

# Use of the HESI A2 Entrance Exam and GPA as Primary Admissions Criteria for Baccalaureate Nursing Education: A Secondary Analysis of Proposed and Existing Admissions Policies

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**ABSTRACT**— *Current employment opportunities for registered nurses are emphasizing the need for new graduates who are prepared to engage in critical thinking activities that demand on-the-spot decision-making. These market pressures have caught the attention of academic institutions to assess and refine their admissions policies to enroll the most qualified applicants for nursing educational programs. Schools of nursing also need to maximize existing resources for nursing education in a budget-tight economy. Selecting the best-qualified applicants and facilitating their retention presents one way to meet the demands of future employers and maximize dwindling resources. The purpose of this retrospective study was to investigate, compare, and contrast existing admissions criteria and selection policies from a pre-licensure baccalaureate nursing education program in the state of New Mexico with a proposed new state-wide admissions criteria.*

*Existing selection criteria for the study institution and a proposed state-wide admissions policy both produce a rank-ordered, prioritized listing of students deemed best-suited for success in nursing education. The study compared and contrasted the results obtained using both methods from six consecutive cohorts of pre-licensure baccalaureate students enrolled in a four-year traditional program.*

*Conclusions from the analysis support the use of the proposed state-wide model as an acceptable equivalent to the existing admissions process for the study institution. Further investigation is indicated to consider results from other institutions of similar size and location as well as comparisons with program exit exams and National Council of State Boards of Nursing (NCSBN) NCLEX-RN first attempt pass rates.*

**Keywords**— nursing education, admissions criteria, HESI

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## 1. INTRODUCTION

Current employment opportunities for registered nurses are emphasizing their need for new graduates who are better prepared to engage in critical thinking activities that demand on-the-spot decision making. These market pressures have caught the attention of academic institutions to assess and refine their admissions policies to enroll the most qualified applicants that can meet the current market needs. Along with this, schools of nursing need to maximize existing education resources for pre-licensure baccalaureate nursing (BSN) education in a budget-tight economy. Selecting the best-qualified applicants and facilitating their retention presents one way to meet the demands of future employers and maximize dwindling resources and institutional demand [1]. The purpose of this retrospective study was to investigate, compare, and contrast existing admissions criteria and selection policies from a pre-licensure baccalaureate nursing education program in the state of New Mexico in the United States of America with proposed new admissions criteria for schools of nursing in the state of New Mexico. Specifically, the question of interest is identified as: does the ordering of students by rank change under two different admission and selection criteria conditions?

The study intends to compare and contrast the results obtained using both selection methods from six consecutive cohorts of pre-licensure baccalaureate students enrolled in a four-year traditional nursing education program.

## 2. BACKGROUND

The discussion and use of selection criteria for determining student admissions to nursing education programs has been a topic of intense interest amongst nurse educators for many years [2]. Within the literature, there is a rich, existing history of research seeking to identify the characteristics and preparation qualifications that best predict success in nursing education [3]. The issues that emerge in the literature clearly demonstrate a worldwide importance, as evidenced by investigation of nursing student admissions and subsequent educational success in countries as far removed as Singapore [4] and Pakistan [5]. The focus of the investigation presented here did not seek to address the topic of predicting nursing student success as a whole, but rather to focus on the suitability of a newly-proposed admissions

model that contains criteria that might be a useful alternative for existing admissions methodologies at the selected institution.

The proposed admissions criteria model was developed through a state-wide consortium seeking to standardize nursing education across the state of New Mexico. The emergence of international and national systemic efforts seeking to standardize nursing education is evidenced through the efforts of such initiatives such as the Curriculum Meeting Points [6], Hawaii Statewide Nursing Consortium (HSNC) [7], the Oregon Consortium for Nursing Education (OCNE) [8], and the New Mexico Nursing Education Consortium (NMNEC) [9]. The identified initiatives demonstrate strong interest among nurse educators at all levels for the development of standardized curricula to strengthen educational processes.

