# Research Briefs

## The Predictive Accuracy of Health Education Systems, Inc. (HESI) Exit Exam (E²) for Associate Degree Nursing (ADN) Students at South Texas College (STC)

### Evidence from 2001— 2009 Data

STC's ADN program is using the $E^2$ as a benchmark for progression and a guide for remediation. The HESI $E^2$ has been validated as a predictor of the National Council Licensure Examination for Registered Nurses (NCLEX-RN) success. Thus, the adoption of HESI as a progression policy ensures that schools of nursing across the United States have NCLEX-RN pass rates above acceptable levels. As an inherent result of STC's evidence-based culture, historical data were analyzed to verify that it works for STC programs and students as well.

**KEY FINDINGS**

- The requirement of passing the $E^2$ or an alternate test ensures first-time NCLEX success for a great majority of the students.
- As a student's $E^2$ score increases the probability of that student passing the NCLEX-RN increases significantly.
- The $E^2$ is highly accurate in predicting NCLEX-RN success.
- There is no significant difference between the passing rates of the $E^2$ and the alternate NLN test.

**IMPLICATIONS**

For Practice:

- Include a condensed and simplified version of these findings in the next version of the ADN student guide to point the nursing candidates' attention to the importance and usefulness of the $E^2$.
- Develop a comprehensive nursing department database.

For Policy:

- Review and update periodically the exit examination and graduation requirements to promote student success.

For Research:

- Perform more comprehensive analyses aimed at explaining and predicting nursing students' entry, graduation, and certification probabilities.
- Use findings to identify and recommend pathways and options to meet student needs.

### Background

Nursing students are required to take and pass a national licensing examination (NCLEX-RN) in order to work as a registered nurse (RN) in the United States. This licensure examination is designed to measure how competent an entry-level registered nurse is to perform safely and effectively. STC is committed to improving the passing rate of the NCLEX-RN by its students. This is of extreme importance for several reasons. First, NCLEX passage rates have been falling at most nursing schools nationwide. NCLEX failure contributes to the nursing shortage. This shortage has been addressed in March 2009 by President Barack Obama at a health care summit at the White House (http://www.whitehouse.gov/assets /documents/White_House_Forum_ on_Health_Reform_Report.pdf). Second, NCLEX failure has also personal and financial consequences for the nursing students. Finally, NCLEX failure can affect the school's accreditation, funding, and reputation. Nursing programs in the state must maintain acceptable pass rates on the NCLEX or face sanctions or possible program suspension.

Schools of nursing are increasingly administering exit and diagnostic examinations to evaluate student outcomes. The HESI $E^2$ is one such exit examination which is used as a benchmark for progression and remediation at increasing numbers of schools of nursing. The $E^2$ is designed for administration near the completion of the curriculum. The reliability and validity of the $E^2$ is determined rigorously by HESI using analyses based on psychometric testing.

STC's ADN program requires all of its students to take and pass the $E^2$ at the end of their final term of study. The cut-off score for pass/fail is set at 850 consistent with numerous other schools of nursing across the United States. Passing the $E^2$ is a requirement for graduation and eligibility to take the NCLEX-RN upon recommendation of the ADN program director. To evaluate the effectiveness of this policy, the STC ADN program decided to analyze historical $E^2$ and NCLEX-RN data of its students.

### Purpose of Study

This study was designed to examine the association between $E^2$ scores and NCLEX-RN outcomes. Furthermore, the prediction accuracy of the $E^2$ in predicting NCLEX-RN success was analyzed and assessed.

### Methodology

The ADN program and Research and Analytical Services department staff in collaboration sorted and tabulated all historical HESI and National Council of State Boards of Nursing, Inc. (NCSBN) data available to them in print reports. While the first NCLEX-RN attempt was considered for each student, the $E^2$ attempt at which they passed was used. Furthermore, in recent semesters, alternative diagnostic examinations have been accepted from students who failed the $E^2$. Most recently (in Spring 2009) all ADN students in their last term have taken both the $E^2$ and the National League for Nursing (NLN) readiness test. Therefore, a comparison of student success in passing these two examinations is provided as well.

### Research Questions

This research attempted to answer the following questions:

1. What are the passing rates of STC ADN students in $E^2$, NLN, and NCLEX-RN examinations?
2. Is there a positive association between $E^2$ scores and NCLEX-RN outcomes?
3. Is $E^2$ a good predictor of NCLEX-RN success?

### Findings

The passing rates of STC ADN students in E2, NLN, and NCLEX-RN examinations are summarized in Table 1. Only students with complete data are included in the tabulation. First, the number of students who took the HESI and the passing rates are reported for each academic year.

