 minutes = 1/2 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

3. Run 15 minutes = 3/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can d

Below are a number of tasks as a nursing student you perform during the simulation center activities, especially medical-surgical nursing simulation scenarios. By circling one of the numbers given, please indicate how certain you are in your abilities to do each of the things described below.

1. Learn and execute fundamental skills, such as sanitation, respect of a patient's privacy and safety, and using appropriate presentation skills, e. g., My name is Loren, and I will be taking care of you today.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

2. Think critically when assessing a patient's situation in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

3. Request additional help from my instructors or supervisors to repeat any challenging medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

4. Adequately handle medical surgical simulations based on my past successful experiences.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

5. Persist when I am challenged and rapidly recover from obstacles I face in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

6. Observe and imitate my peers and teachers.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

7. Compare my capabilities to other students' and the teachers' abilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

8. Gain confidence in my ability to execute medical surgical simulations when I see teachers or students similar to myself succeed.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

9. Perform well when teachers are competent and teach me the necessary skills to manage the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

10. Successfully perform medical surgical simulations because I have the same capabilities that made my peers or teachers (I consider models) excel.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

11. Learn nursing skills through the teachers' feedback and evaluation of my performance in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

12. Effectively perform the medical surgical simulations when my peers and teachers verbalize positive appraisal of my capabilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

13. Give up when my peers or teachers verbalize negative statements about my ability to execute medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

14. Achieve the nursing goals I aspire to because the medical surgical simulation activities place me in situations that bring success

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

15. Rely on teachers' encouragements when I have self-doubts about my ability to engage in medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

16. Believe that physical states such as sweating and body aches can indicate I am unable to execute certain tasks in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Let the following states lower the confidence in my ability to execute tasks in the medical surgical simulations:

17. Fatigue

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

18. Aches and Pains

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

19. Stress and Tension

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

20. Moodiness

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Appendix B

The Pilot Simulation Self-Efficacy Survey

Thank you very much for your help participating in this pilot survey. The goal of this activity is to test if the survey questions are effective in fulfilling the purpose of the study.

Practice Rating

To familiarize yourself with the rating form, please complete this practice item first.
If you were asked to run **right now**, how certain are you that you can run each of the minutes or distances described below?

Rate your degree of confidence by recording a number from 0 to 100 using the scale given:

1. Run 5 minutes = 1/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

2. Run 10 minutes = 1/2 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

3. Run 15 minutes = 3/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Below are a number of tasks as a nursing student you perform during the simulation center activities, especially medical-surgical nursing simulation scenarios. By circling one of the numbers given, please indicate how certain you are in your abilities to do each of the things described below.

1. Request additional help from my instructors or supervisors to repeat any challenging simulation scenarios.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

2. Consider more assistance in a difficult simulation activity not important even though such extra help might lead to mastery.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

3. Take failure in a simulation activity seriously, view it with some uncertainty, and utilize preparative attempts prior to trying it again.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

4. Assess the patient's situation in a simulation center environment based on my nursing skills.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

5. Make an effort to think critically when engaging in simulation center activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

6. Improve my fundamental skills, such as sanitation, respect of a patient's privacy and safety, and using appropriate presentation skills, e.g. , My name is Susan, and I will be taking care of you.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

7. Check medication administration record and administer appropriate medications.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

8. Call the doctor and obtain orders specific to patient complaint.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

9. Recognize the symptoms and the causes of a condition or state a patient is suffering from.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

10. Communicate with a patient or a family member in the simulation center.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

11. Develop a sense of professionalism in the simulation center.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

12. Make a sustained effort to obtain the successful experience I need from the simulation center activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

13. Persevere in the face of adversity and quickly rebound from setbacks when engaging in the simulation center activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

14. Compare my capabilities to other students' and the teachers' abilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

15. Ignore the importance of models such as peers and teachers when managing simulation activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can

16. Become positively influenced by the behaviors of my classmates and teachers.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

17. Observe and imitate my peers and teachers.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

18. Collaborate with my peers and teachers to do well in a simulation activity.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

19. I possess the ability to master a task in a simulation activity because I have the same capabilities of my models who mastered that activity.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

20. Enhance my nursing skills through the evaluation of my performance in the simulation center activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

21. Use debriefings from my peers to improve and develop my nursing skills in a simulation center environment.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

22. Effectively perform the simulation center tasks when my peers and teachers verbalize positive appraisal of my capabilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

23. Avoid challenging simulation center activities when my peers or teachers verbalize less than capable statements about my abilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

24. Recognize my personal and emotional traits that hinder or enhance my performance in the simulation center activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

25. Believe that physical states such as sweating and body aches can indicate I am unable to execute certain tasks in the simulation activities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Let the following states lower the confidence in my ability to execute tasks in the simulation center activities:

26. Fatigue

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

27. Aches and Pains

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

28. Stress and Tension

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

29. Moodiness

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

30. Believe that my physical or emotional states, such as body aches and stress, do not really decrease my confidence and competence in simulation tasks.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Appendix C

Lindenwood Institutional Review Board Permission to Conduct Research

LINDENWOOD

LINDENWOOD UNIVERSITY ST. CHARLES, MISSOURI

DATE:	February 3, 2015
TO:	Moulay Abdelkarim Moukrime, Ed.D
FROM:	Lindenwood University Institutional Review Board
STUDY TITLE:	[694002-1] Analyzing the Change and Development of Simulation Self-Efficacy among Practical Nursing Students
IRB REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	January 30, 2015
EXPIRATION DATE:	February 4, 2016
REVIEW TYPE:	Expedited Review

Thank you for your submission of New Project materials for this research project. Lindenwood University Institutional Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to the IRB.

