EXECUTIVE SUMMARY: THE EFFECTS OF HIGH FIDELITY SIMULATION ON HESI GRADES

by

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A DNP Project Presented in Partial Fulfillment
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Abstract

The nursing program at a community college in Texas had a steady decrease in National Council Licensure Examination for Registered Nurses (NCLEX-RN®) and Health Education Systems, Incorporated (HESI) scores for the past five years. After making several changes in the program, HESI scores continued to be low. In 2012, the school built a new state of the art high fidelity simulation lab. The faculty considered high fidelity simulation (HFS) as a possible solution to improve the scores. The purpose of this project was to examine whether the integration of HFS with traditional clinical learning experiences would increase the students’ performance on the HESI, therefore, this project was undertaken to compare the HESI scores of two groups of nursing students: the combination group and the traditional group. The combination group comprised of students who participated in 50% HFS and 50% traditional clinical experience and completed their HESI exam in 2014. The second group, the traditional group, comprised of students who only participated in traditional clinical learning experiences and completed their HESI exam in 2012. Their clinical experience was 100% at the bedside in the hospital setting. HESI scores from the combination group had an increase in score by 57.97 points; the traditional group had a decrease of 18.69 points in their HESI exit exam. The project outcome showed effectiveness of HFS and offers a basis for continuing this intervention for further assessment in the nursing program in the future.
The Effects of High Fidelity Simulation on HESI Scores

Nursing schools are increasingly opting to administer a new generation of computer-based standardized exams such as those developed by Health Education Systems, Inc. (HESI). HESI exams evaluate students’ competency as well as their ability to demonstrate achievement of curricular outcomes. HESI exams were introduced in the program as a response to the declining pass rates in the National Council Licensure Examination for Registered Nurses (NCLEX-RN®) (Adamson, Nibert, & Young, 2008). The NCLEX-RN® serves as a benchmark to ensure that all new graduating nurses are safe practitioners. Successful passing of the NCLEX-RN® is required before the graduate nurse can practice. From 1995 through 2000, the National Council of State Boards of Nursing (NCSBN) recorded declining pass rates nationally for the NCLEX-RN® in each successive year. There was a decrease in the national annual pass rate for the registered nurse from 90.2% in 1995 to 83.8% in 2000 (Adamson et al., 2008). The community college has also had a decrease in their annual pass rate.

Since 2010, the community college’s nursing program’s annual pass rate for the NCLEX-RN® exam has steadily declined from 91.1% to 77.14%. Several factors were identified as the possible reasons for this decline. These included an increase in the difficulty level of the NCLEX-RN®, the amount of content in the courses, and an increased number of at risk students. The program was challenged to determine the root cause and to find a possible solution to the decline in NCLEX-RN® and HESI scores. Faculty sought a solution to this problem to avoid being put on probation, losing accreditation, or missing out on funding from the government. Therefore, the major aim of the faculty at the community college was to determine what intervention could help increase the school’s HESI scores.

In response to the declining pass rates, faculty introduced the HESI which is used to determine how students would perform on the NCLEX-RN®. Faculty knew the HESI would help
identify students who are at risk for failing NCLEX-RN® early so that they can be referred to remediation (Adamson et al., 2008). Adamson et al. (2008) and Britt, Nibert, and Young (2008) reported that there is sufficient evidence indicating that remediation improves NCLEX-RN® pass rates of students with known academic deficits. This is because HESI exams have high predictive accuracy which allows many nursing faculties and schools to use HESI exams as a benchmark for progression and remediation (Adamson et al., 2008; Britt, Nibert, & Young, 2008; Levy, 2014; Sullivan, 2011). Levy (2014) described how the HESI exam implemented in 2007 and HESI mid-curricular exam implemented in 2008 significantly improved NCLEX-RN® scores of nursing students at a Milwaukee area college, which had been put in probation in 2007 due to declining student pass rate on the NCLEX-RN®. In fact, in 2013, the college recorded 100% pass rate for five quarters. Consequently, the adoption of HESI exams has been on the rise and Adamson, Hsia, Morrison, and Nibert (2004) reported that available records at the HESI database indicate that the number of nursing schools administering HESI exams has increased significantly. For example, between December 1999 and December 2003 alone, that number increased from 85 to 565.

