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Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate

Elwanda F. Adams Robertson

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Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate

Degree Nursing Program

Elwanda F. Adams Robertson

Submitted in Partial Fulfillment for the Doctor of Nursing Practice Degree

Regis University

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STANDARDIZED TESTING AND REMEDIATION

Abstract

First time pass rate success on the National Council Licensure Examination for Registered Nurses (NCLEX-RN) is an expectation for all nursing programs. Nursing faculty need adequate resources to assess, analyze, and support the development of individual plans for student success (Carrick, 2011). This project was created to address the less than 85% NCLEX-RN pass rates in a small private college. The project utilized three categories of computerized standardized Health Education Systems Inc. (HESI) exams; the A2 admission, specialty, and the E2 exit exams. Mandatory remediation directed at students who scored below the predetermined benchmark levels on the standardized exams was the intervention. Data was collected retrospectively following program graduation and NCLEX-RN licensure examination. Based on the results from this small sample size project, standardized testing and mandatory remediation may have contributed to improved NCLEX-RN program outcomes. Recommendations could be made that the program of nursing should adhere to admission requirements on the A2 composite admission exam. Students who score below benchmark on HESI specialty and exit exams should be required to participate in mandatory remediation.

Key Words: DNP Capstone Project, Standardized Testing, NCLEX-RN, Remediation, Retention

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STANDARDIZED TESTING AND REMEDIATION

Executive Summary

Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate Degree Nursing Program

Problem

Undergraduate students have varied academic preparation prior to entering nursing programs. Programs of nursing need to be prepared to make early identification of at risk students and provide practical interventions that will avert academic failure. Faculty need adequate resources to assess, analyze, and support the development of individualized plans for student success. Financial and accreditation sanctions accompany poor program outcome measures.

Purpose

The purpose of this evidence based project was to determine whether standardized testing coupled with enforcement of required remediation would improve NCLEX-RN pass rates in a small private college which had a first time NCLEX-RN pass rate below the national benchmark of 85% for three consecutive years.

Goal

The goal of this project was to improve the associate degree nursing program NCLEX-RN graduate pass rates to the national average of 85% over a two-year period.

Objectives

Project objectives identified for this project were: 1) administer HESI A2 exam prior to program admission as prescribed in the program admission requirements; 2) administration of HESI specialty exams upon completion of predetermined nursing courses within the program of nursing, and administration of four parallel versions of the E2 exam during the fourth semester of the program prior to graduation; 3) implement mandatory remediation for students who do not achieve the predetermined benchmark level on the HESI specialty and exit exams; and 4) compare control group and intervention group data using descriptive and inferential statistical analysis to explore the relationship between A2 scores, specialty exam scores, E2 scores, and NCLEX-RN outcomes.

Plan

This project was a quantitative, retrospective, comparative study that compared Associate Degree Nursing program NCLEX-RN pass rates between the Fall 2013 graduates in the control group with the Spring 2015 graduates in the intervention group.

Outcomes and Results

The 2013 control group pass rate was 50%. The 2015 intervention group pass rate was 86.66 %. Standardized testing, coupled with enforcement of required remediation, may have contributed to an improvement of NCLEX-RN pass rates in a small private college that had a first time NCLEX-RN pass rate below national benchmark of 85% for three consecutive years.

STANDARDIZED TESTING AND REMEDIATION

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Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate
Degree Nursing Program

Introduction

The U.S. Bureau of Labor Statistics reports that the nursing shortage will grow to an astounding 1.05 million registered nurses (RN) by the year 2022 (American Association of Colleges of Nursing, 2014). The Carnegie Foundation for the Advancement of Teaching determined that every nursing school would need to increase enrollment by 90 % to meet the current and projected RN predicted needs (Benner, Sutphen, & Day, 2009). In many colleges and universities, increasing nursing student enrollment annually is not a realistic goal related to availability of nursing faculty and clinical sites. Nursing programs need to place an impetus of focus on the criteria of those students accepted into the program (American Nurses Association, 2011). More focus will also need to be placed on the retention of students (Newton, Smith, Moore, & Magnan, 2007).

Graduates of nursing programs must pass a National Council Licensure Exam for Registered Nurses (NCLEX-RN) in order to work as a professional nurse. The program's NCLEX-RN pass rate represents the proportion of graduates that pass the licensure exam on the first attempt. Nursing programs are highly regulated by state boards of nursing (BON) and in order for a program to remain in good standing, it must maintain a minimum pass rate (the state board of nursing standard) for new nursing graduates (McHugh, 2013). Boards of nursing are legislated the responsibility of protecting the public by assuring that nurses who practice in their state are safe, competent, and ethical practitioners. This responsibility is implemented through legislated nurse practice acts and administrative rules that define and regulate nursing practice and nursing education (Wangerin, 2015).

Problem Recognition and Definition

Students in undergraduate programs have varied academic preparation prior to entering their first nursing course. Programs of nursing need to be prepared to make early identification of at risk students and provide timely interventions that will prevent academic failure. Faculty need adequate resources to assess, analyze, and support the development of individualized plans for student success (Carrick, 2011). Poor program outcome measures including high student attrition, and decreased NCLEX-RN program pass rates, are detrimental for the individual student, the program, the university, and the future health care workforce (Stillwell, 2012).

There are also financial and accreditation sanctions that accompany poor program outcome measures. In 2016 the total, first time, US educated NCLEX-RN pass rate was 84.57%. The repeat exam NCLEX-RN pass rate was 46.14% (NCSBN, 2016). Anecdotal reports indicate pass rates decline exponentially with each subsequent attempt. A graduate who has failed three times is unlikely to ever pass without re-education. Failure to achieve the minimum pass rate will ultimately result in the BON closing the nursing school, after a period of correction, which varies by state. Graduates who cannot pass the NCLEX-RN cannot work as an RN. For many students, loans allowed the student to attend school. Without the RN position, the student cannot repay the student loan. The school then incurs a high loan default (McHugh, 2013).

To better prepare students for the NCLEX-RN and increase first time pass rates, nursing programs across the United States are using standardized testing systems to implement policies that require students to achieve a benchmark score before being allowed to graduate. Some schools use standardized testing results at the conclusion of predetermined nursing courses in order for the student to progress in the program (National League for Nursing, 2012). These policies are designed to identify at risk students prior to graduation and NCLEX-RN candidacy

so that remediation can be initiated and NCLEX-RN failure averted (Nibert, Young, & Britt, 2006). Remediation is recommended to accompany standardized testing because when testing holds no consequences and remediation is not required, students are likely to devalue the standardized exams and view the entire process as unimportant (Lauer & Yoho, 2013).

Project Purpose

The purpose of this Doctorate of Nursing Program (DNP) project was to determine whether standardized testing coupled with enforcement of required remediation would improve program NCLEX-RN pass rates in a small private college in the south-central region of the United States which had a first time NCLEX-RN pass rate below the national benchmark of 85% for three consecutive years.

Problem Statement

The Associate Degree Nursing (ADN) program in a small private college in the south central region of the United States began to experience NCLEX-RN performance rates less than 85%. As a result, the program was at risk of being placed on probation by the State BON. The Accreditation Commission for Education in Nursing (ACEN) had also placed the program on warning status related to the program pass rates.

Because of imminent sanctions by the State BON and the accreditation agency, in fall 2012, the ADN program faculty chose to implement the Health Education Systems Inc. (HESI) standardized testing system. Standardized examinations have been found to be successful measures for benchmarking program outcomes, measuring student achievement, and guiding remediation prior to licensure candidacy (Elsevier, 2016). The standardized exams are content specific and based on the National Council of State Board of Nursing (NCSBN) testing blueprint. The HESI exit exam (E2) has been shown to be an accurate predictor (up to 98%) of

success on the NCLEX-RN exam (Zweighaft, 2013). The program of nursing developed an eligibility for graduation policy to explain the purpose, rationale, expectations, and background for the utilization of standardized testing within the curriculum of the program. An eligibility for graduation policy consent form (Appendix A) was developed to ensure that all students understood the purposes of the graduation policy.

During this same period, the program of nursing experienced a high rate of turnover within the nursing faculty. In the summer of 2013, this author became the new ADN program chair. It was noted by the program chair that the turnover of faculty had led to a lack of consistency in the utilization of the testing products and student remediation efforts. The standardized tests had been administered but there was a lack of adherence to the policies related to remediation.

PICO

This project was an evidence based practice (EBP) project in which a quality improvement plan was completed. The project was internal to an agency and was intended to inform the agency of issues regarding the quality of education, and the quality improvement of program outcomes. The results of this project were not meant to generate new knowledge or be generalizable across settings but rather seek to address a specific population, at a specific time, in a specific agency. The project utilizes the acronym “PICO” rather than stating a formal research hypothesis. The acronym stands for: Population or Disease (P), Intervention or Issue of Interest (I), Comparison group or Current Practice (C) and Outcome (O) and is usually framed as a question (Meinyk & Fineout-Overholt, 2010, p. 31).

The PICO question this project addresses is: Within this ADN program will standardized testing and enforcement of required remediation contribute to achievement of NCLEX-RN pass rates at or above the national average of 85% over a two-year period?

When this question is placed in the PICO format, it reads:

- P Students enrolled in associate degree nursing program
- I Standardized testing and enforcement of required remediation to improve program outcomes on NCLEX-RN exam (Intervention group: 2015 cohort)
- C Standardized testing required but not used as guide for remediation or indicator of NCLEX-RN success (Control group: 2013 cohort)
- O Achievement of NCLEX-RN pass rates at or above national average of 85% over a two-year period

Project Significance, Scope, and Rationale

This project was created to address the less than 85% NCLEX-RN pass rates in a small private college. HESI standardized testing had been implemented in spring 2012 to provide custom testing at predetermined points in the nursing curriculum, and an exit exam at the end of the curriculum. However, the test scores were not used in any way to further develop students prior to graduation. In this project, starting in fall 2013, mandatory remediation directed at students who scored below the predetermined benchmark levels on the standardized exams was implemented. The total number of students involved in this project was 29. Fourteen students were in the 2013 control group, and 15 students were in the 2015 intervention group. Data was collected retrospectively following program graduation and NCLEX-RN licensure examination.

Theoretical Foundation for Project

A nursing theory and an adult learning theory were chosen to form the theoretical framework for this research project. Brockett and Hiemstra first presented the Self-Direction in Adult Learning Theory in 1991. This theory proposes that all learners can be empowered to take responsibility for learning; that a certain level of self-direction exists in every individual and in all learning situations. Self-directed learners are able to transfer knowledge or make application of information gained in one environment or situation to other settings. Examples of self-directed learning activities include self-guided reading, study groups, electronic interactive learning activities, and reflective writing. The role of the teacher is to dialogue with the learner, provide necessary resources, evaluate learning outcomes, and promote critical thinking (Brockett & Hiemstra, 1991).

The self-directed adult learning theory as described by Brockett and Hiemstra (1991) supported the teaching learning paradigm adopted by this project's program of nursing faculty while implementing the standardized testing and mandatory remediation strategies. Standardized testing and remediation strategies were tools by which the faculty found success and gained a confidence in their ability to facilitate self-directed remedial activities and improve student-learning outcomes. While participating in the remedial activities the students overcame their fear of failure and were empowered by the faculty to take back the responsibility for their own learning.

The self-directed learning theory is congruent with Margaret Newman's nursing theory of Health as Expanding Consciousness and Personal Transformation. Both theories have implications for nursing education. Newman uses the term self-awareness to describe the process wherein an individual becomes empowered to gain a greater understanding of one's own

circumstances in the midst of challenges and as a result becomes engaged in strategies that lead to a positive progression. Newman (2003) says that it is nursing's responsibility to help patients let go of the artificial, self-imposed boundaries that may have negative effects in their lives. The required remediation following the standardized testing is an example of this positive progression applied to nursing education.

Newman's theory defines personal transformation as a dynamic and uniquely individualized process of expanding consciousness. The individual becomes aware of old and new self-views and then integrates these views into a new self-definition. Transformational learning is dialogue driven inquiry, which enables self-discoveries. Through transformation the individual's feelings, imaginings, and thoughts are unified with actions. The individual moves from an attitude of ego-centered to ego-transcendence (Newman, 2003). The educator can promote transformation by enabling the learner to enter into inner dialogue. Transformation from the educational perspective is an interactive process (Wade, 1998). Faculty facilitated remediation following high stake standardized testing is an example of transformational learning (Wade, 1998).

In this project, specialty exams were administered at the end of six predetermined nursing courses. Students were aware that remediation would be required if the score on the specialty exam was below the predetermined benchmark score of 900. The depth of remedial assignments would be dependent upon the level of deficit identified by the exam. When faced with a score below the benchmark, students may have viewed the standardized testing exams as an obstacle in the path. Faculty observed student behaviors ranging from angry outbursts to emotional breakdowns. These behaviors are often manifestations of stress. Stress within the context of high stakes exams has the potential to be exacerbated, especially when faced with heavy academic

and clinical responsibilities. The student begins to fear failure and may begin to grieve a potential loss of career path. The student's ego-identity is challenged.