This project has been determined to be a project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the completion/amendment form for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of February 4, 2016.

Please note that all research records must be retained for a minimum of three years.

If you have any questions, please contact Robyne Elder at (314) 566-4884 or relder@lindenwood.edu. Please include your study title and reference number in all correspondence with this office.

If you have any questions, please send them to IRB@lindenwood.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Lindenwood University Institutional Review Board's records.

Appendix D

Allied Health Dean's Permission Letter

Dear Institutional Research Board Committee:

It is my understanding that Moulay Abdelkarim Moukrime will be conducting a research study at Community College in the spring of 2015. His study is entitled: Analyzing the Change and Development of Simulation Self-Efficacy among Practical Nursing Students. Mr. Moulay Abdelkarim Moukrime has informed me of his research study goals, design, and participants. I approve this endeavor and will offer the help he needs to conduct this study at Community College.
Please do not hesitate to contact me in case you have any questions. My telephone number is

Sincerely,

Dr.

Appendix E

LINDENWOOD

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Analyzing the Change and Development of Simulation Self-Efficacy among Practical Nursing Students

Principal Investigator: Moulay Abdelkarim Moukrime

Telephone: [redacted] E-mail:

Last four digits of the student ID: _____ Student Survey Number: _____

1. You are invited to participate in a research study conducted by Moulay Abdelkarim Moukrime under the guidance of Dr. Rhonda Bishop and Dr. Sherry DeVore. The first purpose of this research is to explore if there is a change in students' self-efficacy or belief in their ability to execute medical surgical simulations. The second goal is to determine if there is a change in students' reliance on the sources of information, which develop their self-efficacy. The third goal of this study is to reveal the effects of age, gender, and educational level of practical nursing students on the use of or reliance on each source of self-efficacy.

2. a) Your participation will involve:
   Completing a self-efficacy survey. A pretest will be given at the beginning of the spring semester. A posttest will be administered at the conclusion of the course in July 2015.

   b) The survey will take between 10 to 15 minutes to complete each time. The total length of participation is 30 minutes. There will be no monetary compensation for your participation, but there will be refreshments as a thank you for your time.

   Approximately 65 students will be involved in this research. The survey will be conducted on three campuses. One campus has about 25 students. The other two campuses have about 20 students each.

3. There are no anticipated risks associated with this research.

4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about self-efficacy and may help teachers and administrators offer a learning environment where students can perform better and become more successful in their education. The possible benefits to you from participating in this research are learning about the sources of information that can help you build a strong belief in your ability to succeed and achieve your educational goals.

5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer.

6. We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study and the information collected will remain in the possession of the investigator in a safe location.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Moulay Abdelkarim Moukrime at [redacted] or the Supervising Faculty, Dr. Rhonda Bishop and Dr. Sherry DeVore. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

_____	_____
Participant's Signature Date	Participant's Printed Name
_____	_____
Signature of Principal Investigator Date	Investigator Printed Name

Appendix F

The 10 Item Simulation Self-Efficacy Survey

Thank you very much for your help participating in this study.

Please circle one of the options below to indicate your age, gender, and educational level:

Age: 18-29 30-39 40-49 50+

Gender: Male Female

Educational level: High School Junior College Bachelor Graduate

Practice Rating

To familiarize yourself with the rating form, please complete this practice item first. If you were asked to run **right now**, how certain are you that you can run each of the minutes or distances described below?

Rate your degree of confidence by recording a number from 0 to 100 using the scale given:

1. Run 5 minutes = 1/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

2. Run 10 minutes = 1/2 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

3. Run 15 minutes = 3/4 mile

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

Below are a number of tasks as a nursing student you perform during the simulation center activities, especially medical-surgical nursing simulation scenarios. By circling one of the numbers given, please indicate how certain you are in your abilities to do each of the things described below.

1. Adequately handle future medical surgical simulations based on my past successful experiences.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

2. Persist when I am challenged and rapidly recover from obstacles I face in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

3. Observe and imitate my peers and teachers.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

4. Compare my capabilities to other students' and the teachers' abilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

5. Learn nursing skills through the teachers' feedback and evaluation of my performance in the medical surgical simulations.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

6. Effectively perform the medical surgical simulations when my peers and teachers verbalize positive appraisal of my capabilities.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Let the following states lower the confidence in my ability to execute tasks in the medical surgical simulations:

7. Fatigue

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

8. Aches and Pains

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

9. Stress and Tension

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

10. Moodiness

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

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Vita

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