The exit HESI exam is a comprehensive assessment constructed to mirror the content of the NCLEX-RN® exam. Many nursing schools require their students to pass this exam with a specific pass-mark as a qualification for graduation from the nursing program. These tests allow institutions’ nursing faculty or departments to consistently assess their students’ learning and performance, provide focus for remediation, and appraise the strength of their curriculum (Lauer & Yoho, 2013). The clinical question developed for this project is as follows: Will the associate degree nursing program have higher HESI scores now than prior to the incorporation of simulation into the curriculum?
Background and Significance of Project

This project evolved after faculty completed an in-depth assessment of the curriculum and testing in the program. In response to the declining HESI scores and NCLEX-RN® pass rates, the faculty decided to implement an intervention plan which included a review of its nursing curriculum and test plan in relationship to the NCLEX-RN® blueprint. Using the NCLEX-RN® test plan as a guide, faculty made changes to the curriculum to include more specific information. This included reducing the ‘nice to know’ information and focusing on the ‘need to know’ information. The faculty also reviewed test item design in relationship to higher levels of Bloom’s taxonomy. After review of the course test plans, faculty determined that all exams at the foundational level would include knowledge and understanding questions, with some application questions. The upper level courses would include questions at application, analysis, synthesis, and evaluation levels. Additionally, the department partnered with the English department to offer tutoring for students who had English as a second language. In addition to tutoring, they offered conversational English and writing skills. Unfortunately, few students took advantage of the tutoring.

The PICOT method was used to develop the clinical question. The PICOT method provides a consistent method of identifying components of a clinical practice issue. The problem identified for this project was the decrease in HESI scores. The intervention or issue was to compare two groups of students: the combination group with the traditional group. The comparison group was the traditional group. The outcome was to see an increase in HESI scores. The time frame for this project was for the year 2014.

In 2012, the community college built a new HFS lab for the health science departments. High-fidelity simulation refers to “structured student learning experiences with the use of a technologically advanced computerized mannequin, the human patient simulator” (Coke, Hicks,
& Suling, 2009, p. 1). The human patient simulator (HPS) is anatomically precise and has the capability to reproduce physiologic responses. As such, “students participate in scenarios with decision-making events that mimics a clinical setting (Coke et al., 2009, p. 1). This means that it can allow for repetitive practice and therefore increase acquisition of clinical skills. Simulation has been used in nursing schools over the past few decades to enhance clinical learning, provide critical thinking, as well as psychomotor learning opportunities in low- and high-risk clinical environments as well as populations (Claman & Richardson, 2014). This is because it offers relevant, realistic clinical experiences that enable nursing students to become more competent. However, Claman and Richardson (2014) acknowledged that no consensus exists on the extent of its use in clinical learning settings. Despite this, Gates, Hughes, and Parr (2012) noted that HFS is an acceptable alternative for traditional clinical learning experiences in nursing education. For example, the California Board of Registered Nursing currently allows up to 25% of student clinical learning to take place in simulation laboratories (Gates et al., 2012).

The simulation lab at the community college consists of four rooms for medical/surgical simulation, one room for pediatrics and one room for obstetrics. The students were scheduled one day in the HFS lab for orientation that introduces the student to the rules of the lab and how the human patient simulator (HPS) functions. Previously, students did not participate in a true simulation scenario as the faculty was resistant to change and not receptive to trying the new technology. With the NCLEX-RN® and HESI grades continuing to decline, faculty became open to the idea that if HFS was added to the curriculum there might be an impact on HESI scores.

**Purpose and Goals**

The purpose of this project was to compare the effectiveness of HFS to actual clinical experience among students enrolled in an associate degree nursing program. The comparison was to examine the effectiveness of high-fidelity simulation alone and in combination with
clinical experience on knowledge acquisition and clinical performance of nursing students, compared to students in the traditional clinical. The goal of the project was to determine if adding simulation to the traditional clinical experience increased HESI exam scores.

**Project Description**

The project consisted of choosing a cohort of 85 traditional students during 2012, and 40 combination students during 2014. In 2012, HFS had not been implemented at the school while in 2014 the program was integrated in the students’ learning processes. Both groups of students were enrolled in the medical/surgical courses. Students were divided into two groups: the combination group comprised of students who participated in 50% HFS and 50% traditional clinical experience. The second group participated in 100% traditional clinical as part of their clinical experience.

Evaluation of HESI scores compared the group who received HFS in addition to clinical to the group who did not receive HFS. Descriptive analysis and analysis of variance were performed to establish whether there were differences in mean scores between the two groups. Analysis was conducted using predictive analytics software.