The student's response to stress as described here is congruent with Hans Selye's General Adaptation Syndrome (Selye, 1956). A relationship can be forged between the instructor and the student during the remediation sessions that may empower the student to overcome personal fears, and feelings of anger and frustration that often accompanies standardized testing scores that fall below benchmark. Open and reciprocal dialogue between the educator and the student cultivates new meaning to the testing and remediation. The required remediation is no longer viewed as a threat but rather a process that may lead to success on the NCLEX-RN. The student feels supported by the faculty and begins the process of transformational learning.

Literature Selection

A literature review provided a background for the project (Appendix B). Search terms and databases were used to review the literature in a comprehensive manner. Search terms included NCLEX-RN pass rates, HESI standardized testing, nursing education outcomes, predictors of success, student attrition, remediation and retention. Databases included CINAHL, EBSCO, Medline, and Google Scholar. Forty-nine articles were initially obtained from the search, and after further refining, 34 were reviewed and evaluated for relevancy to this project. One limitation identified in the review of literature is the limited number of studies that can be classified as Level I studies. Level I studies are systematic review or meta-analyses of relevant randomized controlled trials or evidence based clinical practice guidelines centered upon systematic reviews of randomized control trials. The majority of studies found in the literature were classified as level IV or well defined, case control, cohort, non-experimental studies (Houser & Oman, 2011).

Review of Evidence

National accrediting agencies and State Boards of Nurse Examiners utilize the NCLEX-RN pass rates as a benchmark measure of a nursing program's curricular effectiveness. Nursing faculty and administrators are highly disappointed when program graduates fail the licensure exam, as it is a reflection on the quality of the school and the faculty (Wangerin, 2015). An ongoing pattern of mediocre pass rates can place a nursing program's accreditation at risk, and poor pass rates can hinder recruitment of well-qualified applicants. Potential consequences of NCLEX-RN failure have long motivated nurse educators to search for measures of student readiness for licensure examination (Langford & Young, 2013). A nursing program's existence depends on maintaining a minimum pass rate at or above the national pass rate standard. Low pass rates will result in probation and possible loss of the nursing program (McHugh, 2013).

One strategy used by nurse educators to improve NCLEX-RN readiness is standardized testing. HESI standardized nursing exams were developed in the early 1990s (Nibert & Morrison, 2013). The exams are an evidence based, research driven product developed to provide students with psychometrically sound standardized testing, and to identify areas of weakness for individualized student remediation (Nibert & Morrison, 2013). HESI testing can be used at specified intervals throughout a program of nursing curriculum. Nursing faculty must determine how to best implement standardized testing within their particular environment and how to use the exam findings to enhance student's remediation efforts (Nibert et al., 2006). The HESI admissions assessment exam (A2) assesses prospective student's readiness for nursing education. Specialty exams provide a formative evaluation of student mastery of content, and allow remediation needs to be addressed early. HESI exit exams (E2) can be used to determine student readiness for the NCLEX-RN (Chen & Voyles, 2012).

HESI Admissions Assessment Exams (A2)

There are eight subsets that make up the academic component of the A2. Each nursing program is expected to choose the appropriate subsections of the exam to adequately assess a potential student's fitness to their program. Detailed individual diagnostic reports including composite scores, subject-area composite scores, and percentage scores are provided for prospective students and educators. The overall A2 composite score incorporates the mean scores from all the subsets administered (Basi, Glass, Grams, & Johnson, 2013). Applicant scores on the (A2) provide objective data that can be used to strengthen evidence based admission decisions. Many schools require a definite passing composite score on the A2 in order for students to be eligible for admission (HESI Exam Guide, 2015).

Peer reviewed research findings have shown that A2 scores are valid predictors of student success and are valuable components in nursing program admission. Basi et al. (2013) recommended the level of student ability necessary for successful program completion for RN program applicants is a 75% minimum cumulative score over the academic subject areas tested. Five component scores: basic math, reading comprehension, grammar, vocabulary and general knowledge, and anatomy and physiology and the A2 composite scores have been strongly correlated with first and second semester nursing courses within ADN programs, which is when most attrition occurs (Chen & Voyles, 2012; Knauss & Willson, 2012; Lauer & Yoho, 2013; Murray, Merriman, & Adamson, 2008; Underwood, Williams, Lee, & Brunnert, 2012).

A study by Chen and Voyles (2012) recommended utilizing the A2 in conjunction with pre-nursing program course grades in an admission process because the value of such grades in determining admission may be questionable. Potential for concern was based on problems associated with grade inflation and variable grading systems. Lauer and Yoho (2013) found that

when the A2 is used as an admission criterion the students selected for programs are more likely to graduate because they have demonstrated that they are academically prepared for the rigors of a nursing curriculum.

In one study, a total of 217 students took the A2 exam, and of those students, 80 did not complete the program within two years. A t-test was used to assess the difference in A2 scores for those who completed the program and those that did not. The A2 scores were significantly higher ($p < .001$) for those who completed the program within two years (Murray et al., 2008). A2 scores provide a valuable measure of student ability to succeed within the nursing program and enable faculty to make evidence-based decisions regarding applicant selection (Underwood et al., 2012).

HESI Specialty Exams

The purpose of any nursing program is to educate competent, committed, and caring registered nurses. HESI specialty exams were designed to expose students to standardized testing early in the education process, and to measure the students' ability to apply concepts related to specific clinical nursing content areas (Morrison, Adamson, Nibert, & Hsia, 2004). Nurse educators administer HESI specialty exams with the intention of identifying at risk students, identifying knowledge gaps, and providing remediation to improve student scores on the E2 (Lavandera et al., 2011; Spurlock & Hunt, 2008; Zweighaft, 2011). The E2 has been determined to have an accuracy of between 96.36% and 99.16% in predicting NCLEX-RN success (Nibert & Morrison, 2013; Zweighaft, 2016).

Zweighaft (2011) evaluated the effectiveness of HESI specialty exams on HESI exit exams and NCLEX-RN student performance in baccalaureate, associate degree, and diploma nursing programs. An independent samples t-test was used to compare scores on the E2 of

students who attended schools that used both specialty and E2 exams with scores of students who attended schools that did not use specialty exams. There was a statistically significant difference in the average scores of students who took specialty exams and students who did not. HESI specialty exams were found to be associated with higher student scores on the E2. The study (Zweighaft, 2011) found that 91.5% of students who scored in the range of 850 – 900 on specialty exams passed the NCLEX-RN on the first attempt. As HESI specialty exam scores decreased, the percentage of NCLEX-RN failures increased. A chi-square test for independence found that the Critical Care, Pediatrics, and Medical Surgical specialty exams were best indicators of NCLEX-RN success. The use of specialty exams expose students to standardized testing early in the curriculum, which may explain why users of specialty exams had higher E2 scores than nonusers (Zweighaft, 2013, 2014).

Summary reports of HESI specialty and exit exams generated from each individual student's exam provide content scores that can guide student remediation efforts. The summary reports provide a measure of external curricular evaluation, which compares a student or group of students to an overall student population. These external sources may also be useful in evaluating nursing curricular strengths and weaknesses (Zweighaft, 2016). Lauer and Yoho (2013) found that specialty exams, as an ongoing measure of student performance and curricular effectiveness, helps to ensure that student weakness as well as program curricular weaknesses are identified early so that action can be taken to rectify those weaknesses.

HESI Exit Exams E2

The HESI E2 exams are based on the blueprints for the NCLEX-RN licensing exam. These exams allow faculty to consistently and authoritatively evaluate student learning, provide direction for remediation, and evaluate the strength of the program curriculum (Elsevier, 2016).

When nursing program outcomes related to NCLEX-RN pass rates decline, the faculty focus needs to be on improving the quality of the program (Nibert & Morrison, 2013). Program improvements must include analysis of the curriculum, implementation of evidence based practice strategies, and faculty development (Jones & Pendergraft, 2013). Program improvements of curriculum requires implementing internal and external curriculum and program evaluation methods. Internal curriculum evaluation includes policies and strategies to measure outcomes described in course syllabi to include: faculty development to advance proficiency in test item writing, test blue printing, and the use of item analysis data, to evaluate and improve faculty designed exams. External curriculum evaluation can be defined as the use of standardized testing to compare one student or a group of students with the national population (Schroeder, 2013).

External curricular policies are needed to address the evaluation of external curricular program outcomes including NCLEX-RN pass rates and accreditation commission's outcomes standards. External curriculum policies are also necessary to facilitate the 'best practice' implementation of standardized testing, remediation, and progression strategies (Barton, Willson, Langford, & Schreiner, 2014; Schroeder, 2013; Spurlock & Hunt, 2008). According to a study by Eun, Knoetek, and Heining-Boynton (2008) students are positively influenced by the voice of authority when program outcomes and student learning goals are compatible. If a student is aware of a policy that prevents progression in the event of a substandard standardized test score, then it is more likely that they will internalize the responsibility and urgency for test preparedness.

For program faculty, testing and progression policies are the blueprint by which they can enable the student to be successful. If the faculty believes that a remediation plan will result in

greater student success, then they will internalize the responsibility for providing adequate test preparation and remediation (Barton et al., 2014). Students and faculty value standardized exams that are reliable and valid in predicting success on NCLEX-RN exams. Students appreciate when the testing environment and the test itself closely models the actual licensure exam experience because practice that mimics the real exam may help diminish the ‘high stake’ test anxiety related to the NCLEX-RN exam (Mee & Hallenbeck, 2012).

Schroeder (2013) implemented strategies for both internal and external curriculum evaluation. These strategies were formalized with the development of a testing policy manual that described the procedures used to implement the internal and external curriculum evaluation process. To measure the effectiveness of the testing policy, NCLEX-RN outcomes were compared before and after implementing the testing policy. Findings indicated that the mean NCLEX-RN pass rate for the five years following implementation of the testing policy was significantly higher ($p < .01$) than the mean NCLEX-RN pass rate for the five years preceding implementation of the testing policy.

In programs where policies have been developed for progression based on student performance on the HESI E2, the faculty determine the benchmark scores that identify students who are at risk of NCLEX-RN failure, and in need of remediation (Nibert et al., 2006). In many instances, policies have been implemented whereby the specialty exam scores and E2 scores are also applied to final course grades (Coon, 2014). Benchmarks for E2 scores used for progression and remediation vary widely in the literature (Nibert et al., 2006). Much inconsistency was noted among programs related to the weight of the standardized exams on final course grades (Coon, 2014).

Since 1996, the effectiveness of the multiple parallel versions of the E2 has been evaluated using an ex post facto, non-experimental design in 11 validity studies (Elsevier, 2016). Repetitive exit exam testing was addressed in the sixth validity study. Three versions of the E2 were evaluated. Students who scored 900 on the first attempt passed the NCLEX-RN 96.44% of the time. Ninety-three percent of students who achieved 900 on version two passed the NCLEX-RN on the first attempt. Students who achieved 900 by the third version passed the NCLEX-RN on the first attempt 82.5% of the time (Adamson & Britt, 2009). A one-way ANOVA revealed no significant difference in the predictive accuracy between exit exam versions one and two. The third version of the exit exam was found to be significantly less accurate in predicting NCLEX-RN success (Adamson & Britt, 2009). These findings have been supported by multiple studies (Lauer & Yoho, 2013; Lavendera et al., 2011; Nibert & Morrison, 2013; Sullivan, 2012).

Langford and Young (2013) found that allowing students to repeat the exit exam until they are successful, dilutes the relationship between the exit exam score and the NCLEX-RN outcomes. Students requiring multiple attempts to reach benchmark are more likely to fail the NCLEX-RN exam with each successive retesting than are students who achieve the benchmark on the first attempt. Spurlock and Hunt (2008) recommended attaching consequences to standardized testing and requiring remediation for students who do not achieve benchmark scores. The results of the study indicated that if testing holds no consequences, and remediation is not required, students are likely to devalue the standardized testing exams and view the entire process of testing and remediation as unimportant. E2 scores were significantly higher when consequences were associated with program progression and when remediation was required, rather than merely suggested.

Barton et al. (2014) surveyed 64 nursing programs regarding current policies and practices related to the use of E2 exams. Elsevier (owner of HESI) recommends a minimum benchmark score of 900 for the specialty and exit exams, but many schools have chosen to implement lower benchmarks. This study determined that the predictive accuracy of the E2 decreased with each descending scoring level:

- E2 scoring level of 900 or better equaled 98.26% accuracy
- E2 scoring level of 850 – 900 equaled 95.13% accuracy
- E2 scoring level of 800 – 849 equaled 92% accuracy
- E2 scoring level of 700 – 799 equaled 86% accuracy
- E2 scoring level of less than 699 equaled 71.30% accuracy

Fifty-six percent of the schools surveyed had set consequences for not meeting the benchmark score and these included; course failure, delayed NCLEX-RN candidacy, and delayed graduation. The study revealed that schools having a consequences related policy had a mean score of 907.2 and those without the policy had a mean score of 855 (Barton et al., 2014). Sullivan (2012) studied the NCLEX-RN first time pass rate of students in programs that required a minimum benchmark score as a graduation prerequisite. Using an algorithm designed by the researcher, it was determined that 73% of the students who were not allowed to graduate due to the progression requirement on the E2 would have also failed the NCLEX-RN on the first attempt. Only 27% of the students would have passed the exam on their first attempt.