The state consortium group, the New Mexico Nursing Education Consortium (NMNEC), is focused on the development of a concept-based BSN curriculum with a subset of coursework that could be shared with the Associate's Degree in Nursing (ADN) programs in the state. The collaborative work of NMNEC has been ongoing since 2009 and has involved representatives from 15 state-supported BSN and ADN nursing schools as partners and full members. The goal of the consortium is to create a unified and coordinated system of nursing education in New Mexico that streamlines the education process by closing gaps between the ADN and BSN curricula and providing an enhanced pathway to the BSN degree for students across the state. The faculty and administration of New Mexico State University (NMSU) in Las Cruces, NM have elected to participate in the proposed state-wide deployment of the standardized NMNEC curriculum. In keeping with the standardization of educational criteria and coursework, the opportunity is presented for member institutions to embrace a shared set of admissions requirements and selection procedures.

Over the course of negotiation for changes to curricula and processes, each partner institution considered their own resources, strengths, limitations, and stakeholder needs. One of the major points requiring significant negotiation for NMNEC was the admissions process itself and how best to create a consistent methodology that would allow for efficient and effective selection of the best-qualified applicants while also meeting the diverse missions of the schools across the state. As part of the consensus building process, the issue of admission examinations was broached with questions about how to best use standardized entrance examinations. This was of particular interest to institutions making use of the HESI A2 Admission Assessment [10]. Supporting research by Brodman [11] demonstrated a strong correlation between results of the HESI A2 admissions exam and subsequent student success in nursing education. The following analysis is presented in order to add to the knowledge of how the HESI A2 exam may be used as one component in the admissions process.

### **3. ADMISSIONS CRITERIA**

Existing selection criteria for the NMSU Baccalaureate education program and the proposed NMNEC model both produce a rank-ordered, prioritized listing of students judged to be best suited for success in nursing education in keeping with the corresponding applicant pool available at the time of selection. NMSU currently admits nursing students to the upper division pre-licensure program twice per year; once during the Fall term, and again during the Spring term. The study compared and contrasted the resulting rank-ordered data from six consecutive cohorts of enrolled pre-licensure Baccalaureate students admitted to the program under existing guidelines with retrospective score calculation and resultant ranking of applicants following NMNEC recommendations.

Independent of the NMNEC consortium and as part of regular program development, the NMSU Baccalaureate program modified its admissions criteria for students admitted during the Fall 2007 and subsequent terms. The modifications incorporated a minimum combined score of 78.00 percent on the HESI A2 entrance examination in addition to consideration of grade point average (GPA) and other non-academic considerations in keeping with the land-grant mission of NMSU. Existing privacy policies of the institution restricted complete disclosure of the full set of admissions criteria and their weightings for public dissemination. The categories included for existing admissions consideration for the program included the following: state of legal residence, number of pre-requisite courses undertaken at NMSU, military experience, GPA, and HESI A2 scores. The data contained within the specifics of the existing admissions criteria were deemed non-essential for purposes of the presented research, which focused on the outcomes of the processes, not the specific contents of the processes themselves.

As one component in the overarching NMSU nursing education program design, the admissions requirements in use have met with success for the NMSU BSN program. The admissions methodologies in place, combined with educational processes and program design have produced NCLEX-RN licensure initial pass rates of 93.10% for 2009, 95.5% for 2010, and 95.60% for 2011 [12]. Retention rates for the same time periods were 86.09% for 2009, 93.63% for 2010, 96.19% for 2011, and 100% for 2012. Attrition and retention were calculated based on students who were dismissed from the program for academic reasons, and excluded applicants who withdrew for issues unrelated to academic or clinical performance e.g. geographic relocation or unexpected health concerns. The existing admissions criteria have therefore been demonstrated as comprising one component of a successful baccalaureate nurse education program. Consideration of modifications of the admissions criteria through the acceptance of the standards and criteria proposed

by NMNEC warranted comparison of the outcomes of both selection processes in order to assess potential impact of the adoption of modified standards upon existing success and attrition rates.