**Summary of Literature**

A search was conducted to locate articles regarding simulation, HFS, HESI scores, nursing students and Benner’s Model. Of the articles identified, the abstracts were analyzed and any articles not directly related to HFS or HESI scores were discarded. Of those remaining, the actual papers were analyzed and more were discarded as they were determined to be irrelevant.

**Theoretical Framework**

The conceptual framework for HESI exams according to Adamson et al. (2008) is founded on the classical test theory as well as the critical thinking theory. The classical test theory, which is the foundation for measurement theory, suggests that in any assessment, “the
The total score is only as good as the sum of its parts” (Kline, 2005, p. 91). The theory acknowledges that the total test score comprises multiple items, and this total score or observed score has both an individual’s true ability and a random error, which is something in the environment which could have influenced the individual’s performance on the test. The true score is the student’s score that would be the same each time the student takes the test (Sullivan, 2011). Therefore, an individual’s true score can be found by taking the average score that they would get on the same test administered in several testing sessions. The assumption is that the items chosen for any one test are representative of the aspect being tested and are selected from an infinite domain of potential test items (Kline, 2005). The error score accounts for extraneous variables that the student may experience while undertaking the test, which may not exist on a different exam day (Sullivan, 2011). The observed score can therefore be used to predict a student’s performance on an exam. For the scores to be an accurate representation of the student’s true score, it is very important to use mathematical models that help reduce systematic random error (Adamson, Nibert, & Young, 2008). Similarly, the theory also suggests that even when two or more tests with different domains or testing different aspects are administered to students, they would still give true scores of the individual students though with different error scores. Overall, this theory suggests that if HESI exams can correctly account for human error then it can accurately predict what a student would score on a parallel exam, which in this case is the NCLEX-RN®.

The second theory that provides an important theoretical foundation for HESI exams is the critical thinking theory of nursing. Critical thinking, according to Martin (2002), is a thought process made use of by nurses for clinical decision-making. Critical thinking is “explicitly aimed at well-founded judgment, utilizing appropriate evaluative standards in an attempt to determine the true worth, merit, or value of something (Ozkahraman & Yildirim, 2011, p. 176). According to midrange theory, nurses’ critical thinking increases with experience, which Martin (2002)
notes develops over time as a novice nurse acquires knowledge and experience that allows them to have clinical expertise. This is because it is expected that as a student nurse progresses through nursing education, they grow “in the knowledge of nursing within the classroom, encounter more acutely ill patients, increased technology, and complex ethical issues within the clinical setting” (Ozkahraman & Yildirim, 2011, p. 181). These experiences help student nurses grow in skills of critical thinking. Perhaps this explains why a critical thinking test is a major component of the HESI exams offered at the end of curriculum implementation.

Based on the notion that nurses critical thinking and expertise develop over time through experience, Benner developed the Dreyfus Model of Skill Acquisition for nursing students to explain the transition processes which nursing students undergo from student-nurse to novice nurse through to expert nurse (Benner, 1982, 1984). Benner defines skill levels into five levels of nursing experience: novice, advanced beginner, competent, proficient, and expert (Benner, 1982). A novice is a beginner with no experience. They are taught general rules to help perform tasks; they simply follow instructions of the expert nurse. The advanced beginner shows acceptable performance, and has gained prior experience in actual nursing situations. A competent nurse generally has two or three years’ experience on the job in the same field. These nurses have long-term goals, and they are able to achieve efficiency and organization and are able to take action based on conscious critical thinking. A proficient nurse perceives and understands situations as whole parts. They have a more holistic understanding of nursing, which improves decision-making. These nurses learn from experience to anticipate sudden changes in clinical situations and how to quickly respond to those changes. Expert nurses no longer rely on principles, rules, or guidelines to connect situations and determine actions. They have more experience, are highly proficient, and have an intuitive grasp of clinical situations which help them to function efficiently in clinical situations (Benner, 1982, 1984).
Benner explains in her writings that: Nursing skills, which are acquired through experience, are a prerequisite for becoming an expert nurse. These different levels of skills show changes in the three aspects of skilled performance: movement from relying on abstract principles to using past experiences to guide actions; change in the learner’s perception of situations as whole parts rather than separate pieces; and passage from a detached observer to an involved performer, engaged in the situation rather than simply outside of it. Each step builds on the previous step as principles are refined and expanded by experience and clinical expertise. (Nursing Theory 2015, p.1)

This model provides the foundation in simulation bringing the student from novice to advanced beginner by challenging them to identify and resolve multiple common patient problems. The use of simulation technology will help students at all levels to gain the cognitive, affective, and psychomotor skills necessary to develop the student into that expert nurse, able to think critically and perform the skills necessary for collaborative problem solving with members of the health care team.