Spurlock and Hunt (2008) proposed that predicting NCLEX-RN failure with a diagnostic or predictive test can be very challenging because for most schools, NCLEX-RN failures are relatively low in prevalence. In this study, a sample size of 179 students were allowed up to five attempts to achieve a benchmark score of 850 on the E2 exam. No mention was made in the

study of the utilization of specialty exams or remediation being required between E2 attempts. A progression for graduation policy had been developed but never fully implemented. Out of 167 students who achieved the benchmark score, 22 failed the NCLEX-RN on the first attempt. Twelve students were expected to fail the NCLEX-RN because they graduated from the nursing program without achieving the 850 score. Ten of those students went on to pass the exam on the first attempt.

Based upon their findings, Spurlock and Hunt (2008) indicated that the first E2 exam score was statistically significant related to NCLEX-RN outcomes. Those students who scored very highly on their first attempt did in fact have little chance of failing the NCLEX-RN. A student score of 650 and below was linked to an 87% chance of failing the NCLEX-RN on the first attempt. When students were allowed to retake the exit exam multiple times to achieve the minimum 850 required to graduate, the relationship between the exit exam scores and NCLEX-RN outcomes nearly disappeared.

Lauer and Yoho (2013) determined that E2 scores were statistically significant predictors of NCLEX-RN success, but these scores alone did not perform well as a sole predictor of NCLEX-RN failure. The findings in this study suggested that a 'best practice' approach would be to utilize the E2, and the student's academic performance, based upon the nursing grade point average (GPA) to more accurately identify students at risk for first time NCLEX-RN failure.

Remediation

Barton et al. (2014); Dufrene, Hodges, and Vandergerg (2016); Langford and Young (2013) studied nursing program policies related to mandatory remediation requirements for scores below the required benchmark on the E2. The majority of the programs required 2 to 6 weeks of remediation (Langford & Young, 2013). Schools with a mandatory remediation policy

had a mean score of 885.18 on the E2 and those without a policy had a mean score of 849.91 (Barton et al., 2014). Program faculty developed remediation plans and the students were mandated to participate in the remediation plans. Remediation strategies included self-guided remediation (case studies, test items, study guides, online student resources, NCLEX preparation books), faculty guided group remediation, faculty guided individual remediation, formal review and remediation (HESI, ATI, Kaplan), and peer/mentor tutoring (Barton et al., 2014; Langford & Young, 2013; Pennington & Spurlock, 2010; Schroeder, 2013).

Dufrene et al. (2016) evaluated the impact of case studies on specialty and E2 exam scores. Student groups who used the case studies as remedial tools scored higher on both specialty and E2 exams than the groups of students who did not use case studies. McGann and Thompson (2008) found that faculty guided remediation can facilitate behavioral changes that may contribute to academic success for at risk students. Remediated students reported developing a positive relationship with the remedial faculty and felt the instructor was most effective when they were honest, direct, and excellent listeners. Remedial sessions with the faculty support person increased student motivation, decreased anxiety, and helped students set priorities. It was noted that remediation may force the student to face their academic issues in a realistic and concrete fashion (McGann & Thompson, 2008). The remedial process should also include teaching at risk students to use learning and motivational strategies and self-management skills to improve academic success (Langford & Young, 2013).

McHugh (2013) studied the effects of high stakes testing and remediation on NCLEX-RN success. The study described the outcomes of an NCLEX-RN pass rate improvement plan implemented in four nursing programs with six different campuses. All programs were in jeopardy of closure due to low NCLEX-RN pass rates and or high student attrition. In this study,

McHugh (2013) identified a mismatch between student and faculty expectations of each other. Nursing students viewed the degree as an outcome, and viewed themselves as customers. The instructor was viewed as their employees. The students who struggled with the rigor of the nursing courses felt that the school was responsible for their learning, and held the strong opinion that “teachers should teach me”. In contrast, the nursing instructors viewed knowledge and expertise as the outcome. They sometimes viewed the students as subordinate, and viewed themselves as knowledge imparters and gatekeepers against incompetence. The faculty paradigm was that the students were responsible for their own learning and academic success.

The programs in the McHugh (2013) study implemented interventions to increase the rigor of the nursing courses and instituted high stakes testing in every course. Additional interventions included: early identification of academic performance problems, immediate implementation of low academic performance contracts, supervised study sessions, and tutoring. Students scoring below 80% on any exam were required to attend two 8-hour instructor staffed study halls each week. Instructors provided remedial materials, tutoring, and graded homework assignments during the study hall sessions. McHugh (2013) concluded that low pass rates can be reversed through increased academic rigor. However, academic rigor alone will improve pass rates, but will also result in lower graduation rates. High stakes, standardized testing is key to ensuring that at risk students have mastered content. Supervised study sessions, tutoring, and remediation following standardized testing, in addition to increased rigor, will achieve high NCLEX-RN pass rates and higher program graduation rates.

This review of the literature has provided evidence that the HESI E2 exam is more accurate at predicting first time NCLEX-RN success when it is used as a graduation requirement. From a student’s perspective, a requirement to pass a single exam in order to graduate may seem

unfair, after spending time and money for an education (Sullivan, 2012). A single ‘high stakes’ exam can cause pronounced personal, social and financial stress for the student. Nursing programs are encouraged to consider the profound impact such exams can have on a student’s potential livelihood. The E2 should be only part of a progression policy. Continued remediation is essential for all students, but it is a paramount concern for those who require retesting to achieve benchmark scores (Barton et al., 2014; Lauer & Yoho, 2013; Nibert et al., 2006; Spurlock & Hunt, 2008; Sullivan, 2012).

Project Plan and Evaluation

Market Risk Analysis

A SWOT analysis is a structured tool for evaluating the strengths, weaknesses, opportunities and threats of a project. Strengths are those things that provide support to a project (Zaccagnini & White, 2014). There were a number of strengths identified for this project (Appendix C). A new college provost was hired during the summer of 2014 who had a vision of change for the institution. Overall college enrollment increased for fall 2014 by a gain of 100 students in the freshman cohort. In the ADN program, all six nursing faculty were masters prepared. Five of the six nursing faculty were new hires in 2013, and all returned to begin the academic year in fall 2014. The ADN graduates’ skills were in high demand in the community in both acute care and long-term care facilities. There was strong support from nursing administration in the local health care facilities to provide clinical sites and to serve as members of the nursing program advisory board.

Though there was strong support for the program, certain weaknesses were identified. Weaknesses are those internal aspects of a project that could be improved, that are resource poor or that might otherwise negatively influence the project (Zaccagnini & White, 2014). The

counties included in the project program's service area have a high rate of poverty and are listed as medically underserved areas on the Health and Human Services (HHS) website (United States Department of Health and Human Services, 2012). In addition, according to the High School Feedback Report (2013) the average composite American College Testing (ACT) for the high schools located in the service area was 18.8, which is less than most of the state's college admission eligibility requirements. An additional weakness was the high cost of the program in terms of tuition, books, supplies, and uniforms. The program faced competition from other schools in the service area, which included two community colleges and a Bachelor of Science (BSN) program. As a result, it was also difficult to find qualified candidates for this selective admission program.

Opportunities and threats are those things external to the project that might be involved in successful project completion (Zaccagnini & White, 2014). A primary external opportunity for the program was recruitment of student athletes. The program director collaborated closely with coaches and the athletic director to foster a 'can do' attitude for student athletes interested in the nursing program. On-site tours of the nursing laboratory and support areas were provided to both high school and middle school students from public schools in the service area. The program also reached out to recruit second career students in the service area because an associate degree program can be appealing to students during an economic downturn which existed in the counties surrounding the college campus.

The primary threat to the ADN program was the trending NCLEX-RN pass rate of less than 85%. The declining pass rate had a negative impact on the college's reputation and accreditation. An additional threat was the program admission and readmission process. Because of a decreased applicant pool, students were admitted into the program who did not meet

program admission criteria. Students who failed a nursing course were automatically readmitted the following semester. External stipulations imposed by the State BON and the accrediting agency required the college administration to support adherence to the program admission requirements and institute revised readmission policies. These changes resulted in a decrease in number of full time equivalent (FTE) students admitted into the program for the 2013 – 2014 academic year and thus increased the mathematical impact of any NCLEX-RN student failures.

Driving Force / Restraining Force

A driving force for the completion of this project was a concern shared by the college administration and the nursing faculty that the program might lose its accreditation. There was a probability that the State BON might also place the program on probation. Probationary status from the State BON would prohibit admission of students into the program for at least one full year and could result in closure if pass rates did not improve. A restraining force that was a challenge to overcome in this project was the resistance from the students. The students enrolled in the program feared the increased rigor of the nursing courses. They also feared failure of the program courses related to the standardized testing. The students did not fear failing the NCLEX-RN. It was well known that individuals had graduated from the ADN program, taken the licensure exam two or even three times, finally passed it, and were able to procure a nursing position.

Pre-nursing students attending the college feared taking the admission exam. A majority of the students who took the A2 exam were unable to achieve the required composite score of 77. Again, students were aware that this component of the program admission policy had not been adhered to in past admission cycles. Students felt that they were being unfairly treated when suddenly the current program of nursing chair was observing the published program admission

requirements. The project was highly supported by college faculty and administration and this was a sustainable force for the implemented changes.

Stakeholders and Project Team

The project team included the Regis University (RU) faculty project chair, a RU faculty who served as the project statistician, and the Regis University DNP student. A senior faculty member from the local college served as the project mentor. An Elsevier company (owner of HESI) representative, the nursing program faculty, and the college administration supported the project. The stakeholders included the program of nursing students, local health care agencies, the college community, the accreditation agency, and the State BON.

Cost-Benefit Analysis and Sustainability

The college administration demonstrated a commitment to the success of the program and its students by purchasing the HESI testing packages as well as remedial resources, software, and online programs to include case studies, practice exams, and adaptive learning systems software (Appendix D). In the fourth semester, the college provided a nationally recognized NCLEX-RN review course at no cost to the student. The benefits for the college and the student were parallel. The student paid approximately \$9400.00 per semester for full time tuition. In order for the investment to be beneficial the student must be able to matriculate successfully in the program, pass the NCLEX-RN following graduation and seek gainful employment as a registered nurse.

The college was tuition driven. Marginal NCLEX-RN pass rates have the potential for serious adverse effects on a program's reputation, as well as recruitment of potential students. The ability to receive government funding, grants, and private donations is affected by a program's first time pass rates. Program pass rates needed to improve in order for the program to

continue to exit. Helping the students achieve success on the NCLEX-RN was a high priority for the faculty, the administration, and the student.

It is important to identify students early and incorporate remediation from day one. To enhance sustainability of this project the program should build on the momentum of student success on the NCLEX-RN exam. Formative assessment interventions such as the HESI specialty exams should be sustained. It will be important to continue to develop a baseline of student assessment in the first semester, and continue to collect data as the student progresses. The program of nursing should consider providing a mentor or remedial coach with the primary role of assessment, analysis, and support of the development of individualized plans for students. The mentor or remedial coach would identify at risk students, assist the student to develop an individualized plan, provide follow up and accountability, and be a source of support and confidence building for the at risk student.

Mission and Vision

The mission of the nursing program was to prepare associate degree nursing graduates to practice as generalists upon graduation and to complete credentialing as a registered nurse. Associate degree nursing graduates use evidence-based-practice decision-making strategies to critically think, and provide holistic patient care within the community and society. The vision of the program of nursing was a commitment to educational excellence and the promotion of the nursing profession as a caring discipline with professional health care standards.

Goals

The goal of this project was to bolster the exit exam scores and improve the associate degree nursing program NCLEX-RN graduate pass rates to the national average of 85% over a two-year period.

Project Objectives

Project objectives identified for this project were:

- (1) Administer A2 exam prior to program admission as prescribed in the program admission requirements.
- (2) Administration of specialty exams upon the completion of predetermined nursing courses within the program of nursing. Administration of four parallel versions of the E2 exam during the fourth semester of the program prior to graduation.
- (3) Implement mandatory remediation for students who do not achieve the predetermined benchmark level on the specialty and exit exams.
- (4) Compare control group and intervention group data using descriptive and inferential statistical analysis to explore the relationship between A2 scores, specialty exam scores, E2 scores, and NCLEX-RN outcomes.
- (5) Compare NCLEX-RN pass rates of the control and intervention groups.

Specific benchmarks associated with the implementation of the project included the permission to conduct the project that occurred in spring 2015 followed by the sequence of events that concluded with the final written project submission in spring 2017 (Appendix E).

Logic Model

The logic model provided a diagram for this project (Appendix F). The issue of concern was that the program outcomes on NCLEX-RN pass rates were below the national average. Influential factors included a lack of rigor and lack of adherence to program policies. Students had been admitted to the program who were lacking in academic preparation. The academically weak students became overwhelmed by the academic rigor of the program. These students were

then unable to meet the expectations of the program when coupled with the pressures of personal obligations such as work, family, and finances.