The NMNEC admissions recommendations breakdown of criteria include a 50% allocation for the HESI A2 entrance exam, a 40% allowance for prerequisite Grade Point Average (GPA), and a 10% allocation for non-academic variables [13]. For purposes of the study, the NMNEC recommendations were allocated at 50% for the HESI A2, 40% for the prerequisite GPA, and a full 10% allocation at maximum value for the non-academic portion. The 10% variable is intended to afford individual institutions some flexibility in order to best meet the needs of the populations that they serve. As there were no non-academic variables available for the study, allocation of full 10% scores to all calculations effectively leveled any impact of the non-academic variables for data analysis. It is understood that results from actual implementation of the proposed methodology would differ from those in this study, in keeping with re-allocation of the 10% variable by individual institutions.

The HESI A2 entrance examination scores and prerequisite GPA are components common to both existing and proposed admissions policies and procedures in place at the institution from which the data were drawn. The institutional data included additional considerations with different weightings when compared with the proposed NMNEC admissions policy. As noted previously, both methodologies produce an ordinal ranking of applicant scores subsequently used for selection and screening purposes. Data collection involved collection and aggregation of the admissions data for six cohorts of BSN student applicants for the traditional pre-licensure nursing program at NMSU.

#### **4. DATA COLLECTION**

The admissions criteria and resulting ranked listings of accepted applicants forming the subject of this study were retrieved from the nursing administration program development records at NMSU. As such, no further data collection was required in order to complete the proposed analysis. Aggregation of the data required merging Microsoft Excel spreadsheet files in to a single database suitable for block analysis. The aggregate data set for analysis omitted non-academic components of the instrumentation (such as demographics) that were not deemed pertinent to the focused, comparative investigation. All information pertaining to student identification was removed from the combined database prior to data analysis in order to restrict any potential investigator bias as well as ensure student confidentiality for protected educational records in keeping with the United States Federal Educational Rights and Privacy Act (FERPA).

#### **5. DATA ANALYSIS**

Data for a total of 385 total applicants were available for analysis after validation of available records representing the 6 cohorts selected. A total of 48 applicants were selected from each cohort following the criteria for both the existing NMSU and proposed NMNEC selection methodologies. The existing NMSU selection algorithm yielded acceptance for 285 of the 385 applicants, rejecting a total of 100 applicants as meeting minimum criteria yet deemed less competitive when compared with other applicants within the same cohorts. Statistical analysis was carried out comparing and contrasting the results of the proposed NMNEC methodology with the results identified from the existing NMSU strategy. Power analysis using Lenth's online calculator [14], demonstrated power at the 0.999 level for Chi-square where the confidence interval is identified at 0.05. Statistical power references the adequacy of the sample size in relation to the magnitude and significance of any inferences [15]. The sample size was therefore identified as being adequately robust to allow inference to the population of interest through referencing the data collected.

Testing to analyze the ordinal lists produced by the existing NMSU protocol (admit Y/N) versus the proposed NMNEC selection methodology (admit Y/N) was carried out for all six cohorts for which data was available. Statistical analysis was conducted using IBM SPSS statistical software [16] Initial inspection of the data utilizing the nonparametric Wilcoxon signed-rank sum test showed that the resulting lists produced by use of the two compared methodologies were not different from one another to a statistically significant degree when comparing existing NMSU versus proposed NMNEC criteria ( $z = -.0291$ ,  $p=0.771$ ). The Wilcoxon test is designed to compare two related samples to identify whether or not the mean ranks of the population represented by the sample differ from one another [17].