Based on these two theories, the design, administration, as well as interpretation of HESI tests are done through educational and psychological measurement processes (Adamson et al., 2008). In measuring psychological attributes, “quantitative values are assigned to the sample of behaviors obtained from administering a test” (Adamson et al., 2004, p. 40S). Therefore, by observing as well as classifying identical behaviors, it is possible to draw inferences about the psychological constructs that contribute to the makeup of the student. Similarly, it is also possible to identify relationships between psychological constructs and practical consequences. This makes it possible to predict test-taking behaviors such as success in the nursing academic programs or practice, which explains why HESI exams are increasingly being adopted as entrance exams. Adamson et al. (2004) explain that the nurses who design or set and review the
HESI nursing exams make use of course syllabi from nursing programs across the US in combination with NCLEX-RN® test blueprints offered by the National Council of the State Boards of Nursing (NCSBN) to define the constructs that are indicative of behaviors needed for entry-level practice.

**Validity and Reliability of HESI Exams**

Any assessment and evaluation process is only accurate if valid and reliable exams are used. HESI exams have been found to be effective measures for benchmarking nursing program outcomes, assessing student achievement, directing remediation before licensing the candidate, as well as facilitating effective hospital orientation. Adamson et al. (2004) conducted a validity study of the HESI exit exam to examine the accuracy of the exam in predicting NCLEX-RN® success as well as the extent of risk of failure of the licensure examination associated with specific scoring intervals. The HESI exit exam is “a comprehensive computerized nursing examination that is administered in the last semester or quarter of a nursing curriculum” (Adamson et al., 2004, p. 29S). The test items in these exams are designed using a critical thinking model described by Britt, Morrison, and Smith (1996) and Morrison & Free (2001), which require clinical nursing judgment to decide on the correct response(s). The HESI exit exam simulates the NCLEX-RN® in that it follows the test blueprint for both registered and practical nurses. In this study, the researchers adopted a descriptive comparative design to examine students’ NCLEX-RN® outcomes data of 1999-2000 academic year provided by nursing schools, which was used to determine the accuracy of the HESI exit exam in predicting NCLEX-RN® and NCLEX-PN® success. The analysis process only considered the NCLEX-RN® outcomes of those who had been predicted to pass. The researchers reported a very high level of accuracy (98.46%) in predicting NCLEX-RN® success of 6,800 fourth year nursing students. The prediction accuracy was 98.3% for registered nursing students and 99.4% for practical
nursing students. The prediction accuracy for year 3, 2, and 1 were also significantly high at 97.78% for year 3, 96.49% for year 2, and 97.41% for year 1. This provides evidence of reliability of the HESI exit exam. In addition, each scoring interval was also found to be significantly different from one another, with $p = 0.001$ (Adamson et al., 2004).

Other studies have also found evidence supporting the validity and reliability of HESI exams (Britt, Lauchner, & Newman, 2000; Nibert & Young, 2008). All these studies reported accuracies of predicting NCLEX-RN® success between 96.4% and 98.3%. For example, in a sample of 2809 associate degree, baccalaureate, diploma, as well as practical nursing students, (Britt, Lauchner, & Newman, 2008) it found the HESI exit exam to be an accurate predictor of nursing students’ success, with an accuracy of 99.49% when exams were monitored and 96.82% when not monitored. Nibert and Young (2008) also found the HESI exit exam to be a consistent predictor of NCLEX-RN® success in associate degree nursing, BSN, diploma, as well as practical nursing students. For all year I-III students whose data were analyzed, the exit exam was highly predictive of NCLEX-RN® success. This shows that the HESI exit exam is a reliable predictor of NCLEX-RN® performance. Langford and Young (2012) also provide evidence indicating that the HESI exit exam is reliable, noting that in seven previous studies (Adamson & Britt, 2009; Adamson, Nibert, & Young, 2008; Algina & Crocker, 1986; Lauchner, Britt, & Newman, 1999; Lewis, 2005; Nibert & Young, 2008), the researchers have reported NCLEX-RN® predictive validity of 93.36% to 99.2% in more than 41,000 students at over 150 institutions across the country. In their study, Langford and Young (2012) also found the HESI exit exam to predict 98.3% NCLEX-RN® success. Adamson et al. (2002) went further and compared the NCLEX-RN® outcomes for five exit exam scoring benchmark intervals and found that when the exit exam scores decreased by interval, the proportion of NCLEX-RN® failures significantly increased. For example, the results showed that if a student scored 900 or higher on
the exit exam, then student would be 98.3% successful on the NCLEX-RN® of the time and only experience 1.7% rate of failure. Similarly, any student who scored 850-899 on the exit exam was successful 94.1% of the time and had 5.9% rate of failure, and so on.