The assumptions related to this DNP project were related to unit exams and NCLEX-RN outcomes. It is assumed that NCLEX-RN outcomes reflect the quality of the nursing program. An additional assumption was that students struggle with the application questions in nursing courses that are so different from questions faced in general education courses. Finally, an assumption was that nursing exams should evaluate student achievement and serve as a feedback loop to improve teaching and guide program evaluation plans.

The independent variable was the standardized testing and mandatory remediation implemented with the 2015 cohort group. The dependent variable was that the pass rate would be increased to 85%. The goal was that the students would be successful on the first attempt of taking the NCLEX-RN upon graduation from the program. Strategies to meet this goal included:

- Administration of the A2 exam as a component of the admission process;
- Administration of the specialty exams at the completion of the six targeted nursing courses;
- Administration of E2 exams with up to four parallel versions to achieve benchmark scores;
- Enforcement of mandatory remediation when benchmark scores were not achieved.

Population Sampling Parameters

The sample population consisted of the 2013 and 2015 ADN program graduates. Students enrolled in the ADN program were all considered full time students, and most were receiving some form of financial aid. Many of the students were single parents, and a majority of the students were employed at least 20 hours per week in addition to attending school. All students

enrolled in the program of nursing were caucasian. There were no minority students. The control group consisted of 14 fall 2013 graduates. The intervention group consisted of 15 spring 2015 graduates. The program admission criteria was the same for both control and intervention groups. The program's admission criteria included a pre-nursing grade point average of 2.75 and a grade of C or better in all pre-requisite courses. The minimal A2 composite score for admission to the program was set at 77.

Setting Description

The college was located in the south-central region of the United States. The total population of the service area was approximately 75,000 people. The U.S. Department of Health and Human Services (2012) lists the counties in the college service area as medically underserved areas. Medically underserved populations (MUPs) may include groups of persons who face economic, cultural, or linguistic barriers to health care. These areas have been designated as having too few primary care providers, a high rate of infant mortality, high poverty, and a high elderly population.

Protection of Human Rights

A letter of approval was obtained from the college administration to access student records (Appendix G). This author petitioned the local college's IRB Committee and the decision was made that approval was not required because of the type of data this research study would generate. The research would only report and compare group and mean scores for the control and intervention groups. The interventions implemented were designed to assist nursing students in achieving higher test scores while in the program and improve program outcomes on the NCLEX-RN (Appendix H).

IRB approval was requested and granted by the Regis University IRB Committee. The research projected minimal risk or benefits to the participants and the IRB review level was assigned Exempt status (Appendix I). This author completed the Collaborative Institutional Training Initiative (CITI) Social Behavior Research Investigators and Key Personnel Training Basic course (Appendix J).

This was a retrospective PICO project. There was minimal risk and benefit to the student because the data was gathered from student academic records following the graduation of both cohort groups. The only risk to the student was confidentiality. Confidentiality was carefully and strictly protected. Student names and academic factors were not reported. The predictors of the NCLEX-RN outcomes were the HESI A2 scores, specialty scores, and the E2 scores. No other variables were studied. The research project involved the collection of existing data and documents. The sources for the data collection were publicly available, or the information was recorded in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

Description of Research Design

This DNP project was a quantitative, retrospective, comparative study that compared ADN program NCLEX-RN pass rates between the fall 2013 graduates in the control group with the spring 2015 graduates in the intervention group. HESI standardized testing exams were purchased by the program of nursing and delivered electronically via a secure server to the school's computer lab. The three categories of HESI exams utilized by the program of nursing were the admission assessment (A2), six specialty exams, and four parallel versions (V-I, V-II, V-III, and V-IV) of the exit exam (E2).

The program of nursing had determined a minimal composite score of 77 on the A2 exam as one component of the program admission requirements for both the control and intervention groups. Pre-nursing students were informed via program handbills as well as in literature provided at mandatory pre-nursing admission conferences of the program admission requirements. Students were also made aware of an admission exam study guide resource for the A2 exam. This study guide resource was available for purchase in the campus bookstore. HESI specialty exams were administered at the end of six predetermined nursing program courses (Table 1).

Table 1

HESI Specialty Exams

Semester	Course Number	Course Name	Abbreviation
Semester I	NUR 110	Fundamentals of Nursing	Fund
	NUR 120	Nursing Pharmacology	Pharm
Semester II	NUR 150	Medical Surgical I Nursing	MS I
	NUR 160	Behavioral Health Nursing	BHN
Semester III	NUR 210	Medical Surgical II Nursing	MS II
	NUR 220	Nursing Care of Childbearing Family	CBF

If the student was unable to achieve the benchmark score on the E2 after four attempts, the student would not pass this NUR 270 Capstone course, and would not graduate from the nursing program. The program faculty had determined a benchmark score of 850 on the specialty exams and the E2 for the 2013 control group. This standard was increased to 900 for the 2015 intervention group based upon findings from the ninth HESI exit exam validity study

(Zweighaft, 2013). In the fourth semester, the college provided a nationally recognized NCLEX-RN review course at no cost to the student.

Table 2

HESI E2 Testing Calendar

2013 Control Group		2015 Intervention Group	
4 th Semester – Week 8	E2 Version I	4 th Semester Week 11	E2 Version I
4 th Semester – Week 10	E2 Version II	4 th Semester Week 14	E2 Version II
4 th Semester – Week 12	E 2 Version III	4 th Semester Week 16	NCLEX-RN Review Course
4 th Semester – Week 14	E2 Version IV	2 Weeks Post 4 th Semester	E2 Version III
4 th Semester – Week 16	NCLEX-RN Review Course	8 Weeks Post 4 th Semester	E2 Version IV

The nursing program attached the E2 to the NUR 270 Capstone course, which was offered during the second eight weeks of the final semester. During this course, students in both the control group and intervention group were also assigned a 120-hour clinical preceptorship experience. Students were required to complete the preceptorship and achieve benchmark level on the exit exam in order to pass the fourth semester capstone course. Students were allowed up to four parallel versions of the E2 to achieve a predetermined benchmark score.

Students in the 2015 intervention group were made aware that remediation would be required if the score on the specialty exam was below the predetermined benchmark score of 900 on a specialty or exit exam. The depth of remedial assignments would be dependent upon the level of deficiency identified by the exam. The program faculty developed an eligibility for graduation policy to explain the purpose, rationale, expectations, and background for the utilization of standardized testing within the curriculum of the program. An eligibility for graduation policy

consent form (Appendix A) was developed to ensure that all students understood that the standardized testing exams were utilized for the following purposes:

- Compliance with the program admission process
- Assurance of student preparation for NCLEX-RN
- Comparison of student knowledge with an external national standard to assure competence
- Assurance of continuous quality improvement of the curriculum
- Evaluation of program performance

Consent forms were obtained for each student in both the control group and the intervention group. Students were required to read and sign the consent form during orientation to the first nursing program course, and in each subsequent nursing course across the program curriculum. The student's signature acknowledged that the eligibility for graduation policy had been reviewed and that the student had been informed of the benchmark score for each specialty and exit exam.

Students in the 2013 control group were encouraged to use the specialty exams as a guide for remediation. Students in the control group were provided a copy of the computer-generated analysis of their performance each specialty exam (Appendix K), and were given written directions on how to access available online remediation provided by HESI through an Elsevier Evolve website. No mandatory remediation was provided or required by the program faculty.

Remediation contracts for HESI specialty and exit exams were developed with the students in the 2015 intervention group based upon the HESI score correlation table (Table 3) used to predict success on the NCLEX-RN (HESI Exam Guide, 2015).

Table 3

HESI Score Correlation Table

HESI Score	Correlation of Predicted Success on NCLEX-RN
> 950	OUTSTANDING probability of passing
900 - 940	EXCELLENT probability of passing
850 - 899	AVERAGE probability of passing
800- 849	BELOW AVERAGE probability of passing
750 - 799	Additional preparation needed
700 - 749	Serious preparation needed
650 - 699	Grave danger of failing
< 649	Poor performance expected

Specialty exam remediation. Students in the 2015 intervention group were required to meet with the program of nursing chair to develop a remediation plan following each specialty exam:

- 900 and above: Students were required a two hour self-review in the computer lab of the questions missed and the provided rationales on the specialty exam within one week following the exam.
- 850 – 899: Completion of Adaptive Quizzing Assignments based upon the content tested was required. Elsevier Adaptive Quizzing Software was purchased for each student in the cohort. The Adaptive Quizzing Software is a learning system, which presents content and concepts to students in a digital format. As students apply what they have learned in response to questions posed by the system, the student's responses are captured digitally and evaluated by an algorithm based on sound learning theory. The system provides additional learning experiences based upon the student's response (Sportsman, 2014).

The learning experiences guide the student to additional appropriate content, leading them toward competence in the subject, and is designed to encourage consolidation of content into long-term memory. The system encourages students to be accountable for their own learning. The system allows the instructor to monitor the student's use of the system so that if students are not engaged in learning the content, the instructor can intervene. The system also provides summative data to both the learner and the instructor (Limke, 2013). The students were required to self-review the questions missed on the specialty exam by returning to the computer lab within one week of the date of the exam. Students were allotted two hours to self-review for each question missed as well as the provided rationales on each specialty exam.

- 800 – 849: Remediation study sessions were required. Each student was required to sign up for two sessions, which were scheduled over a period of one month following the specialty exams. The students were required to self-review the questions missed on the specialty exam by return to the computer lab within one week of the date of the exam. Students were allotted two hours to self-review each question missed as well as the provided rationales on each specialty exam.
- 799 and below: Remediation study sessions were required. Each student was required to sign up for two sessions, which were scheduled over a period of one month following the specialty exams. Elsevier online case studies were also assigned. The online case studies were available to the students via the Evolve website at no charge to the student. The case study assignment was based upon the deficiency areas on each specialty exam. Online case studies are designed to provide real world patient care scenarios accompanied by application-based questions and rationales that help students learn how to manage

complex patient conditions and make sound clinical judgements. The case studies also include alternative item formats to provide additional practice with NCLEX style questions (Elsevier, 2014). Students were allowed up to four weeks to complete the assigned online case studies. Students were required to self-review the questions missed on the specialty exam by returning to the computer lab within one week of the date of the exam. Students were allotted two hours to self-review each question missed as well as the provided rationales on each specialty exam.

E2 exit exam remediation. Students in the 2015 intervention group were required to meet with the nursing program chair to develop a remediation plan following each E2 exit exam:

- E2 - Version I (V-I): Administered in the 11th week of the fourth semester of the nursing program.
 - Remediation: All students were required to return to the computer lab to self-review questions missed on the Version I (V-I) of the Exit exam (E2) within one week of taking the exam. Each student was allotted two hours to review the missed questions and provided rationales on the exit exam.
- E2 – Version II (V-II): Administered in the 14th week of the fourth semester of the nursing program. Only students who scored below benchmark on the E2 (V-I) were required to take Version II of the exam.
 - Remediation: Students were required to return to the computer lab to self-review questions missed on the E2 (V-II) within one week of taking the exam. Each student was allotted two hours to review the missed questions and provided rationales on the exam.

All students in the cohort were required to attend a week long nationally recognized NCLEX-RN review course in the 16th week of the fourth semester. The course was provided at no charge to the students. Grades for the NUR 270 Capstone course were withheld until the review course was completed. Upon completion of the review course, a grade of “pass” was assigned in the NUR 270 Capstone course for all students who had achieved 900 or above on the E2 (V-I) and (V-II). The students were released to graduate from the program of nursing and take the NCLEX-RN exam.

- E2 – Version III (V-III): Administered two weeks post fourth semester. Only students who scored below benchmark on (V-I) and (V-II) were required to take Version III. Students who scored 900 or above on (V-III) were assigned a grade of “pass” in the NUR 270 Capstone course, allowed to graduate from the nursing program, and take the NCLEX-RN exam.
 - Remediation: Students not achieving benchmark level on the (V-III) were required to begin the Directed Studies course. The Directed Studies course was a six-week, (not-for-credit), post curricular course taught by the chair of the program. The course met three days per week for six hours each day.
- E2 – Version IV (V-IV): Administered eight weeks post fourth semester. Students who achieved the benchmark score were assigned a grade of “pass” for the NUR 270 Capstone course. Students who did not achieve the benchmark were assigned a failing grade for the NUR 270 Capstone course and did not graduate from the program of nursing.

Description of Project Tools

A2 admission exams. The HESI A2 consists of both an academic portion and a personality portion. There are eight subtests that make up the academic portion of the exam: math, reading,

vocabulary, grammar, biology, physics, anatomy and physiology and chemistry. The A2 score range is zero to 100. The personality portion of the exam consists of two sections; a learning style assessment and a personality profile. Nursing programs may choose to include the learning style assessment and the personality profile as optional components of the admission assessment. Applicant scores on the A2 exam provides objective data that can be used to strengthen evidence based admission decisions. Each school maintains their own criteria for admissions and required minimum scores (Basi et al., 2013).