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### Table 1 - Test Passing Rates of STC ADN Graduates by Academic Year

*(Only students with complete data are included; "Took NCLEX" group is a subset of the union of the "Passed HESI" and "Passed Alternate" groups.)*

| Graduating Class | Took HESI | Passed HESI[1] | Took Alternate[2] | Passed Alternate | Total of Passed HESI or Alternate | Took NCLEX[3] | Passed NCLEX[4] |
|---|---|---|---|---|---|---|---|
| 2000[5] | - | - | - | - |  | 47 | 32 (68%) |
| 2001 | 36 | 33 (92%) | - | - | 33 (92%) | 33 | 28 (85%) |
| 2002 | 65 | 57 (88%) | - | - | 57 (88%) | 55 | 50 (91%) |
| 2003[6] | 129 | 90 (70%) | - | - | 90 (70%) | 84 | 76 (90%) |
| 2004 | 81 | 65 (80%) | - | - | 65 (80%) | 60 | 50 (83%) |
| 2005 | 122 | 117 (96%) | 2 | 2 (100%) | 119 (98%) | 110 | 95 (86%) |
| 2006 | 130 | 103 (79%) | 24 | 24 (100%) | 127 (98%) | 126 | 119 (94%) |
| 2007 | 140 | 89 (64%) | 33 | 26 (79%) | 115 (82%) | 111 | 94 (85%) |
| 2008 | 174 | 134 (77%) | 40 | 40 (100%) | 174 (100%) | 102 | 86 (84%) |
| 2009[7] | 143 | 72 (50%) | 71 | 51 (72%) | 123 (86%) | 121 | 108 (89%) |
| TOTAL | 1020 | 760(75%) | 170 | 143 (84%) | 903 (89%) | 849 | 738 (87%) |

1 Number of students who passed in any of their attempts

2 Any alternate test: Kaplan, National League for Nursing (NLN), etc.

3 Not everyone who passes HESI or an alternate test takes immediately the NCLEX; there is a lag time usually.

4 Number of students who passed in their first attempt

5 HESI was not required

6 Fall and Spring only, does not include Summer

7 Fall and Spring only, does not include Summer

The *"Took Alternate"* column represents only those students who failed the HESI and then took an alternate readiness test. The *"Took NCLEX"* group cannot be larger than the *"Total of Passed HESI or Alternate"* column. The findings suggest that the requirement of passing the E² or an alternate test ensures first-time NCLEX success for a great majority of the students.

The correlation coefficient between E² scores and NCLEX-RN outcomes was .26 (statistically significant, $p<.001$). The correlation coefficient can be interpreted as a measure of the E²'s ability to discriminate between those who can pass and those who cannot pass the NCLEX-RN. For this type of correlation coefficient (point biserial correlation coefficient was used because one variable is continuously measured and the other is dichotomous), a value of .30 and above is considered very good; at least .15 is recommended, and above .25 is generally accepted as good.

Table 2 summarizes the accuracy of E² to predict the NCLEX-RN outcome by academic year. Two different values were used as the cut-off value: 850 and 900. In other words, the table lists the percentage of those who passed NCLEX-RN out of the students who scored 850 or more and 900 or more, respectively, on E². The percentages suggest that E² is highly accurate in predicting NCLEX-RN success.

In the Spring semester of 2009, all ADN students in their last term (n=85) took both HESI and NLN tests. This provided an opportunity to compare the passing rates of the two examinations (Table 3). The Chi-square test on the cross-tabulated frequencies established that the two tests are not independent from each other (p-value<.05) and produce consistent outcomes (62% of students who passed HESI passed NLN as well; 63% of students who failed HESI failed NLN as well). The fact that there is no significant difference between overall passing rates of the two tests (44% for HESI and 48% for NLN) further support this (p-value=.64).

### Table 2—Prediction Accuracy of HESI E²

|  | Accuracy | |
|---|---|---|
| Year | HESI >= 850 | HESI >= 900 |
| 2001 | 91% | 91% |
| 2002 | 91% | 97% |
| 2003 | 91% | 91% |
| 2004 | 85% | 97% |
| 2005 | 86% | 89% |
| 2006 | 96% | 98% |
| 2007 | 90% | 94% |
| 2008 | 88% | 90% |
| 2009 | 97% | 97% |

### Table 3—Comparison of HESI and NLN

|  |  | NLN | | |
|---|---|---|---|---|
|  |  | Fail | Pass | Total |
| HESI | Fail | 30 (63%) | 18 (37%) | 48 |
|  | Pass | 14 (38%) | 23 (62%) | 37 |
|  | Total | 44 (52%) | 41 (48%) | 85 |

### Implications for Further Research

For STC's ADN program, assisting students to complete the nursing curriculum and helping new graduates become successful first-time NCLEX-RN candidates have always been a high priority. A condensed and simplified version of these findings will be included in the next version of the ADN student guide to point the nursing candidates' attention to the importance and usefulness of E².

This preliminary study is also a gateway for further research to investigate alternative tests to E² and to reevaluate the cut-off score of 850 on the E². A periodically reviewed and updated policy will ensure that the program graduates and recommends quality students for certification, that the NCLEX-RN success/failure prediction is further improved, and that the College remains accredited and recognized by maintaining the state pass rate requirements.

It is the intent of the ADN program to analyze the data continuously and in depth. For this purpose, the department has asked Technology Resources for help in building a database. This database will contain historical and future data of the program's students regarding their entry requirements, progression during the course of study, and their exit and licensure test scores. Once the database is available to the ADN program and the RAS department, more comprehensive and accurate analyses can be performed aimed at explaining and predicting nursing students' entry, graduation, and certification probabilities.