**Effectiveness of HESI Exams**

The HESI is given much emphasis because it is believed to have the potential to improve the performance of nursing students on the NCLEX-RN® and this is very important for nursing schools and students (Britt, Nibert, & Young, 2008). In fact, in most cases, nursing schools whose students consistently fail on the NCLEX-RN® are subject for investigation for possible withdrawal of accreditation or even closure. As a result, many nursing schools work hard to ensure that they have high passing rates by making use of the HESI exams.

Following published evidence of the validity and reliability of the HESI exit exam as an accurate predictor of students’ NCLEX-RN® preparedness and success, Britt, Lauchner, & Newman, (2008) went further and examined how the HESI exit exam scores could be used as a benchmark for progression as well as a guide for remediation for assisting students to attain the minimal exit exam benchmark score. Consequently, the researchers made use of data obtained from Adamson et al.’s (2004) study. Administrators of 158 schools where Adamson et al. (2004) obtained their data were surveyed and additional data was obtained from the HESI database on the participating schools’ use of different versions of the exit exam to retest the low-scoring students. The results showed that 30.2% had adopted the HESI exit exam as benchmark for progression policy. These schools had a policy that designated a specific exit exam benchmark score for progression. Some of the school administrators surveyed indicated that they had optional remediation programs for students who failed their exit exams although 28.19% implemented a mandatory remediation program for such students. The exit exam allowed schools to engage such students in specifically designed remediation course, tutoring sessions,
and an NCLEX-RN® simulation exam. It also allowed the faculty to engage in a comprehensive review that is guided by NCLEX-RN® preparation books or reenroll the students in core nursing courses. On the contrary, Sullivan (2011) who examined the effectiveness of the exit exam in increasing NCLEX-RN® pass rates among baccalaureate nursing students did not find evidence indicating that HESI is effective. The researchers used a large sample of Bachelor of Science in nursing (BSN) student graduates as well as potential graduates from nursing programs across the country. The pass rates for NCLEX-RN® first-time BSN students in nursing programs that make use of HESI exit exam with other computerized exams and those of students who were not engaged in exit exams. The results did not show statistically significant difference between the two groups, suggesting that the teaching offered in the nursing school is enough to prepare students for the NCLEX-RN® even without the use of the HESI exam. This inconsistency could be explained by the methodological approach, which did not look at the performance of the students who had been predicted to pass the NCLEX-RN® using the HESI exams. Besides, it also suggests that many schools offer compulsory remediation programs to students who fail in the HESI exit exam. One of the main reasons why HESI was developed was to enable educators to identify students with weaknesses and find ways to help them improve their performance (Adamson et al., 2004; Adamson et al., 2008; Britt, Nibert, & Young, 2008).

In a study conducted by Free, Morrison, and Newman (2002) to examine the effect of the use of the HESI exit exam as a progression or graduation requirement in five nursing programs, it was noted that after two years of practicing this policy, the NCLEX-RN® pass rates increased by 9-41%. Although the study did not analyze the results of individual students, Hunt and Spurlock (2008) suggest that five nursing programs are within the range of good sample size for establishing the effect of HESI exams. In their study of 179 nursing students in one school, Hunt and Spurlock (2008) found a statistically significant relationship between first attempt scores on
the exit exams and NCLEX-RN\textsuperscript{®} pass rates. The researchers also found that the best benchmark score for first-time test takers that should be used to predict NCLEX-RN\textsuperscript{®} success is 650. The correlation between exit exam re-test scores and NCLEX-RN\textsuperscript{®} success however had lower correlation coefficient compared to first-time test score. Noel’s (2009) study which examined the effectiveness of the HESI exit exam graduation requirement as a predictor of NCLEX-RN\textsuperscript{®} success also supported the findings of Free et al. (2002) and Hunt and Spurlock (2008). The study adopted a descriptive correlational design using a sample of 94 licensed vocational nursing students who were required to pass the exit exam with a cut-off score of 850 as a graduation policy. The results showed that there was a significant positive relationship between the exit exam score requirement and increased first-time pass rates on the NCLEX-RN\textsuperscript{®}.