Detailed individual student diagnostic reports and institutional summary reports are provided for both prospective students and educators. The reports and summaries include composite scores, subject-area composite scores, and percentage scores. The overall A2 composite score incorporates the mean scores from all the subtests administered (Basi et al., 2013). Individual student reports include scoring explanations and missed questions by topic for each subtest. Many schools require a definitive passing composite score in order for the student to be eligible for admission (HESI Exam Guide, 2015). The ADN program in this project chose the following subsets: math, reading, vocabulary, grammar, and anatomy and physiology. An A2 composite score of 77 was required for program admission.

Each subset of the A2 exam consists of approximately 50 questions. Math skills that are tested include: addition, subtraction, multiplication, division, ratios, proportions, fractions and decimals. A large portion of the math section included conversions, household measures, and dosage calculations. In the reading comprehension exam students are required to identify a primary theme, find the meaning of phrases in context, determine logical inferences, and understand reading passages. The vocabulary section measures the student's grasp of health care related terms. Basic grammar principles are evaluated. These include important terms, their uses in grammar, common grammatical errors, and parts of speech. The anatomy and physiology

component addresses anatomical structures, general terminology, and body systems (HESI Exam Guide, 2015).

Specialty exams. HESI specialty exams contain critical thinking questions that are used to measure students' knowledge of nursing content and their ability to apply concepts to clinical problems. Nurse experts including educators, practitioners, and researchers write the test items. Specialty exams are useful in that they expose students to standardized testing and provide a tool for faculty to identify remedial needs of students. Specialty exams are 55 item content focused exams typically administered at the conclusion of a nursing course, and usually count as some portion of the student's final grade in the course. Scores range from 0 to 1800 with the highest score dependent upon the difficulty level of the test items included in the exam (Zweighaft, 2013).

Students benefit from taking one or more specialty exams during their nursing curriculum. E2 scores were found to be higher in schools that administer specialty exams and remediated identified at risk students (Zweighaft, 2013). Summary reports generated from each individual student's exam provide content area scores that can guide student remediation efforts. Specialty exams administered as a portion of the course grade had a greater impact on the E2 than when specialty exams are used for practice and remediation only (Zweighaft, 2013).

E2 exit exams. The HESI E2 exams assess student preparedness for NCLEX-RN and can be utilized as a guide for remediation. The E2 is a 160-item computerized exam that is designed to simulate NCLEX-RN. Difficulty level and discrimination data are obtained on every test item with each use. A proprietary mathematical model is used to calculate HESI scores which range from 0 to 1500. The distribution of content on all exams is the same distribution of content described in the NCLEX-RN blueprint (Spurlock & Hunt, 2008). There are multiple, parallel

versions of the exit exam. HESI exit exams have been the subject of 11 validity studies that investigated the accuracy of the HESI E2 in predicting NCLEX-RN exam (Zweighaft, 2016). The exit exams were determined to have an accuracy of between 96.36% and 99.16% in predicting NCLEX-RN success (Nibert & Morrison, 2013; Zweighaft, 2016).

Instrument Reliability and Validity

Numerous studies have been conducted with HESI A2 entrance exams to address predictive validity in relation to success in nursing courses (Knauss & Willson, 2012; Murray et al., 2008; Underwood et al., 2012). The A2 exam has been found to be a valid predictor of student academic ability to succeed in nursing programs. In ADN programs, the A2 demonstrated a statistically significant positive correlation with 88.90% of all nursing course grades (Murray et al., 2008). Research with the specialty exams was incorporated into the 9th and 11th predictive validity research with the exit exam (Zweighaft, 2013, 2016). In these studies, E2 scores were significantly higher for those schools using the specialty exams in their courses. Content validity for the E2 is achieved through use of the NCLEX-RN exam blueprint to determine content, type of questions, and reading level. Reliability is determined for each version of the E2 by conducting item analysis on each exam and statistically calculating reliability.

A Kuder-Richardson Formula 20 (KR-20) is calculated for all HESI specialty and exit exams and these data are used to calculate the estimated reliability of the exam prior to its administration. The estimated reliability of the specialty exams ranged from 0.84-0.92. The E2 estimated reliability for all exit exams ranged from 0.90 – 0.94 (Zweighaft, 2013). For the 11 completed validity studies, the E2 was found to have 94.8% to 99.2% accuracy in predicting NCLEX-RN success for students who achieved the recommended score of 850 or greater on the E2 (Zweighaft, 2016).

Data Collection

The A2, specialty exams, and E2 scores were gathered by the primary researcher from student records after the student graduated from the program and had taken the NCLEX-RN exam. NCLEX-RN outcomes from the first exam attempt for each student in the 2013 control group was obtained from the State BON program report. NCLEX-RN outcomes from the first exam attempt for each student in the 2015 intervention group was obtained from the State BON online website utilizing the state licensure verification system. The information for each group was stored under lock and key in the primary researcher's office for protection of privacy. The researcher was the only person to view the student names attached to standardized testing scores and NCLEX-RN pass rates. A list of scores was compiled for each cohort. Names were not attached to the student scores.

Statistical Analysis

Control group and intervention group data was retrospectively analyzed. Descriptive and inferential statistics were utilized with the mean entry and exit exam scores and the NCLEX-RN pass rates. A mean A2 score was computed for both the control and the intervention group. A mean E2 score was computed for both the control group and the intervention group. Students were allowed up to four versions of the E2 exam. The final E2 score for each student was used in determining the mean E2 for each cohort. Statistical analysis utilizing the Pearson correlation coefficient and analysis of variance (ANOVA) was applied to explore the relationship between the mean A2 scores, the mean E2 scores, and the NCLEX-RN outcomes. NCLEX-RN pass rates were compared between the two groups. The data was entered into a data file in Statistical Packages for the Social Sciences (SPSS) where the data analysis occurred.

Project Findings and Results

Objective (1) Administer A2 exam prior to program admission as prescribed in the program admission requirements.

When admitted to the nursing program, only 2 of the 14 students in the 2013 control group met the minimal A2 composite score of 77. Twelve of the 14 students in the 2013 control group were admitted with an A2 score below the predetermined admission composite score of 77. Table 4 reflects the A2 scores for the 2013 control group and the group's subsequent NCLEX-RN success outcomes upon graduation from the program.

Table 4

HESI A2 Composite Scores: 2013 Control Group

A2 Composite Scores	Control Group	Passed NCLEX-RN 1 st Attempt
Below 60	1	0
60 – 65	3	1
66 – 70	5	2
71 – 76	3	3
77 – 79	1	0
80 – 85	1	1
86 – 90	0	0

Eighty-six percent of the students in the 2013 control group were admitted to the nursing program with an A2 composite score below the minimal requirement of 77. Of those 12 students, 50% passed the NCLEX-RN exam on the first attempt. The remaining 14% of the students in the 2013 control group achieved the A2 composite score minimal requirement of 77 prior to being

admitted to the program of nursing. Fifty percent of those students passed the NCLEX-RN on the first attempt.

The 2015 intervention group consisted of 15 students. All students in the intervention group met the admission criteria based on the A2 composite score of 77. Thirteen of the 15 graduates, or 86.66 % passed the NCLEX-RN on the first attempt. Two students from the 2015 intervention group did not pass the NCLEX-RN on the first attempt. The 2015 intervention group A2 composite scores are reflected in Table 5.

Table 5

HESI A2 Composite Scores: 2015 Intervention Group

A2 Composite Scores	Intervention Group	Passed NCLEX-RN 1 st Attempt
Below 60	0	0
60 – 65	0	0
66 – 70	0	0
71 – 76	0	0
77 - 79	4	3
80 - 85	7	6
86 - 90	4	4

Collectively, 12 of the 29 graduates (41%) in the project were admitted into the program of nursing with A2 composite scores below the required admission criteria. Six of the 12 graduates (50%) admitted with scores below the required A2 composite score of 77 passed the NCLEX-RN on the first attempt. Seventeen of the 29 graduates (58%) in the project were admitted into the program of nursing with an A2 composite score at or above the required

admission criteria of 77. Fourteen of the 17 graduates (82%) admitted with score at or above 77 passed the NCLEX-RN on the first attempt.

Objective (2) Administration of specialty exams upon the completion of predetermined nursing courses within the program of nursing. Administration of four parallel versions of the E2 during the fourth semester of the program prior to graduation.

2013 Control Group Specialty Scores. The specialty exam scores for the 2013 control group are presented in Table 6. The scores are grouped according to the HESI score correlation table (HESI Exam Guide, 2015).

Table 6

HESI Specialty Exam Scores: 2013 Control Group

	Semester I		Semester II		Semester III	
Specialty Exams	NUR110 Fund	NUR120 Pharm	NUR150 MSI	NUR160 BHN	NUR210 MSII	NUR220 CBF
900 and above (excellent probability)	1	5	7	1	4	6
850 – 899 (average probability)	1	2	1	0	2	2
800 – 849 (below average probability)	3	0	1	0	1	2
799 and Below (severe danger of failing)	9	7	5	13	7	4

Specialty exams administered in semester one of the program were NUR 110 Fundamentals of Nursing and NUR 120 Pharmacology. Eighty-six percent of the students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing the NCLEX RN on the NUR 110 Fundamentals of Nursing specialty exam. Fifty percent of the

students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing NCLEX-RN on the NUR 120 Pharmacology specialty exam

NUR 150 Medical Surgical I and NUR 160 Behavioral Health specialty exams were administered in semester two. Forty-three percent of the students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing NCLEX-RN on the NUR 150 Medical Surgical I Nursing specialty exam. One hundred percent of the students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing NCLEX-RN on the NUR 160 Behavioral Health specialty exam.

In the third semester of the program, the students were required to take the NUR 201 Medical Surgical II and NUR 220 Nursing Care of Child Bearing Family specialty exams. Fifty-seven percent of the students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing NCLEX-RN on the NUR 210 Medical Surgical II Nursing specialty exam. Forty-three percent of the students in the 2013 control group scored in the categories of ‘below average’ or ‘severe danger’ of failing NCLEX-RN on the NUR 220 Nursing Care of the Child Bearing Family specialty exam.

2013 Control Group E2 Scores. The final E2 score for each student was used in determining the mean E2 for each cohort. Table 7 reflects the E2 scores of the 2013 control group. Scores are grouped according to the HESI score correlation table (HESI Exam Guide, 2015). The predetermined benchmark score for the 2013 cohort group on the E2 exam was 850.

Table 7

HESI E2 Scores: 2013 Control Group

	E2 – Version I	E2 – Final Version	Passed NCLEX-RN 1 st Attempt
900 and Above	0	0	0
850 - 899	2	6	5
800 - 849	4	2	0
799 and Below	8	6	2

Six of the 14 students (43%) in the 2013 control group achieved the benchmark score of 850 after four attempts on the E2. Five of the six students (83%) who achieved the 850 benchmark on the E2 exam passed the NCLEX-RN on the first attempt. Eight of the 14 students (57%) in the 2013 control group did not achieve the benchmark score of 850 after four attempts on the E2. Two of the eight students (25%) in the 2013 control group who did not achieve the benchmark score of 850 after four attempts on the E2 passed the NCLEX-RN on the first attempt. Six of the eight students (75%) in the 2013 control group who did not achieve the benchmark score of 850 after four attempts on the E2 did not pass the NCLEX-RN on the first attempt.

2015 Intervention Group E2 Scores. Table 8 reflects the 2015 intervention group HESI E2 Scores. Scores are grouped according to the HESI score correlation table (HESI Exam Guide, 2015). The benchmark score for this cohort on the exit exam was 900.

Table 8

HESI E2 Scores: 2015 Intervention Group

	E2 – Version I	E2 – Final Version	Passed NCLEX-RN 1 st Attempt
900 and Above	2	15	13
850 - 899	10	0	0
800 - 849	1	0	0
799 and Below	2	0	0

Two of the 15 students in the 2015 intervention group achieved the benchmark score of 900 on the E2 on the first attempt. The remaining 13 students achieved a score of 900 by the fourth attempt. One student in the 2015 intervention group did not achieve the 900 benchmark after four attempts and did not graduate from the program of nursing. This student was excluded from the project. Thirteen of the 15 students (87%) in the 2015 intervention group passed the NCLEX-RN on the first attempt.

Objective (3) Implement mandatory remediation for students who do not achieve the benchmark level on the specialty and E2 exit exams.

2013 Control Group Specialty Exam Remediation. The students in the 2013 control group were encouraged by the nursing program faculty to use the specialty exams as a guide for remediation. The students were provided copies of their individualized computer-generated analysis of each specialty exam. The students were provided written directions to access available online HESI remediation tools via the Elsevier Evolve website. No mandatory remediation was provided or required by program faculty. All students in the 2013 control group were required to attend a nationally recognized NCLEX-RN review course that was purchased for the students by the college in week 16 of the fourth semester.

2015 Intervention Group Specialty Exam Remediation. The specialty exam scores for the 2015 intervention group are presented in Table 9. The scores are grouped according to the HESI score correlation table (HESI Exam Guide, 2015).