Crosstab calculations comparing the two resulting ordinal rankings produced by each method revealed a Cohen's Kappa chi-square of 0.529 where  $p = 0.000$ , demonstrating a moderate magnitude, highly significant similarity between the two ranked lists produced. Interpretation of the magnitude for Cohen's Kappa is supported by statistical findings published by Landis & Koch [18], Altman [19], and Fleiss, Levin, & Paik [20]. Cohen's Kappa measures the agreement between the evaluations of two raters or methodologies when both are rating the same objects [21]. In this situation, the two methodologies are both rating the same pool of applicants. A value of 1 indicates perfect agreement, whereas a value of 0 indicates that agreement is no better than chance. Additional analysis with McNemar's chi-square test ( $p = 1.00$ ) [22] revealed that the likelihood of being chosen or rejected for admission is not associated with the instrument (or selection methodology, in this case), through rejection of the null hypothesis that such likelihood is in fact associated with the methodology. McNemar's test is used to investigate pairs of dichotomous data to assess for differences, commonly for effects such as assessment before and after an intervention [23].

In summary, the findings validated the belief that the ranking scores produced by the two models investigated were not different to a statistically significant degree. Therefore, the proposal that the results of the two instruments or methodologies are similar is supported. The pertinent statistical results observed in the investigation are presented in summary format in Table 1.1.

Table 1: Statistical findings

Statistic	Data	Result	Significance
Cohen's Kappa chi-square	NMSU rank v. NMNEC rank	k = 0.529	p = 0.000
Wilcoxon signed rank sum	NMNEC accept Y/N vs NMSU accept Y/N	z = -1.365	p = 0.172
McNemar's chi-square	NMSU rank v. NMNEC rank	*not provided by SPSS	p=1.000

## 6. LIMITATIONS OF THE STUDY

Although the sample size is deemed adequately robust to allow confidence in statistical inference owing to the single source of all data from only one institution, care must be taken with broader interpretation. The 10% non-academic portion of the scoring process is considered to be elective on the part of individual participating educational institutions, and incorporation of such considerations would serve to modify specific outcomes not captured in the subject secondary analysis reported. Therefore, leveling of non-academic variables from the proposed NMNEC methodology may introduce a margin of inconsistency in calculation. In the interests of academic freedom and flexibility, participating institutions are afforded the opportunity to best tailor their admissions processes to their regional populations. Adoption of the proposed process criteria by participating agencies therefore should be undertaken with the understanding that customization of non-academic criteria for 10% of the total score could result in differing outcomes.

Furthermore, the applications criteria and selection methodology for the study focused attention on a limited set of data points, and excluded potentially significant demography such as applicant age, maturity level, socio-economic status, and previous educational experience. Any or all of these factors have the potential to impact student success, yet remain outside the domain of the identified inquiry. Future application of the NMNEC criteria allows the opportunity to recognize such potentially significant variables including customization of the 10% institution-specific criteria, which were leveled for the purposes of this study.

## 7. CONCLUSIONS

Results of the secondary analysis support the use of the proposed NMNEC model as an acceptable alternative to the existing admissions process for the selected baccalaureate program at New Mexico State University. The decision to modify currently successful methodologies for applicant selection with a new proposed state-wide model is well affirmed by the findings of the study, in that the proposed methodology produces statistically similar findings within the confines of the data available. The flexibility to tailor the admissions processes to best fit the needs of individual institutions is retained while simultaneously standardizing the admissions criteria for all participating schools of nursing. Endorsement of the NMNEC proposed algorithm should not be anticipated to result in any adverse program outcome findings, as the proposed methodology selects candidates for admission in a manner that correlates highly with current successful student selection methodologies.

Additional investigation is indicated to validate these findings with other institutions of similar size and location. Ongoing opportunity is presented to examine correlation with standardized program exit exams and subsequent NCLEX-RN pass rates for the same students as they progress through the educational system and become members of the nursing profession at large. Furthermore, the findings are highly significant to institutions considering adoption of similar admissions procedures policies. Support is provided for similar consortiums worldwide as standardization of pre-licensure nursing education is considered and investigated.

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