**High-Fidelity Simulation**

High-fidelity simulation (HFS) generally refers to “structured student learning experiences with the use of a technologically advanced computerized mannequin, the Human Patient Simulator” (Coke, Hicks, & Suling, 2009, p. 1). The Human Patient Simulator (HPS) is anatomically precise and has the capability to reproduce physiologic responses. As such, “students are administered sequential decision-making events within an environment that mimics a clinical setting” (Coke et al., 2009, p. 1). This means that it can allow for repetitive practice and therefore increase acquisition of clinical skills. It has been used in nursing schools over the past few decades to enhance clinical learning, provide critical thinking, as well as psychomotor learning opportunities in low- and high-risk clinical environments (Claman & Richardson, 2014). This is because it offers relevant, realistic clinical experiences that enable nursing students to become more competent. However, Claman and Richardson (2014) acknowledge that no consensus exists on the extent of its use in clinical learning settings and even the National Council of State Boards of Nursing (NCSBN) and the national accreditation bodies do not
prescribe guidelines on the amount of hours that should be spent in training. Despite that, Gates, Hughes, and Parr (2012) note that HFS is an acceptable alternative for traditional clinical learning experiences in nursing education. For example, the California Board of Registered Nursing currently allows up to 25% of student clinical learning to take place in simulation laboratories (Gates et al., 2012).

In systematic review on evidence supporting the effectiveness of HFS, Lewis, Smith, and Strachan (2012) concluded that HFS offers students a learning environment in which they are able to “develop non-technical skills, that is safe and controlled so that they are able to make mistakes, correct those mistakes in real time, and learn from them, without fear of compromising patient safety” (p. 82). To establish the effectiveness of HFS, Gates et al. (2012) examined the effects of learning through HFS on knowledge acquisition in 104 undergraduate nursing students. The results showed that students who participated in HFS scenarios scored significantly higher on examinations compared to students who were engaged in traditional clinical learning experiences, with a mean of 6.89 against 6.08. Coke et al. (2009) however did not find any significant difference between students who were engaged in HFS and those engaged in traditional learning experiences. In fact, students who were engaged in HFS consistently scored lower than those in the traditional or combined traditional and simulation learning experiences. At the end of simulation and/or clinical experiences, the simulation only group had acquired the least knowledge gain and demonstrated least ability to undertake clinical performances in patient care scenarios compared to the other two groups. However, the simulation and combo groups experienced significant increases in their self-confidence level in taking care of patients in acute care. The researchers however did not establish inter-rater reliability, therefore it is difficult to determine whether the rating scale was defective or not. The findings of Lewis et al. (2012) suggested that the HFS would be more effective if integrated with traditional clinical learning
experiences. The evidence suggested that combination of HFS and traditional learning experiences significantly improved students’ critical thinking as well as decision-making, effective communication with the patient and within work teams, team behavior, situation awareness, clinical leadership, and so on.

**Synthesis and Congruence to Organizations Strategic Plan to Project**

The vision of the community college is to be the leader in educational excellence and in the achievement of equity among diverse populations, to empower students to achieve their goals, redefine their expectations, and encourage their exploration of new opportunities. Their mission is to ensure student success, create seamless transitions, and enrich the quality of life in the communities they serve. The goals include student success, the expansion of high school partnerships, workforce and economic development and their people. These goals will ensure that the mission of the college is obtained. The project supports the mission, vision and goals by seeking to improve student outcomes and provide safe and effective graduate nurses into the workforce.

**Project Design**

The first group, the combination group, of students participated in HFS in addition to the traditional clinical experience. This group comprised of 40 students who were enrolled in the ADN program in the medical/surgical courses in 2014. The group participated in 50 % HFS and 50% traditional clinical experience. Clinical groups assigned to the combination group were randomly selected by the clinical placement coordinator. Time in the HFS lab was spent participating in a simulation considered by the faculty as appropriate to their level. Each weekly scenario for that course lasted approximately 20 minutes. Their skills were evaluated through performance evaluations and cognitive skills were evaluated through the end of course HESI exam.
The second group, the traditional group, of students only participated in traditional clinical learning experiences. Their clinical experience was 100% at the bedside in the hospital setting. HESI scores data of 85 students, enrolled in the ADN program in the medical/surgical courses in 2012, where collected for the purpose of this study.