Table 9

<i>HESI Specialty Exam Remediation: 2015 Intervention Group</i>						
	Semester I		Semester II		Semester III	
Specialty Exams	NUR 110 Fund	NUR 120 Pharm	NUR 150 MS I	NUR 160 BHN	NUR 210 MS II	NUR 220 CBF
900 and above (excellent probability) Self-Review	5	2	0	4	1	10
850 – 899 (average probability) Adaptive Quizzing	1	1	5	3	2	4
800 -849 (below average probability) Remediation study sessions	4	2	2	3	3	0
799 and below (severe danger of failing) Remediation study sessions and Case Studies	5	10	8	5	9	1

For the 2015 intervention group, in semester I specialty exams were administered upon completion of NUR 110 Fundamentals and NUR 120 Pharmacology. Six students scored in the ‘excellent’ or ‘average’ probability of passing NCLEX-RN category on the NUR 110 Fundamentals specialty exam and were assigned Adaptive Quizzing or self-review remediation. Nine students were divided into two groups of four and five students for NUR 110 remediation

study sessions. A total of four study sessions were held for NUR 110 Fundamentals remediation. Five students were assigned NUR 110 Fundamentals online case studies.

Three students scored in the ‘excellent’ or ‘average’ probability categories of passing NCLEX-RN on the NUR 120 Pharmacology specialty exam and were assigned Adaptive Quizzing or self-review remediation. Twelve students were divided into two groups of six for NUR 120 remediation. A total of four study sessions were held for NUR 120 Pharmacology remediation. Ten students were assigned NUR 120 Pharmacology online case studies.

Specialty exams were administered upon completion of NUR 150 Medical Surgical I and NUR 160 Behavioral Health in Semester II of the nursing program. Five students scored in the category suggesting an ‘average’ probability of passing NCLEX-RN on the NUR 150 Medical Surgical I specialty exam and were assigned Adaptive Quizzing or self-review remediation. Ten students were divided into two groups of five for NUR 150 Medical Surgical I remediation sessions. A total of four study sessions were held for NUR 150 Medical Surgical I remediation. Eight students were assigned NUR 150 Medical Surgical I online case studies.

Seven students scored in the categories suggesting an ‘excellent’ or ‘average’ probability of passing the NCLEX-RN on the NUR 160 Behavioral Health specialty exam and were assigned Adaptive Quizzing or self-review remediation. Eight students were divided into two groups of four for NUR 160 Behavioral Health remediation sessions. A total of four study sessions were held for NUR 160 Behavioral Health remediation. Five students were assigned NUR 160 Behavioral Health online case studies.

For the intervention group, in semester III, specialty exams were administered in NUR 210 Medical Surgical II and NUR 220 Nursing Care of Child Bearing Family courses. Three students scored in categories predicting ‘excellent’ or ‘average’ probability of passing the

NCLEX-RN on the NUR 210 Medical Surgical II specialty exam and were assigned Adaptive Quizzing or self-review remediation. Twelve students were divided into two groups of six for NUR 210 Medical Surgical II remediation sessions. A total of four study sessions were held for NUR 210 Medical Surgical II. Nine students were assigned NUR 210 Medical Surgical II online case studies.

Fourteen students scored in the categories suggesting ‘excellent’ or ‘average’ probability of passing NCLEX-RN on the NUR 220 Nursing Care of Child Bearing Family specialty exam and were assigned Adaptive Quizzing assignments or self-review remediation. One student was required to participate in remediation sessions for NUR 220 Nursing Care of Child Bearing Family remediation sessions. Two study sessions were held for NUR 220 Nursing Care of Child Bearing Family remediation. One student was assigned NUR 220 Nursing Care of Child Bearing Family online case studies.

2015 Intervention Group E2 Remediation. All students in the 2015 intervention group were required to meet with a nursing faculty to review E2 results. Students were provided guidance as to what areas deficiencies had been identified on the E2 (V-I) test report and analysis. During this time frame all students were engaged in an eight week, 120 hour preceptorship graduation requirement. To accommodate the preceptorship experience, the second E2 was scheduled well in advance so that all students could adjust preceptorship schedules. The 2015 intervention group E2 Testing and Remediation Calendar is presented in Table 10.

Table 10

HESI E2 Testing and Remediation Calendar: 2015 Intervention Group

3/30/15	E2 (V-I): (All students Self Review) 2 students achieved Benchmark (BM) Score
4/24/15	E2 (V-II): 7 students achieved BM Score
5/11-15/15	(All students) Mandatory NCLEX-RN Review Course
5/27/2015	E2 (V-III): 1 student achieved BM Score
6/1/2015	Six Week Directed Studies (DS) Course 1 st Day (Six students enrolled)
7/9/2015	(DS) Last Day of Directed Studies Course
7/14/ 2015	E2 (V-IV): (5 students achieved BM score, 1 student did not)
7/27/2015	1 st DS student NCLEX-RN Exam
9/2/15	Last DS student NCLEX-RN Exam

March 30, 2015: The E2 (V-I) was administered to all students in the intervention group. Two students achieved the benchmark score of 900.

April 24, 2015: The E2 (V-II) was administered to 13 students. Seven of the 13 students achieved benchmark. All students who did not achieve benchmark were allowed two hours to review questions missed on E2 (V-II) on the following day.

May 11-15, 2015: All students were mandated to attend a five day nationally recognized NCLEX-RN review course. This course was provided to the student at no charge. The college paid for the students to attend. Final semester grades were withheld in the NUR 270 Capstone course until the students had attended all sessions of NCLEX-RN review course. Upon completion of NCLEX-RN review course the nine students who had previously achieved the 900 benchmark score were given course grades for the NUR 270 Capstone course and were released

to graduate and take the NCLEX-RN exam. The remaining students were assigned a grade of Incomplete 'I' in the NUR 270 Capstone Course.

May 27, 2015: The E2 (V-III) was administered to seven students. One of the seven students achieved benchmark and was released to graduate and take the NCLEX-RN exam.

June 1, 2015: The six week (not-for-credit) Directed Studies course began. The six students who had not achieved the 900 benchmark score after three attempts were required to be in class with the program of nursing director who was acting as the remediation instructor for the Directed Studies course. This course met every Tuesday, Wednesday, and Thursday from 8:30 am to 2:30 pm for six consecutive weeks. A content review occurred from 8:30 to 11:30 am. After a lunch break, the students returned to the classroom for a two hour NCLEX-RN style question review session.

July 9, 2015: Last day of the six week Directed Studies course.

July 14, 2015: The E2 (V-IV) was administered to six students. Five of the six students achieved benchmark. One student scored below the 900 benchmark and subsequently did not graduate from the program of nursing and was excluded from continuing in the project. The five students who achieved the benchmark score were released to graduate from the nursing program and take the NCLEX-RN exam. The NCLEX-RN exams were individually scheduled by the students according to date availability and student needs. The first student from the Directed Studies group to take the NCLEX-RN tested on July 27, 2015. The final student from the Directed Studies group tested on September 2, 2015.

Objective (4) Compare control group and intervention group data using descriptive and inferential statistical analysis to explore the relationship between A2 scores, specialty exam scores, E2 scores, and NCLEX-RN outcomes.

A2 Mean Scores. A2 mean scores were computed for both the control and the intervention group. Table 11 reflects the Mean A2 Scores for the 2013 control group and 2015 intervention group.

Table 11

Mean HESI A2 Scores: 2013 Control and 2015 Intervention Group

A2 Composite Admission Requirement	A2 Mean Score (Control Group)	A2 Mean Score Intervention Group
77	69.29	82.95

The A2 composite score of 77 was one component of the ADN program selective admission requirements for both the control and the intervention group. This admission requirement was not observed when the 2013 control group was admitted. The A2 composite score requirement was strictly adhered to during the 2015 intervention group admission cycle. The A2 mean score for the 2013 control group was 69.29. The A2 mean score for the 2015 intervention group was 82.95. The A2 mean score for the 2015 intervention group was 13.66 higher than the mean score for the 2013 control group.

E2 Mean Scores. Students in each cohort were allowed up to four attempts on the E2 to achieve the predetermined benchmark. The final E2 score for each student was used to determine the mean E2 score. Table 12 reflects the E2 Mean scores for the 2013 Control and 2015 Intervention group.

Table 12

HESI E2 Mean Scores: 2013 Control and 2015 Intervention Group

	Control Group	Intervention Group
Version I	756	855
Final Version	792	947
Benchmark	850	900

The 2013 control group mean on the E2 (V-I) was 756. The 2015 intervention group mean on the E2 (V-I) was 855. The 2015 intervention group mean was higher by 99 points than the 2013 control group mean on the E2 (V-I).

The 2013 control group mean on the final attempted E2 version was 792. The 2015 intervention group mean on the final attempted E2 version was 947. The 2015 intervention group mean was higher by 155 than the 2013 control group mean on the final attempted E2.

The 2013 control group mean on E2 (V-I) was 756. The 2013 control group mean on the final attempt was 792. The 2013 control group mean increased by 34 from the E2 (V-I) to the final attempt. The 2015 intervention group mean on the E2 (V-I) was 855. The 2015 intervention group mean on the final attempt was 947. The 2015 intervention group mean increased by 92 from the E2 (V-I) to the final attempt.

Pearson Correlation. A Pearson's product moment correlation (Pearson correlation) statistical analysis was used to explore relationships between A2 scores, specialty exams, E2 scores, and NCLEX-RN outcomes. The Pearson correlation statistic is the most widely used correlation index because it is a statistic that is appropriate when two variables are measured on an interval or ratio scale, or on a level that approximates interval characteristics. Correlation coefficients are indexes whose values range from -1.00 to 0.00 to +1.00. Negative values indicate negative relationships. Positive values indicate positive relationships. A correlation of 0.00 indicates no relationship between the variables. The absolute value (the numerical value without any sign) of the correlation coefficient indicates relationship strength. The smaller the absolute value, the weaker the relationship. For example, -0.90 indicates a very strong relationship, while a +0.45 indicates a moderate relationship. When two variables are perfectly and positively

correlated the correlation coefficient is +1.00. Correlation coefficients directly communicate magnitude (Polit, 2010).

The magnitude of the Pearson correlation coefficient determines the strength of the correlation (Table 13). Although there are no hard and fast rules for assigning strength of association to particular values some general guidelines are provided by Cohen (1988).

Table 13

Pearson Correlation Coefficient Strength of Association

Coefficient Value	Strength of Association
$0.1 < [r] < 0.3$	Small Correlation
$0.3 < [r] < 0.5$	Medium/Moderate Correlation
$[r] > 0.5$	Large Correlation

The concept of correlation can be used to measure the linear relationship between two variables, x and y. The closer the Pearson's correlation comes to 1 the stronger the linear relationship between y and x. Positive values imply a positive linear relationship between y and x. that is; y increases as x increases. Negative values imply a negative linear relationship between y and x; that is, y decreases as x increases (Laerd Statistics, 2013).

It must be emphasized that when a researcher finds that two variables are correlated this does not imply that one variable caused the other. Even a strong correlation between two variables provides no evidence that one variable caused the other. Causation cannot be inferred on the basis of high sample correlation. When a high correlation is observed in the sample data, the only safe conclusion is that a linear trend may exist between x and y (Polit, 2010).

Table 14

Pearson Correlation: 2013 Control Group

Variable	Variable	R Value	Positive/Negative	Significance Level
A2	NUR 120 Pharmacology	.628	Negative	.016 (.05 Level)
NUR 110 Fundamentals	E2 Version II	.580	Positive	.030 (.05 Level)
NUR 220 Nursing Care of Child Bearing Family	E2 Version II	.715	Positive	.004 (.01 Level)
NUR 220 Nursing Care of Child Bearing Family	NCLEX-RN	.583	Positive	.029 (.05 Level)
E2 Version I	E2 Version II	.688	Positive	.007 (.01 Level)

The Pearson correlation indicated a large negative correlation between the A2 exam and the NUR 120 Pharmacology specialty exam at the 0.05 significance level. (It should be noted that this is the only negative correlation identified in the Pearson correlation statistic for either the control or the intervention group). Additionally, the Pearson correlation indicated a large positive correlation between the NUR 110 Fundamentals specialty exam and the E2 (V-II) exam at the 0.05 significance level.

A large positive correlation was seen between the NUR 220 Nursing Care of Childbearing Family specialty exam and E2 (V-II) at the 0.01 significance level. The Pearson correlation indicated a large positive correlation between the NUR 220 Nursing Care of Childbearing Family specialty exam and the total number of control students who passed the NCLEX-RN on the first attempt at the 0.05 significance level. A positive Pearson correlation at

0.01 significance level was noted between the E2 (V-I) exam and the E2 (V-II) exam at the 0.01 significance level.

The faculty in the project program used this data as a part of the 2014 end-of-the-year program curriculum review improvement plan. Changes were made in teaching and learning strategies for both NUR 110 Fundamentals and NUR 220 Nursing Care of Child Bearing Families courses. Course revisions were made in content taught in these courses based upon deficiencies identified on the specialty and exit exams in each of these courses.

2015 Intervention Group. Table 15 reflects a compilation of Pearson correlation significant findings for the 2015 intervention group.

Table 15

Pearson Correlation: 2015 Intervention group

Variable	Variable	R Value	Positive/Negative	Significance Level
A2	NUR 150 Medical Surgical I	.574	Positive	.025 (.05 Level)
NUR 150 Medical Surgical I	E2 Version III	.831	Positive	.041 (.05 Level)
NUR 160 Behavioral Health	NCLEX-RN	.627	Positive	.012 (.05 Level)
NUR 220 Medical Surgical II	NCLEX-RN	.540	Positive	.038 (.05 Level)
E 2 Version I	E2 Version II	.979	Positive	.001 (.01 Level)

The Pearson correlation indicated a large positive correlation between the A2 and the NUR 150 Medical Surgical Nursing I specialty exam at the 0.05 significance level.

Additionally, the Pearson correlation indicated a large positive correlation between both NUR

160 Behavioral Health Nursing and NUR 210 Medical Surgical II specialty exams and the total number of students in the intervention group who passed the NCLEX-RN exam at the 0.05 significance level. There was also a large positive correlation between the NUR 150 Medical Surgical I specialty exam and the E2 (V-III) exam at the 0.05 significance level. A large positive correlation was found between the E2 (V-I) exam and the E2 (V-II) exam at the 0.01 significance level.

Analysis of Variance (ANOVA). The ANOVA was the second statistical method used to test differences in means. The ANOVA analyzes variance to determine the impact of the intervention. The ANOVA is a commonly used technique for comparing means (Lane, 2013). The ANOVA addresses the question of whether or not a relationship exists between the independent and dependent variables. In an ANOVA statistical analysis, the total variation in the scores of the participants is partitioned into different components, and between groups variation is contrasted with / within group's variation (Lane, 2013). The independent variable in this project was the standardized testing using the A2, specialty and E2 exams. The dependent variable in this project was the NCLEX-RN first time pass rate

2015 Intervention Group. The ANOVA was used to measure the impact of the intervention on the intervention group.

Table 16

ANOVA Statistics

NUR 160	F (2,14) = 8.40	Sig = .012
NUR 210	F (2,14) = 5.35	Sig = .038

Based on the results of the ANOVA, two specialty exams were found to be significant to student success on the NCLEX-RN exam. There was a significant effect of the NUR 160

Behavioral Health Nursing specialty exam on the NCLEX-RN pass rate at the 0.05 level. In the table, there was a significant effect of the NUR 210 Medical Surgical II specialty exam on the NCLEX-RN pass rate at the 0.05 level.

Statistical Data Discussion

There appeared to be positive correlations between the specialty exams and the NCLEX-RN pass rates in both cohort groups indicating that the total number of students who passed the NCLEX-RN exam was positively impacted as specialty exam scores increased. It is difficult to explain the negative correlation between the A2 and the NSG 120 specialty exam in the 2013 control group. Possible explanations for the negative correlation are conjecture at this point given that the intervention group faculty were not present. However, it should be noted that the A2 score of 77 was not used to exclude students from the nursing program. The students may not have concerned themselves with the math scores. But in order to progress through the nursing program, in the NUR 120 Pharmacology course, students were required to achieve a benchmark score on the dosage calculation math tests. They were allowed three attempts to score 80% or above. Further study is indicated.

The Pearson correlation statistical analysis of the intervention group data indicated a significant correlation between both the NUR 160 BHN and NUR 210 MS II specialty exams and student success on the NCLEX-RN exam at the 0.05 level. Upon review of the specialty exam scores for the two students in the 2015 intervention group who failed the NCLEX-RN on the first attempt it was noted that both students scored lowest on the NUR 160 and the NUR 210 specialty exams

Table 17

Specialty Exam Scores: 2015 Intervention Group Students (failed NCLEX-RN)

Student	A2	NUR 110 Fund	NUR 120 Pharm	NUR 150 MS I	NUR 160 BHN	NUR 210 MS I	NUR 220 CBF
I – 7	84	802	776	778	576	568	891
I – 9	78	790	771	861	669	741	859

The ANOVA statistical analysis of the intervention group data indicated a significance between the two specialty exams and student success on the NCLEX-RN exam. The specialty exams found to be significant with student success on the NCLEX-RN were NUR 160 Behavioral Health Nursing and NUR 210 Medical Surgical Nursing II.

When discussing the statistical data generated from this project, it must be clearly noted that this project was small in sample size, and included only one nursing program. Therefore, additional studies should be completed to explore relationship between HESI testing, mandatory remediation, and NCLEX-RN program outcomes. However, as a result of the analysis of the data, it could be suggested that a curricular review and course revisions of NUR 160 Behavioral Health Nursing and NUR 210 Medical Surgical II course content and enhancement of teaching/learning strategies may improve NCLEX-RN program pass rates. The result of this project suggests that standardized testing, coupled with enforcement of required remediation, may have contributed to an improvement of NCLEX-RN pass rates in a small private college that had a first-time NCLEX-RN pass rate below the national benchmark of 85% for three consecutive years.

Objective (5) Compare NCLEX-RN pass rates of the control and intervention groups.

The primary outcomes for this project was to boost HESI E2 scores to the benchmark of 900 and to increase the first time NCLEX-RN pass rate to 85%. Table 18 reflects the 2013 control group and 2015 intervention group NCLEX-RN pass rates.

Table 18

NCLEX-RN Pass Rates: 2013 and 2015

2013 Control Group	7 of 14 passed NCLEX-RN 1 st Attempt	50%
2015 Intervention Group	13 of 15 passed NCLEX-RN 1 st Attempt	87%

The Associate Degree Nursing program in this project had a 2013 NCLEX-RN pass rate of 50% for the control group. The 2015 NCLEX-RN pass rate for the intervention group was 86.66% rounded to 87%. This represents an increase in NCLEX-RN program of nursing pass rate of 36.66% or 37% over a two-year period.

Limitations, Recommendations, Implications for Change**Limitations**

Limitations may be theoretical or methodological and can affect the generalizability of a study (Burns & Groves, 2009). There were limitations to this study. General limitations included a small sample size and only one nursing program in the study. It can be difficult to generalize results from a study when the study took place in only one school. However, standardized tests such as the HESI Exit Exams (E2) have well established reliability and validity which may increase the generalizability of the results (Polit & Beck, 2009).

Dissemination of Project Results

The results of this PICO project were disseminated to the nursing program faculty, the leadership committee of the college, the nursing program advisory board, the State BON

education committee, and the program of nursing's accrediting agency. The PICO question this project sought to address was: Within this ADN program, would standardized testing and enforcement of required remediation contribute to achievement of NCLEX-RN pass rates at or above the national average of 85% over a two-year period? Within the 2015 intervention group the following interventions were implemented:

- HESI standardized testing
- A cumulative score on the A2 of 77 was required for admission to the program of nursing as prescribed in the program admission criteria.
- Six HESI specialty exams were administered across the curriculum. A predetermined benchmark score of 900 was required for each specialty exam.
- Remediation was enforced following each specialty exam.
- The HESI E2 exit exams were administered utilizing four parallel versions. A benchmark score of 900 was required for graduation from the program of nursing.
- Remediation was mandatory following versions I, II and III of the E2.

In October 2015, the accreditation commission review team returned to the nursing program for a site-visit. After careful review of both an in-depth program self-review document, and a three-day site visit, the accreditation commission voted in December 2015 to continue full accreditation for the program following the program's improved NCLEX-RN pass rates. In February 2016, the State BON granted the nursing program full approval for 2016 based on the 2015 NCLEX-RN pass rate.

The one student in the intervention group, who was excluded from the study related to failure to achieve benchmark on the fourth attempt, was required to repeat the NUR 270 Capstone

course. The student was also provided additional remedial support during the fall 2015 semester. In January 2016, the student took the NCLEX-RN and passed on the first attempt.

Sadly, however, on June 1, 2016 a decision was made by the Board of Trustees of the college to close the entire college due to financial shortfalls. The entire college was closed as of July 31, 2016. The pass rate for the program of nursing's final nursing cohort, the 2016 class (seven students) was 85.7%.

Implications for Practice

This project was small in sample size, and included only one nursing program. Therefore, additional studies should be completed to explore the relationship between HESI testing, mandatory remediation, and NCLEX-RN program outcomes. However, based upon results of this project, three recommendations could be made for the ADN Program:

- The nursing program should adhere to the selective admission program requirement of a score of 77 on the A2 composite.
- Students scoring below benchmark on HESI specialty and HESI exit exams should be required to participate in mandatory remediation.
- A curricular review and course revisions of content, and enhancement of teaching/learning strategies in didactic and clinical experiences related to NUR 160 (Behavioral Health Nursing) and NUR 210 (Medical Surgical Nursing II) may contribute to improvement of pass rate on NCLEX-RN exam.

Recommendations for Further Study

This project was small in sample size and included only one program of nursing. As previously stated, additional studies should be completed to explore the relationship between STS testing, mandatory remediation, and NCLEX-RN program outcomes. The use of

standardized testing and mandatory remediation within nursing programs is an area in which further research is warranted. Questions to be considered for further research include:

- How do various nursing programs implement eligibility to graduate testing policies based upon standardized testing and mandatory remediation practices?
- What barriers and issues do students and faculty face when using standardized testing and mandatory remediation policies in nursing programs?
- What more timely methods of identification of at-risk students and effective remediation programs need to be developed to assist at risk students both during program of study and prior to licensure examination?
- The use of exit exam scores as a graduation requirement is an extreme example of motivation for remediation and achieving benchmarks on standardized testing. Are there less extreme motivators to be explored that would decrease the ‘high-stakes’ stress on the standardized HESI specialty and E2 exams?

Recommendations for Advanced Leadership – Education

The conclusions in this capstone project support studies found in the review of nursing literature. In nursing education, standardized testing and mandatory remediation may positively impact NCLEX-RN program outcomes and nursing programs may effectively utilize standardized entrance exams as an assessment tool for prospective student readiness for nursing education (Chen & Voyles, 2012; Schroeder, 2013). Specialty exams allow for early identification of at risk students who may need remediation, and standardized exit exam scores are higher when benchmark scores, attachment of consequences, and remediation are incorporated into program curriculum (Chen & Voyles, 2012; Schroeder, 2013, Spurlock & Hunt, 2008, Zweighaft, 2013).

The administration of standardized testing such as the HESI exams used in this capstone project can be used as an external measure of curriculum evaluation and assist nursing faculty and administration in identifying student and curricular weaknesses so action can be taken before students take the NCLEX-RN exam. Based on findings obtained from reviewing exam scores, faculty have the data they need to be proactive to help ensure NCLEX-RN success. Students can be remediated as indicated by standardized testing scores and such action is likely to improve student chances of becoming successful first time candidates to the NCLEX-RN exam (Morrison, 2005). This capstone project's results suggest that when nursing programs administer testing without taking action based on findings of that testing the exam outcomes are rendered to be of little value. Simply identifying student weakness negates the usefulness of the testing process.

Implications for Change

Nurse educators have need of educational tools that assist them in facilitating students to be successful in the program and on licensure exams. Standardized testing, such as the HESI standardized testing system used in this study, is well supported in the literature review, both as a learning tool and as an instrument to obtain data for remediation and program revision. Faculty value an exam that is reliable and valid in identifying at risk student remediation needs as well as predicting NCLEX-RN success. Students appreciate when the testing environment and the test itself closely models the actual board exam (Mee & Hallenbeck, 2012).

Admission exams can be used to assess academic readiness for nursing education (Chen and Voyles, 2012). Remediation needs can be identified early and addressed as the student progresses in the nursing programs (Schroeder, 2013). Continued remediation is essential for all students but is of paramount concern for those who require repeated retesting to achieve

benchmark scores (Nibert et al., 2006). Exit exams have been found to be statistically significant predictors of NCLEX-RN success (Zweighaft, 2016). Standardized testing exams allow faculty to consistently and authoritatively evaluate student learning, give direction for remediation, and evaluate the strength of the program curricula (Lauer & Yoho, 2013).

Summary

The purpose of any nursing program is to educate competent, committed, and caring registered nurses (Zweighaft, 2011). Most states have a regulation about the minimum pass rates on the NCLEX-RN licensure exam. A low pass rate may lead to probation and possible closure of a nursing programs Nursing students today have busy lives that compete with study time. Students and faculty may have differing world views of school, the meaning of education, and educational degrees (McHugh, 2013). Nurse educators constantly search for strategies to identify at risk students early in the educational process with the intention to identify knowledge gaps and provide remediation to improve student success on the NCLEX-RN exam (Zweighaft, 2011). The outcome of this PICO project supports the utilization of HESI A2, specialty exams, and E2 exams as evidence-based ‘best practice’ interventions to identify students at risk of failing the NCLEX-RN and to guide their remediation efforts.