Data analysis utilized HESI scores of the two groups of study participants. Descriptive analysis and analysis of variance were performed to establish whether there were differences in mean scores between the two groups. The analysis used predictive analytics software.

**Findings**

The descriptive statistics of the HESI exams done at the end of their medical/surgical II and III course showed that students who were engaged in traditional clinical learning experiences almost consistently scored higher than students who were engaged in both traditional and HFS clinical learning experiences. As seen in Table 1 below, the traditional group had a higher mean in the exam done at the end of medical/surgical course II, with an average of 885.69 and the combination group had a mean of 808.80 points. However, the two groups had a relatively equal level of performance, with a mean of 867.0 points for the traditional group and 866.77 points for the combination group in the medical/surgical III exam.

An analysis of variance identified a significant difference between the two groups on the HESI exam scores for the exam done at the end of medical/surgical II, with \( F(1, 81.357) = 6.044, \ p = 0.016 \). However, there was no significant difference between the two groups for the HESI exam done at the end of medical/surgical III. Despite the results showing that integration of HFS does not yield higher scores, the descriptive data provide an interesting insight in that there was a negative change of 18.69 points at the end of the medical/surgical III while there was a positive change of 57.97 points at the end of the medical/surgical III course.
Table 1
Descriptive Statistics of Traditional and Combination Group

<table>
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<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<td>162.651</td>
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<tr>
<td>Traditional Group, III</td>
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<td>1098</td>
<td>867.00</td>
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<td>549</td>
<td>1076</td>
<td>808.80</td>
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<tr>
<td>Combination Group, III</td>
<td>40</td>
<td>578</td>
<td>1110</td>
<td>866.77</td>
<td>132.090</td>
</tr>
</tbody>
</table>

Discussion

A comparison of means of medical/surgical II HESI exam scores of the students in the two groups provided evidence suggesting that traditional clinical learning experiences promote superior learning than HFS clinical learning experiences. These results were consistent with Coke et al.’s (2009) findings which also showed that students who were engaged in HFS classes alone performed significantly lower than those taught through traditional learning experiences. The medical/surgical III HESI exam showed that the performance of students in the two groups were equal, suggesting that HFS does not promote superior learning and performance as was suggested by Gates et al. (2012) and Lewis et al. (2012). A look at the changes in the students’ performance in medical/surgical II and III exams shows that indeed integrating HFS in clinical learning experiences promotes greater learning and retention. Gates et al. (2012) also share this view. The results showed that while there was a decline in the performance of students in the traditional learning group, the students in the combination group experienced significant improvement in their performance over the one year period. This suggests that HFS could have played a role in increasing the students’ learning and retention.

Conclusions

The findings of this project provide evidence of effectiveness of HFS in improving nursing students’ learning as well as knowledge and skills retention. The results of the project
were affected by several factors. First, the project assumes that the learning content and teaching practices remained the same except for the use of HFS even though the faculty undertook a review of the curriculum, teaching plan, as well as its test plan and test item design. These could have also affected the scores. Second, the sample size that was used in this study could have been larger to provide more conclusive results. Third, the study did not analyze whether those who were predicted to fail in the NCLEX-RN® improved on the HESI exam when they were taught using both HFS and traditional teaching methods.

**Recommendations**

Recommendations to the community college would be to conduct further study with a larger sample size. Further study should consider adopting an experimental design, with a control group and an experimental group. This could be done by using two or more schools with similar learning content. Another recommendation would be to extend the length of time for the study, to follow the student from admission through graduation looking at HESI exam results throughout the program correlating HESI scores to NCLEX-RN® results.
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APPENDIX A. STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University’s Academic Honesty Policy (3.01.01) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person’s ideas or works.

The following standards for original work and definition of plagiarism are discussed in the Policy:

Learners are expected to be the sole authors of their work and to acknowledge the authorship of others’ work through proper citation and reference. Use of another person’s ideas, including another learner’s, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)

Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else’s ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University’s Research Misconduct Policy (3.03.06) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.
Statement of Original Work and Signature

I have read, understood, and abided by Capella University’s Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA Publication Manual.

Learner name and date

Monica Taylor 6/17/15

Mentor name and school

Dr. Linda Matheson School of Nursing and Health Sciences