The purpose of this project was to determine whether standardized testing coupled with enforcement of mandatory remediation would improve program NCLEX-RN pass rates in a small private college which had a first time NCLEX-RN pass rate below the national benchmark of 85% for three consecutive years. The NCLEX-RN pass rate for the 2013 control group was 50%. The NCLEX-RN pass rate for the 2015 intervention group was 87%. The associate degree nursing program faculty in this project implemented an eligibility for graduation policy to guide

the utilization of standardized testing exams and mandatory remediation for the following purposes:

- Component of the program admission process
- Assurance of student preparation for NCLEX-RN
- Comparison of student knowledge with an external national standard to assure competence
- Assurance of continuous quality improvement of the curriculum
- Evaluation of program performance

The faculty determined that the eligibility to graduate policy was effective in facilitating the implementation of standardized exams and mandatory remediation throughout the curriculum.

As a result of the improved NCLEX-RN pass rates the accreditation commission voted to continue full program accreditation, and the State Board of Nursing granted the nursing program full approval for 2016 based on the 2015 NCLEX-RN pass rate.

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Appendix A: Eligibility to Graduate Policy Consent Form

Consent Forms**2013 ELIGIBILITY FOR GRADUATION POLICY**Purpose/Rationale/Background:

The Associate Degree Nursing Program utilizes standardized testing exams for the following purposes:

- Component of the program admission process
- Assurance of student preparation for NCLEX-RN
- Comparison of student knowledge with an external national standard to assure competence
- Assurance of continuous quality improvement of the curriculum
- Evaluation of program performance

My signature below acknowledges that the Eligibility for Graduation Policy has been reviewed.

It also acknowledges that I have been informed that the HESI Exit Exam minimal passing score is 850.

Signature

Date

Consent Forms**2015 ELIGIBILITY FOR GRADUATION POLICY**Purpose/Rationale/Background:

The Associate Degree Nursing Program utilizes standardized testing exams for the following purposes:

- Component of the program admission process
- Assurance of student preparation for NCLEX-RN
- Comparison of student knowledge with an external national standard to assure competence
- Assurance of continuous quality improvement of the curriculum
- Evaluation of program performance

My signature below acknowledges that the Eligibility for Graduation Policy has been reviewed.

It also acknowledges that I have been informed that the HESI Exit Exam minimal passing score is 900.

Signature

Date

Appendix B: Systematic Review of the Literature (exemplar only)

Article/Journal SRT I	HESI Exams: Consequences and Remediation / Journal of Professional Nursing	Predicting Early Academic Success: HESI Admission Assessment Exam / Journal of Professional Nursing
Author/Year	Lauer, M., & Yoho, M.J. / 2013	Knauss, P. J. & Willson, P. / 2013
Database/Keywords	HESI, NCLEX-RN, Remediation, Nursing Education	HESI Admission Assessment, Nursing School, Academic Success, Entrance Exams
Research Design	Descriptive	Descriptive
Level of Evidence	Level IV	Level VI
Study Aim/Purpose	This study compared mean E2 scores of students who attended schools that attached consequences to E2 scores with students who attended schools that did not attach consequences to E2 scores. (E2 exams are HESI Exit Exams)	To examine the relationship between HESI Admission Assessment (A2) scores and academic performance in the 2 first semester nursing courses of an associate degree nursing program.
Population/Sample size Criteria/Power	154 nursing programs were invited to participate. 66 programs responded to the survey. 36 ADN, 26 BSN, 4 Diploma 2373 students attended schools that associated consequences to the E2. 1385 students attended schools that did not link a consequence to the E2 score.	157 students who were admitted to an accredited ADN program
Methods/Study Appraisal Synthesis Methods	Data was gathered from 2 instruments; the Eighth Validity Study Questionnaire and the E2. Deans and directors were asked if their faculty had designated a benchmark E2 score and if so, what consequences were associated with student failure to achieve that score.	The PON implemented an admission rubric requiring applicants to complete four of the seven component exams provided by the A2. Basic math, reading comprehension, vocabulary/general knowledge, grammar. 75% was set as the benchmark score.
Primary Outcome Measures/Results	43 programs set a benchmark score 7 designated 900 31 designated 850 5 designated a different score 42 programs required students to retest with a parallel version of the E2 if they failed to achieve the benchmark. 29 allowed 1-3 repeat testing 12 allowed 4 or more retesting. 38 PON relayed what the consequences were: 6 programs – consequence was to fail the course 17 - delayed graduation 15 - delayed NCLEX-RN Candidacy	157 students 87% were females 86% white Age range – 19-61 77% were between 19 and 34. Findings indicated a positive, moderate and highly significant correlation between the composite A2 score and final course grades in Nsg I and Nsg II. As the students A2 score increased so did their final course grades in the first two semester nursing courses. The findings of this study support the importance of evaluating applicants vocabulary and general knowledge as a measure of their ability to succeed in the PON.

Appendix C: Strengths, Weakness, Opportunities, and Threats (SWOT) Analysis Table

Strengths	Weakness	Opportunities	Threats
New college provost	College service area listed as Medically Underserved Area	Increased recruitment of student athletes into program	History of lack of adherence to admission policies and decreased rigor in program curriculum
Increased college enrollment	Average local high schools ACT 18.8	Increased recruitment of second career students	Below benchmark NCLEX-RN pass rates: 2011 – 90% 2012 – 76% 2013 – 71%
MSN prepared ADN faculty	Low pool of qualified applicants	Increased on-site tours for local high school and middle school students	Decreased number of students admitted to program 2014-2015 academic year
ADN skills needed in service area	Cost of program: Expensive		
Strong support from health care facilities	Minimal budget, equipment, and technological support		

Appendix D: Budget and Resources

Resources	Cost	College	Student	Researcher
College Tuition	\$9389.00 per semester		\$37,556.00	
HESI Package	\$606.00 per student	\$17,574.00		
NCLEX-RN Review Course	\$500.00 per student	\$14,500.00		
HESI Exit Exam Version III	\$45.00 per exam		\$45.00	
HESI Exit Exam Version IV	\$45.00 per exam		\$45.00	
HESI Coach to Teach Directed Studies Course	\$2000.00 per semester	\$2000.00		
Program Assistant	\$1000.00 per semester	\$1000.00		
SPSS Software Package	\$69.00			\$69.00
Total		\$35,074.00	\$37,646.00	\$69.00

Appendix E: Project Timeline

	Project Timeline
June 2017	Final Paper Written
November 2016	Presentation of Final Project Defense
Fall 2015	Data Collection and Analysis
August 2015	Submission IRB Regis University
August 2015	Completion Project Proposal

Appendix F: Logic Model

Strategies	Assumptions	Issue	Influential Factors	Variables	Goals
Implement HESI Exams	NCLEX-RN measures program quality	NCLEX-RN pass rate below national average	Lack of program rigor. Lack of adherence to program policies.	Independent Variable: Standardized testing and enforcement of mandatory remediation.	Achievement of NCLEX-RN pass rate above 85% over a 2 year period.
Admission Exam (A2) Specialty Exams Exit Exams (E2)	Students face challenging application based nursing exams.		Students admitted lacking academic preparation.	Intervention Group: 2015 Program Graduates	
Enforcement of mandatory remediation	Nursing exams: Evaluate student achievement. Support student learning Improve teaching and guide program improvements.		Students overwhelmed with personal obligations.	Dependent Variable: Achievement of program NCLEX-RN pass rate at or above national average of 85%.	

Appendix G: Agency Letter of Support

**ST. CATHARINE COLLEGE***It's not just college. It's home.*

Agency Letter of Support

St. Catharine College
2735 Bardstown Road
St. Catharine, KY 40061

Date: April 20, 2015

To Whom It May Concern:

It is the intent of St. Catharine College (SCC) to support Elle F. Adams MSN RN in completion of her proposed outcomes research, Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate Degree Nursing Program. Ms. Adams will have permission to have access to nursing student files at the college in order that she may complete the outcomes study.

William Huston

St. Catharine College President

Appendix H: IRB Letter: St. Catharine College

Elle Adams

From: Jeanette Jeffers
Sent: Wednesday, April 22, 2015 1:20 PM
To: Maxwell Ankrah
Cc: Elle Adams
Subject: Use of data

Dr. Ankrah,

I appreciate our discussion regarding Elle's desire to use mean data in her doctorate work. As I shared, she has used an intervention to assist students in achieving higher test scores. It is her desire to use mean scores from the intervention and outcome. Per our discussion, you concurred that she would not need to see approval from the IRB. I will pass this information on to her.

Jeanette

Jeanette Jeffers, PhD, MN, RN
Chair, RNBSN Program
St. Catharine College
2735 Bardstown Road
St. Catharine, KY 40061
(859) 336-5082, ext. 1351
www.scckky.edu



Appendix I: IRB Letter, Regis University



IRB – REGIS UNIVERSITY

August 21, 2015

Elwanda Adams
37 Thrasher Court
Russell Springs, KY 42642

RE: IRB # 15-215

Dear Ms. Adams:

Your application to the Regis IRB for your project, “Standardized Testing and Remediation to Improve NCLEX-RN Pass Rates in an Associate Degree Nursing Program”, was approved as an exempt study on August 20, 2015. This study was approved per exempt study category of research 45CFR46.101.b(#4).

The designation of “exempt” means no further IRB review of this project, as it is currently designed, is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval.

Sincerely,

Patsy McGuire Cullen, PhD, CPNP-PC
Chair, Institutional Review Board
Professor & Director
Doctor of Nursing Practice & Nurse Practitioner Programs
Loretto Heights School of Nursing
Regis University

cc: Dr. Judy Crewell

Appendix J: CITI Training Certificate

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK REQUIREMENTS REPORT***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details.

See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Elle Adams (ID: 4188083)
- **Email:** eadams002@regis.edu
- **Institution Affiliation:** Regis University (ID: 745)
- **Institution Unit:** DNP Program
- **Phone:** 270-585-5172

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social Behavioral Research Investigators and Key Personnel
- **Stage:** Stage 1 - Basic Course

- **Report ID:** 13127780
- **Completion Date:** 06/02/2014
- **Expiration Date:** 06/01/2017
- **Minimum Passing:** 80
- **Reported Score*:** 96

REQUIRED AND ELECTIVE MODULES ONLY DATE COMPLETED

Introduction (ID: 757) 06/02/14
History and Ethical Principles - SBE (ID: 490) 06/02/14
The Federal Regulations - SBE (ID: 502) 06/02/14
Assessing Risk - SBE (ID: 503) 06/02/14
Informed Consent - SBE (ID: 504) 06/02/14
Privacy and Confidentiality - SBE (ID: 505) 06/02/14
Regis University (ID: 1164) 06/02/14

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program

Email: citisupport@miami.edu
Phone: 305-243-7970
Web: <https://www.citiprogram.org>

Appendix K: HESI Student Summary Report (Mee, C. & Hallenbeck, V. (2012))



HESI Assessment

Sample RN Exit Exam ® Summary Report

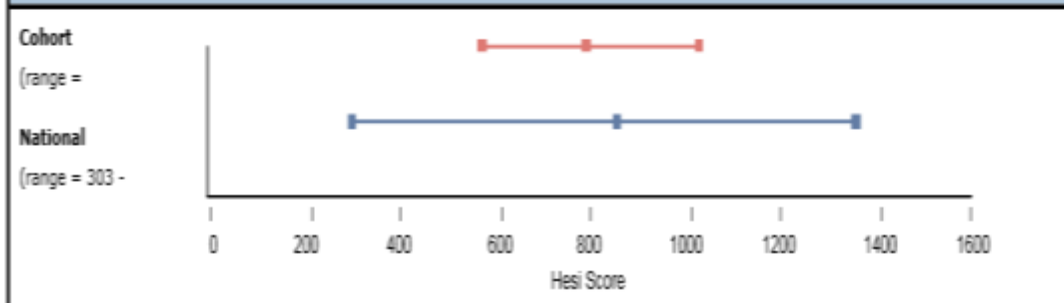
SUMMARY OF AGGREGATE FINDINGS

Number of Students	15	Mean HESI Score	794
Number of Scored Test Items	150	Median HESI Score	798
Number of Non-Scored Test Items	10	Mean HESI Conversion Score	66.58
Reliability of Examination (KR20)	0.94	Range of HESI Scores	575 - 1030
Percentile Rank	29.43	Standard Deviation of Scores	115.26

NATIONAL COMPARISONS OVERALL MEAN SCORE

	All Sam (n = 53520)	BSN	ADN	Diploma
Percentile	48.50	48.79	48.37	42.35
Mean	858	859	858	839

NATIONAL COMPARISONS BY PROGRAM TYPE FOR ALL Sample RN's



ELSEVIER COLLEGE-RN

Elsevier College RN Exit Exam_D

Exam Date: 08/20/2014 To 08/20/2014

HESI Score: 794

Class Scores - Specialty Area

	HESI Category Score	# Items in Category
(1) Community Hlth	658	8
(2) Fundamentals	607	30
(3) Geriatrics	506	5
(4) Maternity	706	20
(5) Medical Surgical	812	67
(6) Pathophysiology	965	15
(7) Pediatrics	882	12
(8) Professional Issues	954	37
(9) Psychiatric/Mental Hlth	1122	25

Specialty Area

Scores Compared to Acceptable and Recommended Levels

